Disability Rights Advocates For Technology

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Testimony of Jerry Kerr

President

Disability Rights Advocates For Technology

before the

United States House of Representatives

Committee on Resources

Subcommittee on National Parks

Oversight Hearing on Disability Access in the National Park System.

May 11, 2006

Mr. Chairman, thank you for the opportunity to appear before your subcommittee at this oversight hearing on disability access in the National Park System.

Disability Rights Advocates For Technology is an advocate for the rights of people with disabilities and a champion of universally designed technology solutions which allow us the opportunity to more fully participate in our society and enhance the quality of our lives.

Today more than 10,000 American citizens turned age 60 a trend that will continue each and every day through the year 2020.

Many are looking forward to a time soon when they will have more resources and opportunities to enjoy our National Parks, Monuments, and Memorials. Unfortunately they are quickly approaching the age group where more than 40% of them may have difficulty walking.

Accessibility for the more than 60 million people in the United States with disabilities and our seniors who have difficulty walking is an issue which all stewards of our federal lands must aggressively pursue.

In 2003 a new assistive mobility device utilizing the principles of universal design was introduced. The Segway is classified by our Federal government as a consumer product, not a motor vehicle. Prior to its introduction the only practical mobility devices available to people with disabilities and those who have difficulty walking required them to be seated in order to operate them.

Now some who have difficulty walking but can stand have a mobility solution available to them which allows them to remain standing. The ability to remain standing for as long as possible has both physical and psychological benefits that are well documented in medical literature. Many disabled individuals have received prescriptions from their doctors for the Segway.

Of the mobility devices on the market today, the Segway is the most versatile and the safest.

Those with disabilities using the Segway include:

Dr. Michael Mayor, a world renowned orthopedic surgeon and an above the knee amputee, uses the Segway while making his rounds visiting hospital rooms at the Dartmouth Hitchcock Medical Center.

Senior Federal Judge James Jarvis, in Knoxville Tennessee ,who has COPD onset by lung cancer, uses his Segway to travel from his courtroom to his office and back allowing him to maintain a more active, mobile and normal schedule.

Brooke Gill a young lady from Dexter Missouri who spent two years in coma after a car accident sustaining a severe spinal cord injury. She completed her education graduating from Southeast Missouri University this past December. The Segway allowed her to thrive at the University even with its very steep hilly terrain.

The Segway is being used by farmers to again walk fence lines and visit their barns and check on livestock when illness or disability had previously foreclosed that possibility.

It is being used by many in their 80s who had given up traveling because of their difficulty walking but now, with assistance of the Segway, have resumed their travels and turned back the clocks of time.

For many people with conditions such as COPD, amputations, spina bifida, multiple sclerosis, Parkinson's disease, spinal cord injuries and many other neurological conditions, the Segway has returned mobility we thought gone forever.

In the three years since its introduction to the general public there are no reports of any substantive injuries being caused to bystanders from those using the Segway. As a matter-of-fact the design of the Segway precludes it from continuing forward once it comes in contact with something and the tires are designed in such a fashion that running over someone's foot or hand causes no injury. The same could not be said about the power wheelchair or scooter.

The Segway weighs a fraction of other mobility devices and its stopping distance in comparison to other mobility devices, in a test by the Federal Highway Administration, was second only to that of a manual wheelchair.

A study done by the Victoria Transport Policy Institute, which compared the safety of the Segway to that of other mobility devices, was presented at the Transportation Research Board's Annual Meeting in January of 2004 in Washington, DC. In assessing the relative safety of the Segway and its risk to others the report suggests the Segway represents a medium risk to others consistent with children playing even when operated at top speeds. Comparatively the report indicates that motor or powered wheelchairs represent a medium to high risk to others, consistent with equestrians (people on horseback).

As the Segway has gained popularity with people who have difficulty walking, many National Park Service Superintendents have exercised good judgment and common sense allowing its use by those who have difficulty walking, but others in the National Park Service have rejected its use by them in even the most urban settings.

A 78-year-old gentleman suffering from COPD was denied access using his Segway HT to the Independence Day celebration at the Jefferson National Expansion Memorial (The St. Louis Gateway Arch) in downtown St. Louis even though the area was trampled by hundreds of thousands of people, trucks, golf carts and other motorized equipment. Superintendent Peggy O'Dell, even after repeated attempts by our organizations to reason with her, and pointing out the provisions in Directors Order #42, denied access to Mr. Bill Williams because the Segway did not meet the definition of a motorized wheelchair. Superintendent O'Dell permitted Fair organizers the use of golf carts in all areas.

59-year-old Judy Hanson of Rockville Utah, who suffers from a spinal cord injury, in an attempt to use her Segway in Zion National Park was told by Superintendent Jock Whitworth that she could not use her Segway anywhere in Zion National Park, not on the roads, not on the sidewalks, not on the wheelchair accessible trails, not anywhere because it was motorized. Superintendent Whitworth advised Ms. Hanson that her use

of the Segway in Zion National Park could result in her being fined and her Segway being confiscated.

On September 23, 2005, Mr. Leonard Timm, a bilateral above the knee amputee, and a founder of DRAFT, was threatened with arrest by the National Park Service while in Washington, DC, using his Segway visiting the Jefferson Memorial.

For almost two years our organization has attempted unsuccessfully on a monthly basis to persuade those within the National Park Services Upper Management to issue guidance clarifying the permitted use of the Segway for those who have difficulty walking.

Common sense and good judgment would dictate that the use of the Segway would be preferable to that of any other mobility device in meeting the National Park Service's objectives.

It is usable in all indoor areas. The tires on the Segway HT generate virtually no shear force, and have less soil compression force than a human footprint. The Segway poses less likelihood of impairing the landscape and environment through soil compaction and rutting than manual wheelchairs or motorized wheelchairs.

Indeed the Segway is less likely to leave evidence of its presence than a pedestrian. It requires no more accommodation than that of a wheelchair, and in most cases less, it is more maneuverable than wheelchairs or scooters and allows its user to participate in the enjoyment of our National Park System in the same manner as everyone else: standing.

The Segway is not a wheelchair. It is an assistive device. The ADA guidance issued by the United States Department of Transportation on September 1, 2005 correctly identified the Segway when used by a person with a disability as a mobility device which is part of a broad class of mobility aids occupying a legal position analogous to canes, walkers, etc...

Many within the National Park Service have been quick to point out that they have no legal mandate under the ADA; however all Federal Agencies must comply with the Section 504 of the 1973 Rehabilitation Act.

The Segway is fully protected as an assistive device as defined by the United States Congress which defined an assistive technology device in "The Rehabilitation Act Amendments of 1973, As Amended" as "any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities."

In the Draft 2006 NPS Management Policies it states:

“A primary principle of accessibility is that, to the highest degree practicable, people with disabilities should be able to participate in the same programs and activities available to everyone else. In choosing among methods for providing accessibility, higher priority will be given to those methods that offer programs and activities in the most integrated setting appropriate”.

The issue of a disabled person who has the ability to stand but has difficulty walking and requires a mobility aid, being forced to sit in either a wheelchair or a scooter is unreasonable and unlawful.

Last fall our organization began our Segs4Vets program donating Segways to members of the United States Military who through service to our country have incurred disability and difficulty walking.

Staff Sergeant Hilbert Caesar of South Ozone Park New York, who lost his right leg as a result of wounds suffered on April 18, 2004 on a road near Baghdad, Corporal Keith Davis of Lumberton Texas, who lost his leg as a result of wounds suffered on August 3, 2005 in Iraq and National Guard Army Specialist Kevin Pannell of Dierks Arkansas who lost both of his legs as result of wounds suffered on June 13, 2004 while patrolling little Fallujah, a rundown insurgency ridden neighborhood in central Baghdad were our first three recipients.

They will be joined this month by United States Marine Corps Corporal Ryan Groves of Charlestown Ohio who lost his left leg in a rocket attack in Fallujah and after 38 surgeries will be discharged from the Amputee Patient Care Center at Walter Reed Hospital to complete his undergraduate studies at Georgetown University, and ultimately attend Law School here in Washington.

We have also donated two Segways to the Amputee Patient Care Center at Walter Reed Hospital that are being used by our soldiers to travel between their quarters in Mologne House and their therapy each day. This month we will donate a Segway to the Physical Therapy Department at the National Naval Medical Center in Bethesda.

Last fall I was contacted by U.S. Army Captain Daniel Gade who was back in Walter Reed Hospital being treated for an infection as result of embedded shrapnel from wounds suffered in battle while serving in Iraq. Wounds which necessitated the amputation of his leg. Until the infection was cleared up Captain Gade was unable to wear his prosthetic leg, but he does use a Segway.

Captain Gade inquired about his legal right to visit the National Mall Memorials and other areas in Washington, DC which were under the control of the National Park Service while using his Segway.

We advised Captain Gade that while we believed he had every legal right to use his Segway as his mobility device we could not guarantee, in light of recent behavior, that the National Park Service would not threaten him with arrest or confiscation of his Segway.

There's no rational explanation for anyone within the National Park Service to deny the use of the Segway by a person with a disability simply because it has a motor. The Segway attains the goal of protection to the environment at the highest level currently available. It is quiet and there is no other means of mobility available today including the wheelchair, scooter, horse, or even the human footprint which will cause less damage to the environment and leave less evidence of its presence than the Segway.

While it seems perplexing that the National Park Service isn't encouraging the use of Segways for all who visit our National Parks and Monuments, it would appear from our conversations with those in the National Park Service that there are many, not only within the National Park Service but also the United States Forest Service, who feel that by allowing the use of Segways by people who have difficulty walking, even though more environmentally friendly, it will permit too many people to visit our National Parks, and other areas under their control.

Attitudinal and policy barriers to accessibility must never be tolerated. This injustice could be corrected immediately through the stroke of a pen, by either the Secretary of the Interior or the Director of the National Park Service, at no cost to our taxpayers.

The Segway represents the beginning of the arrival of new technology devices created utilizing the principles of universal design which will improve the quality of lives for people with disabilities and senior citizens beyond which we ever thought possible.

Through the use of the Segway our Public Lands will be accessible in a more environmentally friendly mode for the enrichment of more people than ever before.

Jerry Kerr

President/Founder

Disability Rights Advocates For Technology

Jerry with his wife Pam

Jerry Kerr together with Leonard Timm, founded **Disability Rights Advocates For Technology**, "DRAFT" a 501 (c) (3) Public Charity dedicated to promoting the increase in access to, provision of, and funding for, assistive technology devices and assistive technology services, in order to empower individuals with disabilities, so they may achieve greater independence, productivity, and integration and inclusion within the community and the workforce.

Both Mr. Kerr and Mr. Timm use a Segway HT in addition to their wheelchairs. They recognized early on the benefits that the Segway HT could provide to those who have difficulty walking. **"For the first time new technology and the principles of universal design have come together to offer us a mobility device for those who can stand but have difficulty walking, which will allow them mobility; standing."** Mr. Kerr is dedicated to exploring the potential that universally designed technology solutions offer the more than 20 million Americans who have difficulty walking, including our senior citizens. In September 2005 Mr. Kerr started DRAFT's Segs4Vets program donating Segways to members of the United States Military whose service to our country has resulted in disability and difficulty walking.

On July 25, 1998 Jerry Kerr's life was suddenly transformed from that of a physically active chief executive officer of a national award-winning home-building and real estate development corporation, avid outdoorsman and pilot; to that of a spastic quadriplegic.

Mr. Kerr was involved in a diving accident shattering his C-4 vertebrae requiring it to be replaced with a cadaver bone. The prognosis was that he would never again move from the neck down. Recognizing that his life would forever be very different, he believed that he could still live a very rewarding and high-quality life, by dedicating his life to the service of those with disabilities.

Determined to maximize his potential for recovery, physical and mental health and life span, Mr. Kerr embarked upon a rigorous physical therapy schedule, four hours a day, six days a week, and sought out every potential advancement in technology which might be beneficial to him. Through this continued regimen, while still neurologically impaired from the neck down, he has regained the ability to stand, and even walk a few paces with the aid of a cane.

Mr. Kerr has devoted his remaining energies to advocating for the rights of individuals with disabilities and as a champion of the benefits that new technologies and universal design can bring to their lives. He has been a featured speaker at No Barriers/Dolomiti 2005 an International Symposium on technology and physical disability in Cortina Italy, The Community Transportation Association of America's National Exposition, and the Alaska Community Transportation Conference, among many others.

DRAFT

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Schedule of Attachments

1. **Disability Rights Advocates For Technology Filed Comments NPS & Forest Service**

   - Comments on NPS draft management policies 2006 dated February 18, 2006.
   - Comments on USDA Forest Service proposed FSORAG & FSTAG dated April 17, 2005.

2. **Disabled Segway Users**

   - Orthopedic Surgeon Michael Mayor, Dartmouth-Hitchcock Medical Center
   - United States District Judge James Jarvis, Knoxville Tennessee
   - Brooke Gill, Dexter Missouri
   - Bill Bartlett, Newport New Hampshire
   - John Hainey, Torrance California
   - Jerry Miller, Palm Harbor Florida
   - Charles Montgomery, Milton Florida
   - Professor Tim Liddy, St. Louis Missouri

3. **Characteristics Of Emerging Road Users and Their Safety-Federal Highway Administration**

4. **Managing Personal Mobility Devices, Victoria Transport Policy Institute**

5. **Letter to Superintendent Peggy O'Dell, Jefferson National Expansion Memorial, July 2, 2004**

6. **U.S. Department of Transportation Disability Law Guidance on "Segways"**

7. **Segway GT Traffic Study (2005) Universities of Arkansas & Tennessee**

8. **Segs4Vets**

   - US Army Staff Sergeant Hilbert Caesar, South Ozone Park New York
   - USMC Corporal Keith Davis, Lumberton Texas
   - US Army National Guard Specialist Kevin Pannell, Dierks Arkansas
   - USMC Corporal Ryan Groves, Charlestown Ohio

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February 18, 2006

Bernard Fagan
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Washington, D.C. 20240

Disability Rights Advocates For Technology represents people with disabilities who are by virtue of new developments in technology and the more widespread use of the principles of universal design finding the opportunity to more fully participate in our society and enhance the quality of their lives.

The National Park System is a national treasure which must be available to every American citizen. Accessibility for the more than 60 million people in the United States with disabilities and the almost 77 million Americans of the baby boomer generation who are quickly approaching the age where as many as 40% of them may have difficulty walking, is an issue which all of the stewards of our federal lands must aggressively pursue.

After reviewing sections of the draft Management Policies of the National Park Service 2006 that relate to accessibility for persons with disabilities, 1.7.2, 7, 8.2.4 and 9.1.2, we are concerned that other than accessibility text having been added to section 1 (1.7.2) and the term "practicable", being inserted in lieu of "reasonable" there is no further guidance or emphasis on accessibility than found in previous Management Policies.

The effect of the term "practicable" will depend upon the definition given it by those making policy, either "being within the limits of ability, capacity or realization" (an improvement in the application of accessibility policy by the National Park Service) or meaning "being what may be done or may occur according to nature, custom, or manners" (an indication of the status quo in terms of accessibility policy by the National Park Service).

We believe that more emphasis and clearer language is necessary with regard to accessibility in the Management Policies in order to curtail the continued misapplication and misunderstanding by the National Park Service regarding the laws protecting the rights of individuals with disabilities in the United States.

In 2003 an assistive mobility device designed utilizing the principles of universal design was introduced. It is classified by Federal government as a consumer product, not a motor vehicle. The Segway is a self-balancing, nontandem, two wheeled device. Prior to its introduction the only practical mobility devices available to people with disabilities and those who have difficulty walking required them to be seated in order to operate them. Now some who can no longer walk but can stand have a solution available to them for their mobility while allowing them to remain standing. The ability to remain standing for as long

as possible has both physical and psychological benefits that are well documented in medical literature. Many disabled individuals have received prescriptions from their doctors for the Segway HT.

One of the primary tenets of disability rights requirements is that to the highest degree reasonable people with disability should be able to participate in the same programs and activities available to everyone else in the most integrated setting possible. In the case of a disable person who has the ability to stand but has difficulty walking and requires a mobility aid, being forced to sit in either a wheelchair or a scooter is unreasonable and unlawful.

The Segway HT is fully protected as an assistive mobility device as defined by the United States Congress. It is usable in all indoor areas. The tires on the Segway HT generate virtually no shear force, and have less soil compression force than a human footprint. The Segway HT poses less likelihood of impairing the landscape and environment through soil compaction and rutting than manual wheelchairs or motorized wheelchairs.

Indeed the Segway HT is less likely to leave evidence of its presence than a pedestrian. It requires no more accommodation than that of a wheelchair, and in most cases less, it is more maneuverable than wheelchairs or scooters and allows its user to participate in the enjoyment of our National Park System in the same manner as everyone else: standing.

As the Segway has gained popularity with people who have difficulty walking, many in the National Park Service have rejected its use by them. They have misused provisions of the Wilderness Act restricting motorized equipment (not applicable to people with disabilities) rejecting the use of Segways by people with disabilities in even the most urban settings.

A 78-year-old gentleman suffering from COPD was denied access using his Segway HT to the Independence Day celebration at the Jefferson National Expansion Memorial (The St. Louis Gateway Arch) in downtown St. Louis even though the area was trampled by hundreds of thousands of people, trucks, golf carts and other motorized equipment. Superintendent Peggy O'Dell, even after repeated attempts by our organizations to reason with her, and pointing out the provisions in Directors Order #42, denied access to Mr. Bill Williams because the Segway did not meet the definition of a motorized wheelchair. Superintendent O'Dell permitted Fair organizers use of golf carts in all areas.

59-year-old Judy Hanson of Rockville Utah who suffers from a spinal cord injury in an attempt to use her Segway in Zion National Park was told by Superintendent Jock Whitworth that she could not use her Segway anywhere in Zion National Park, not on the roads, not on the sidewalks, not on the wheelchair accessible trails, not anywhere because it was motorized. Superintendent Whitworth advised Ms. Hanson that her use of the Segway in Zion National Park could result in her being fined and her Segway being confiscated.

On September 23, 2005, Mr. Leonard Timm, a bilateral above the knee amputee, and a founder of DRAFT, was threatened with arrest by the National Park Service while in Washington, DC, using his Segway visiting the Jefferson Memorial.

The Segway is not a wheelchair. It is an assistive device. The ADA guidance issued by the United States Department of Transportation on September 1, 2005 correctly identified the Segway when used by a person with a disability as a mobility device which is part of a broad class of mobility aids occupying a legal position analogous to canes, walkers, etc...

The United States Congress defined an assistive technology device in "The Rehabilitation Act Amendments of 1973, As Amended" as "any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities."

There are two issues which must be addressed with regard to accessibility by people with disabilities who use the Segway HT for mobility. Access to "Wilderness Areas" as defined by the United States Congress in the "Wilderness Act", and access to the remaining portions of the National Park System not contained within those areas covered under the "Wilderness Act".

The conclusions reached should be identical, even though the rationale for the conclusions is different:

While the Segway is not a motor vehicle, it does have a motor. However, there is no prohibition of the use of motorized devices inside the National Park System. There's no rational explanation for anyone within the National Park Service to deny the use of the Segway by a person with a disability simply because it has a motor. The Segway attains the goal of protection to the environment at the highest level currently available. It is quiet and there is no other means of mobility available today including the wheelchair, scooter, horse, or even the human footprint which will cause less damage to the environment and leave less evidence of its presence than the Segway HT.

The issue with regard to access to the Wilderness Areas by those with disability seeking to use the Segway HT as their mobility device was addressed by "The Rehabilitation Act of 1973, Section 504". Obviously the motorized wheelchair poses much more potential for damage to the environment than any other mobility device. The United States Congress in 1990 in Section 507 of the Americans with Disabilities Act reaffirmed their position "that nothing in the "Wilderness Act" was to be construed as prohibiting the use of a wheelchair in a wilderness area by an individual with a disability".

It is inconsistent and incorrect to believe that because the Segway is not a wheelchair but rather an assistive device that its use is not also protected by section 504 of The Rehabilitation Act of 1973. Any assistive device used by a mobility impaired person that would cause no greater impairment to the land and the environment than a motorized wheelchair would be permissible under the law. It is nonsensical to believe that access to the wilderness areas by a person with disabilities would be permissible atop a 2000 pound horse and not be permissible atop an 84 pound Segway simply because it had a motor.

To further complicate attempts by National Park Service employees to use common sense and good judgment, tools provided for their use such as the Wilderness Access Decision Tool are outmoded, arcane, inconsistent, and incorrect under the law.

For instance on page 6 of the Wilderness Access Decision Tool under section B. Assistive Devices, it states: **section 507 of the ADA specifically allows the use of wheelchairs provided that the wheelchair meets the definition (the key definitions).**

This is factually incorrect, The Rehabilitation Act of 1973 protected the use of wheelchairs by people with disabilities as well as other assistive devices, section 507 of the ADA was simply Congress reaffirming to the National Park Service and the other stewards of Wilderness Areas that access by those using wheelchairs must be permitted.

While the Segway is not a wheelchair but rather an assistive device which is suitable for indoor pedestrian use, National Park Service representatives continually through confusion attempt to apply the definition of a wheelchair.

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On page 7 under 3) If the piece of equipment is an accommodation for maintenance of basic life functions, such as a respirator or an assistive speech device, is prescribed by a physician and designed solely for use by a person with a disability?

There is no requirement under any law that for an assistive device to be protected it must be prescribed by a physician or that it (other than a wheelchair) is designed solely for use by a person with a disability. Moreover there is no requirement under any federal law for a person with a disability to have to produce such a prescription to an authority.

In the case studies there are numerous examples, recommended decisions, and explanation of those decisions.

Case study 2 examines the issue of an Amigo battery powered cart.

While the recommended action is to approve its use, the explanation of that decision is flawed. The term "disabled" has a specific legal definition under federal law; the Amigo was designed for all people who have difficulty walking, not solely for those meeting the definition of disabled under federal law. And there is no prescription necessary for its acquisition. Further, the recommended alternative was that the individual consider the use of a horse as opposed to the Amigo for access to the wilderness areas. While the horse is an interesting alternative, it would pose a higher degree of impact on the wilderness area than the use of the Segway.

We would ask the National Park Service to expand and elaborate on the sections of the Management Policies of 2006 that address accessibility for people with disabilities, so that those within the service have a clear understanding and mandate as a basis for exercising professional judgment.

The Segway represents the beginning of the arrival of new technology devices created utilizing the principles of universal design which will improve the quality of lives for people with disabilities and senior citizens beyond which we ever thought possible. These new technologies must be embraced by those within the National Park Service and encouraged to flourish. Through the use of devices such as the Segway our National Parks and Wilderness Areas will be accessible to more people than ever before and accessible in a more environmentally friendly mode than ever before.

It is perplexing that the National Park Service isn't encouraging the use of Segways for all that visit our National Parks and Monuments but they must take steps to allow its use by people who have difficulty walking in all of our Parks, even those where the Superintendents have not exhibited a willingness to embrace the future. Our laws require it and our citizens demand it.

Sincerely,

Jerry Kerr

Jerry Kerr
President/Founder

Attachments: USDA Forest Service Comments
University Arkansas & Tennessee Study

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DISABILITY RIGHTS ADVOCATES FOR TECHNOLOGY
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April 17, 2005

USDA Forest Service,
Attn: Director, Recreation and Heritage Resources Staff
Mail Stop 1125
1400 Independence Avenue, S.W.
Washington, D.C. 20250-0003

Disability Rights Advocates For Technology, DRAFT, represents people with disabilities who are, by virtue of new developments in technology and more widespread use of the principles of universal design finding the opportunity to more fully participate in our society and enhance the quality of their lives. Access to "Wilderness Areas" and other areas under the management of the Forest Service, or the National Park Service are treasured opportunities to be enjoyed by every American citizen, including those with disabilities. The USDA Forest Service acknowledges the need for a commitment to a policy of universal design which will ensure the integration of all people in programs and facilities without segregation.

The stated regulations and guidance in the proposed **Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG) and the Forest Service Trails Accessibility Guidelines (FSTAG)** however contain definitions of a wheelchair or mobility aid which do not comply with section 504 of the Rehabilitation Act of 1973 as amended in 1998. This Act defines a protected assistive device as ***"any item, piece of equipment, or product system, whether acquired commercially, modified, or customized that is used to increase, maintain, or improve functional capabilities of individuals with disabilities."***

In 2003 an assistive mobility device designed utilizing the principles of universal design was introduced. Classified as a consumer product, it is a self-balancing, nontandem two wheeled device. The Segway HT. Prior to its introduction the only practical mobility devices available to people with disabilities required them to be seated in order to operate them. With its introduction people who could no longer walk, but could stand found a device which would solve many of their mobility problems while allowing them to remain standing. The ability to remain standing for as long as possible has both physical and psychological benefits that are well-documented in medical literature. Many disabled individuals have received prescriptions from their doctors for the Segway HT.

One of the primary tenet's of disability rights requirements is that, to the highest degree reasonable, people with disabilities should be able to participate in the same programs and activities available to everyone else in the most integrated setting possible. In the case of a disabled person who has the ability to stand but has difficulty walking and requires a mobility aid, being forced to sit in either a wheelchair or a scooter is unreasonable and unlawful.

The Segway HT is fully protected as an assistive mobility device as defined by the United States Congress. It is usable in all indoor areas. The tires on the Segway HT generate no shear force and have

less soil compression force than a human footprint. The Segway HT poses less likelihood of impairing the landscape and environment through soil compaction and rutting than manual wheelchairs or motorized wheelchairs.

Indeed the Segway HT is less likely to leave evidence of its presence than a pedestrian. It requires no more accommodation than that of a wheelchair, and in most cases less, it is more maneuverable than wheelchairs or scooters and allows its user to participate in the enjoyment of our National Wilderness Areas and National Parks in the same manner as everyone else; standing.

The USDA Forest Service, the National Park Service, and the Access Board should take immediate steps to bring their policies, regulations and guidance into accordance with the laws passed by the United States Congress.

HISTORY

Wilderness Act

In 1964 the United States Congress passed the "Wilderness Act" seeking to preserve for the enjoyment of present and future generations the benefits of an enduring resource of wilderness. These wilderness areas were to be administered for the use and enjoyment of the American people so that they were left unimpaired for future use and enjoyment as wilderness. It was intended that these areas which were untrammeled by man, after being visited by man would exhibit as little evidence as possible that the visit had ever occurred. ***Only the United States Congress can designate federal lands for protection under the "National Wilderness Preservation System".***

The "Wilderness Act" did not make allowances for exceptions from the Act's prohibition of the use of motorized equipment when used by people with disabilities for mobility. In 1964 many people with disabilities who required wheelchairs, either manual or motorized were often confined to their homes because of the lack of accessibility in their community. There were no curb cuts making streets and sidewalks accessible, there were few level entries or ramps which would make buildings both governmental and commercial accessible. All but the most adventurous individuals with disabilities needed an attendant, a friend or family member to help them navigate the hostile environment which awaited them outside their home. There was little reason or opportunity to visit wilderness areas when they were unable to participate in society within their own neighborhoods.

Architectural Barriers Act

Beginning in 1965 an increasing awareness regarding the barriers of accessibility facing people with disabilities in the United States prompted the passage of the 1968 Architectural Barriers Act, aimed at making federal facilities fully accessible to people with disabilities and hoping to set an example for state, local governments and private industry.

The Rehabilitation Act of 1973

In 1973 the United States Congress finding that people with disabilities constituted one of the most disadvantaged groups in society passed "The Rehabilitation Act of 1973" promising that people with disabilities would enjoy full inclusion and integration in the economic, political, social, cultural, and educational mainstream of American society and to help them achieve equality of opportunity, wherever and whenever possible. Section 502 of this law created the Architectural and Transportation Barriers Compliance Board (Access Board) charged with ensuring federal agency compliance with the ABA and proposing solutions to the environmental barrier problems addressed in the ABA.

Forest Service & National Park Service

With the United States becoming more accessible people with disabilities were increasingly attempting to participate in society more fully. They were visiting national parks and wilderness areas in increasing numbers however in the 1980s some with disabilities were attempting to use fossil fuel powered six wheeled ATVs and other motor vehicles as mobility aids. Because of the lasting damage these devices could cause, and pollution concerns of the internal combustion engines, the USDA Forest Service & National Park Service, developed a definition for a wheelchair which would be permitted for use by mobility impaired persons in wilderness areas. They defined a wheelchair as ***"a device which is designed solely for and used by mobility impaired person for locomotion that is capable of and suitable for use in indoor pedestrian areas."*** Any device which was not suitable for use indoors would be considered a motor vehicle and therefore excluded from use within the NWPS.

It was stated ***"A key concept here is that the NPS treats people who use wheelchairs as pedestrians--not as operators of motor vehicles. As stated in 36CFR 1.2 (3)(e) "The regulations in this chapter are intended to treat a mobility-impaired person using a manual or motorized wheelchair as a pedestrian, and are not intended to restrict the activities of such a person beyond the degree that the activities of a pedestrian are restricted by the same regulations." The use of All Terrain Vehicles (ATVS) and other devices that would not be allowed in elevators, of public buildings and private homes are not allowed in the NWPS."***

Americans with Disabilities Act

In 1990 Congress passed the Americans with Disability Act and in section 507 (c) (1) of the ADA, Congress reaffirmed that nothing in the Wilderness Act was to be construed as prohibiting the use of a wheelchair in a wilderness area by an individual whose disability requires use of a wheelchair. Congress **only** for the purposes of this affirmation further described a wheelchair as ***"a device designed solely for use by a mobility impaired person for locomotion that is suitable for use in an indoor pedestrian area."*** The presumption that when Congress affirmed in Section 507 of the ADA "that nothing in the "Wilderness Act" was to be construed as prohibiting the use of a wheelchair in a wilderness area by an individual with disabilities" that they meant only a wheelchair is inconsistent and incorrect. ***Any assistive device used by a mobility impaired person that would cause no greater impairment to the land and the environment than a motorized wheelchair would be permissible under the law.***

Access Board

On September 6, 1991, the Access Board published ADAAG for Transportation Facilities, which was identical to the earlier ADAAG except that it contained an additional chapter (Section 10) covering transportation facilities, including bus shelters and stations, rail stations, and airports. The Board also published on the same day ADAAG for Transportation Vehicles as a separate document. It covers buses and vans, rapid rail vehicles, light rail vehicles, commuter rail cars, intercity rail cars, automated guideway transit vehicles, high-speed rail cars, monorails and trams and similar vehicles. The Department of Transportation adopted the guidelines for transportation facilities and vehicles as enforceable standards in its ADA regulations.

In developing the minimum accessibility guidelines utilized in the ADAAG for Transportation Vehicles the Access Board relied upon a report prepared for them titled "**Securement of Wheelchairs and Other Mobility Aids on Transit Vehicles**" the report presented in September of 1990 utilized data and information received from the Southern California Rapid Transit District (SCRTD) who in August of 1987 utilized an analytical approach to assess the needs and establish policies to determine what types of wheelchairs could be safely accommodated on their buses. They tested 14 different wheelchair and

mobility aid devices on six different lift/bus types. The criteria that was measured was 1. Length of the wheelchair compared to the lift 2. Maneuverability on the lift and in the buses 3. Securement on the lift 4. Securement in the travel area

Of the 14 different wheelchair and mobility aid devices all had either three or four wheels. This is notable because in 1987 there were no mobility aids or wheelchairs produced which contained other than three or four wheels.

Based upon this study the access board developed a definition of a common wheelchair and mobility aid to allow for a standard to be used allowing for the development and deployment of lifts, ramps and securement areas in transportation vehicles.

"Common wheelchairs and mobility aids means belonging to a class of three or four wheeled devices, usable indoors, designed for and used by persons with mobility impairments which do not exceed 30 inches in width and 48 inches in length, measured 2 inches above the ground, and do not weigh more than 600 pounds when occupied."

The action of the Access Board is noteworthy because they only attempt to define a "common wheelchair or mobility aid" in the ADAAG for Transportation Vehicles, to be used as a standard for the development lifts, ramps and securement areas. In the definition, the only reason the number of wheels is identified is because those were the number of wheels that existed on the tested wheelchairs and aids in the 1987 study. The number of wheels is irrelevant when utilizing the criteria of measurement in the 1987 study. There is no reference or attempt to define "common wheelchairs or mobility aids" in the ADAAG.

Assistive Technology Act of 1998

In 1998 United States Congress recognizing the importance of universal design and assistive technology to people with disabilities and the economic impact to the country passed the "Assistive Technology Act of 1998". In this act they defined Assistive Technology as technology designed to be utilized in assistive technology devices or assistive technology services. An assistive technology device was defined as ***"any item piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities."***

The Rehabilitation Act Amendments of 1973, As Amended

In 1998 United States Congress passed "The Rehabilitation Act Amendments of 1973, as amended" in that Act the term ***"assistive technology device" was defined as having the meaning given such term in section 3 of the assistive technology act of 1998 except that the reference in such section to the term "individuals with disabilities" shall be deemed to mean more than one individual with a disability as defined in paragraph (20) (A).***

Accessibility

The need to provide accessibility for people with disabilities to areas managed by the Forest Service and the National Park Service, including areas contained within the protections of the NWPS is undisputed provided this accessibility can be accomplished without impairing the lands within a wilderness area to facilitate this access. This distinction however is unique to those lands designated as wilderness areas by the United States Congress.

The USDA Forest Service in its "Wilderness Access Decision Tool" speaks to the need of its Federal Wilderness Managers to use common sense and good judgment regarding access to areas within the NWPS by people with disabilities. The criteria suggested to be considered for a decision are:

1. Determine if the person making the request has a disability as defined by the Americans with Disability Act

2. Determine if the request reflects a need directly related to that disability and the person subsequent ability to safely utilize the National Wilderness Preservation System (NWPS), or if it is strictly a matter of convenience and comfort.
3. Determine if granting the request to will have a tangible in effect on the wilderness. No law encourages negative impacts on the NWPS.
4. Determine if there are other means of meeting the request which have less impact on the wilderness resource.

The use of the Segway HT when used by a qualified person with a disability satisfies these criteria more favorably than a wheelchair or any other mobility device. It would be difficult however for the Federal Wilderness Managers to use common sense and good judgment when constrained by a definition which is not lawful.

The National Park Service in its document titled "Management Policies regarding Accessibility for Disabled Persons", under the section titled wilderness preservation Management, stated that ***"as a general rule, public use of motorized equipment or any form of mechanical transport will be prohibited in wilderness areas... mobility impaired persons may use wheelchairs (as defined in 36 C.F.R. 1.4) in wilderness."*** The National Park Service in January 1990 defined a wheelchair as that ***"propelled by human power or a self-propelled wheelchair device, designed solely for and used by a mobility impaired person for locomotion that is capable and suitable for use an indoor pedestrian areas"*** this regulation (while flawed, scooters not designed solely for mobility impaired persons have been afforded the same protections) may have been workable in 1990, but today it is completely unsuitable and unworkable for implementing the laws and protections afforded people with disabilities under the ADA and the 1973 Rehabilitation Act as amended in 1998.

To further complicate matters some within the National Park Service and the USDA Forest Service have incorrectly chosen to apply the unique distinction created by Congress specifically for areas contained within the NWPS, to all lands under their jurisdiction and management. ***The United States Congress when passing the ADA specifically addressed the definition of the "wheelchair" as having application solely for the purposes of access to "Wilderness Areas".***

In a document titled "Policies on Accessibility to Specific National Park Functions" the NPS comments on accessibility for disabled persons in park facilities: ***In accordance with the mandates of the Architectural Barriers Acts of 1968 and section 504 of the Rehabilitation Act of 1973 as amended in 1978, it is the policy of the National Park Service to provide the highest level of accessibility in all visitor and management buildings and facilities as is possible and feasible, consistent with the nature of the area and facility. The degree of accessibility provided will be proportionately related to the degree of man-made modifications made to the area or facility and to the significance of the facility.***

Defining Assistive Devices

One of the dangers of definitions are that they may be imprecise with ever-growing changes in technology, indeed in 1991 Attorney General Richard Thornburgh in publishing the first regulations implementing the ADA consistently said that "***there would be no exhaustive list of devices and services protected under the ADA because any attempt to do so would omit the new devices that would become available with emerging technology."***

Just as a carpenter when building a home who sets an angle slightly out of square, while this mistake is almost imperceptible at its point of origin, as the two walls extend away from that point the inaccuracy becomes glaring. Those agencies, including the USDA Forest Service, the National Park Service, and even the Access Board in the development of minimum guidelines used in the ADAAG for Transportation Vehicles; have crafted a definition in the early 1990s of a common wheelchair or mobility aid which no longer has relevance or accuracy in the real world for the implementation of the law.

DRAFT recognizes and supports the efforts to provide protections to lands contained within the National Wilderness Preservation System and to all lands under the management of the Forest Service, National Park Service, U.S. Fish and Wildlife Service, and the Bureau of Land Management. We support the prohibition of the use of internal combustion engines in areas where they would have a negative impact on the environment. DRAFT also encourages the use of common sense and good judgment when making decisions regarding accessibility.

The Segway HT when used by a qualified person with a disability attains the goal of protections to the environment at the highest level currently available. There is no other means of mobility available today including the wheelchair, scooter, horse, or even the human footprint which will cause less damage to the environment and leave less evidence of its presence than the Segway HT. Its use by a qualified person with a disability is fully protected under the laws passed by the United States Congress.

In 1998 the United States Congress clarified and codified the definition of an assistive device in the amendments to The Rehabilitation Act of 1973, when they defined an assistive technology device as ***"any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities."***

Those agencies charged with implementing regulations to enforce the laws providing protections to people with disabilities must implement changes in existing regulations, policy and guidance in order to comply with the law.

Sincerely,

Jerry Kerr
Jerry Kerr
Founder

Leonard Timm
Leonard Timm
Founder

C: Kay Ellis, Bureau of Land Management
David Park, National Park Service
Connie Lanahan, U.S. Fish and Wildlife Service
Janet Zeller, USDA Forest Service

DARTMOUTH MEDICINE
A Magazine for Alumni and Friends of Dartmouth Medical School and Dartmouth-Hitchcock Medical Center

Vital Signs:
Orthopaedic surgeon Michael Mayor finds that his Segway is just what the doctor ordered

Michael Mayor-future orthopaedic surgeon and bioengineer-was a junior at Deerfield Academy when he was diagnosed with a rare malignancy in his right femur. Efforts at treatment failed. In the winter of his senior year, his leg was amputated above the knee. A few months later, with a prosthesis "that was functional, but never really comfortable," he was off to college and then medical school.

Over the years, Mayor, a longtime professor of surgery at Dartmouth, pushed both legs to their limits with an active lifestyle-skiing, playing tennis, cycling, and even climbing trees to perform arboreal surgery. Eventually, he tore the cartilage in his good knee. Arthroscopic surgery helped, but the joint kept deteriorating. It was time for knee-replacement surgery.

A world-renowned expert at improving as well as implanting replacement joints, Mayor was slated to get one of the cutting-edge polymer implants that he had spent so many years helping to design. Dr. Thomas Shirreffs, a Dartmouth colleague, would perform the surgery. He had, of course, done many such operations during his career, but never on such a patient. Probably no one in the world is better qualified than Mayor to critique that kind of surgery or device. But to Shirreffs's great relief, Mayor pronounced himself eminently satisfied.

But Mayor's schedule requires him to cover vast distances within DHMC, and he didn't want to wear out the new joint. He started looking at alternatives to walking. He first tried the sleek Razor, a machine that did for scooters what in-lines did for roller skates. Razor makes a nifty self-propelled model, which worked well . . . until the batteries proved to be unreliable.

But the Razor was a segue in more ways than one. While it was still running, Mayor was stopped one day by a patient whose husband works for Dean Kamen, a New Hampshire engineer who invented a "human transporter" called the Segway. Mayor was smitten. It not only worked like a charm indoors, it could even negotiate ice and snow outdoors in the winter.

The DHMC mall is a busy place-bustling with wheelchairs, patients pulling IV poles, and small children darting about. But Mayor negotiates them all with aplomb. He's now back on track, doing all the things he loves to.

Photo by Mark Austin-Washburn

This is a common sight on the DHMC mall, as orthopaedic surgeon Mike Mayor glides from place to place on his Segway "human transporter."

A Visit With Judge Jarvis

By Leonard Timm

It's another typical day for Senior Federal Judge James Jarvis as he departs for lunch from the beautiful red brick Howard H. Baker Federal Courthouse in downtown Knoxville Tennessee. Judge Jarvis however, like so many others who have difficulty walking long distances due to gate or stamina related disabilities, will be using a Segway HT to make the trip.

Judge Jarvis who was appointed to the United States District Court by President Ronald Reagan in 1984 has been diagnosed with COPD onset by lung cancer but continues to maintain an active lifestyle with the help of the Segway. “I’m a little short winded, I’ve got lung cancer and it gives me a lot more mobility than I ever had before.” He said.

According to Judge Jarvis he first discovered the Segway when “I read about them first time in the Wall Street Journal and then I saw them on television. I was immediately intrigued with it, I said I’m gonna get me one of those. Then I found out how much they were, about five thousand dollars and I said well that’s too expensive for me right now! I don’t see any need for it!”

With his COPD progressing he began to experience difficulty traversing the long streets that he walked every day. He no longer considered the Segway too expensive.

“When I became disabled, I said I’m going to go buy one, now I can justify it! It’s not a life necessity. I could have my lunch brought in to me and stay inside and never go out or do anything like that, but it’s a necessity to lead an active life.”

For Jarvis, the Segway has given him the ability to maintain a more active, mobile, and normal schedule:

“I got it in October last year (2005) about 7 months ago. Before I started using the Segway I had gotten to the point where sometimes I would be out walking and have to stop and rest on the street.”

Jarvis uses his Segway every day to travel from his courtroom to his office and back.

“It’s a circuitous route and it’s all inside this big complex we have here. I’ll also use it to go to lunch, or go get a haircut, or whatever, all in downtown Knoxville. My friends can walk and talk with me as we go along”, he explained.

Judge Jarvis points out to those unfamiliar with the Segway who don’t understand how it works, find it intimidating or think it’s difficult to operate, that to know the Segway is to love it.

“I just ease along on it…You get better with it as you use it. You can go any speed you want to and it’s almost unconscious you get a feel for it like its part of you and its so fun.”

So if you’re asking; what has the Segway HT done for Judge Jarvis?

“It made life better, a lot better. It’s fun to ride, it even gives me a certain amount of exercise, and it gives me mobility most importantly. It has expanded the areas that I can get around, that’s for sure.”

Case closed.

KFVS upn the beat

Cape Girardeau, MO
Graduation Extra Special for Dexter Girl
Dec 18, 2005, 09:26 PM CST

Graduation Extra Special for Dexter Girl

By: Holly Brantley

CAPE GIRARDEAU, MO --A Dexter family says watching their daughter receive her diploma today was nothing short of a miracle.

That's because Brooke Gill is lucky to be alive.

Brooke grinned from ear to ear throughout graduation ceremonies at Southeast Missouri State University.

To look at her, it's hard to believe that Brooke spent two months in a coma after a car accident nearly took her life. Brooke was barley sixteen.

"I just missed this curve," said Brooke. "The van I was driving turned upside down in the ditch. But, there were these guardian angels behind me.

Brooke's Mother, Janice Gill explains, "A young couple was following her. They stopped and a lady crawled under the van to get to Brooke. Both of them stayed with Brooke, and called for help."

Ever since that day, Brooke has been fighting her way back.

She was home-schooled her junior year of high school. But she returned to Dexter High School to Graduate with her class in 1998.

With the help of her segway, a two wheeled machine, Brooke has thrived in college.

“It was her strong ‘Gill Will’ that brough her around,” said Janice. “She has worked very hard.”

In fact, Brooke’s mother says she doesn’t let anything stand in her way. She’s even conquered the incline SEMO students know as ‘Cardiac Hill’.

“On the segway, I’d take it up Cardiac Hill and they’d be like, ‘Dang, look at that girl. She’s going up Cardiac Hill.’ Then they’d say, ’Just do not go down.’ But, I’d go down the hill and it would be all good,” Brooke said.

Brooke earned a degree in social work. Brooke says she wants to help others because she knows what its like to depend on people.

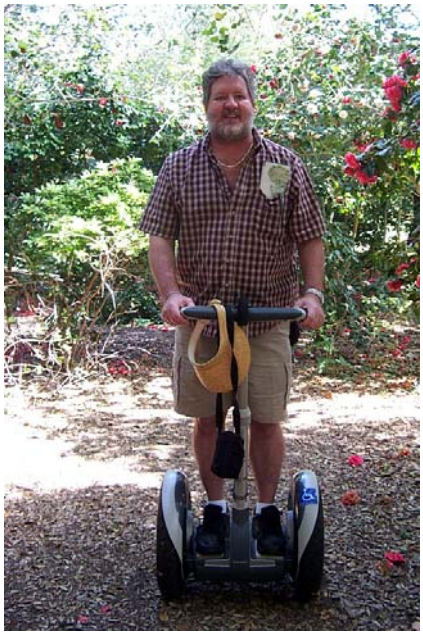
“I want to give back to the community because they’ve give so much to me,” said Brooke.

And with motivation like hers, graduation from college is another sign of many great things to come.

The Gill’s have stayed in touch with the couple who helped Brooke the day of her accident.

John Hainey

Computer Tech. (disabled)
Torrance, LA, CA



I am 50 years old and disabled. I have a damaged sciatic nerve and was in pain 24/7 beginning 10/95. I have a spinal cord stimulator and a morphine pump. I can only walk 91 steps and then I MUST stop and wait for the nerve to "cool" down before I can go on.

I was in therapy and seeing a shrink for suicidal tendencies, I can't do much walking that doesn't cause me great pain. That meant no swap meets, no garden walks, no strolls through the park or zoo with my grandchildren and no walks along the beach with my wife. Even grocery shopping or the Home Depot left me in excruciating pain. Then I heard about the Segway! Then I tried the Segway!! Then I bought my Seggy on the spot!!!

Segway SAVED MY LIFE, LITERALLY!!!!!

Do you understand? I can now go out and see the world. I can't do a lot right now but I've been to the beach, riding the Strand that I haven't been able to get to for 5 years. To be able to smell the ocean spray! WONDERFUL!!

I've been able to go to the Desconso Gardens, in Los Angeles. I've gone to our local Botanical Gardens that I haven't seen in 5 years. To smell the flowers! I've even ridden three miles to my State Farm agent to get insurance. I CAN GET OUT!!! This is great!

I made a box, I call HT2, Human Transporter transporter, with friends help which I load Seggy into, and I go! It is wonderful! I have put handicapped stickers on the fenders of Seggy. They have helped keep down the "Toy" type questions I got before the stickers. People ask if Seggy has helped with my disability and I just about burst into tears with a most emphatic YES!

Seggy has definitely changed my life for the better. Thank you Dean!!!!!

John

Jerry Miller

54 Years old
Indiana State Trooper (Retired/Disabled)
Palm Harbor, Florida

"Like a fresh ocean breeze."

My Segway HT was purchased as an alternative to a motorized wheelchair to assist in my loss of mobility (ability to walk unassisted) due to advancing Parkinson's disease.
My experience with the Segway HT has been an overwhelmingly positive one. There has been a rebirth of my life! The Segway HT has lifted the depression of knowing my loss of mobility would soon make me totally unable to get around without great burden on those around me. Shopping trips with my family to the mall, antique shops, flea markets, etc. (especially around Christmas) would soon be limited. All signs were pointing to a cloud of darkness over my life.

Instead of looks of negative wonder or pity on my outings, I now am constantly approached with anxious looks of curiosity regarding the mechanical marvel of motion that transports me! "Cool!" "That's the first one of those that I've seen except on TV!" "How far can you go on a battery charge?" (I usually say about 25 questions per mile... As an icebreaker.) "Does it work as well as they say?" "Where can I buy one?" "Has it helped you with your Parkinson's like you had hoped?" "Man, that's really techno!" These are some of the more common statements I hear. I have yet to get any negative feedback from anyone, including shop owners, law enforcement, or pedestrians.

A day on the Segway HT is like a fresh ocean breeze. It is refreshing and pleasant and I know that the overwhelming burden on those with me has been lifted which makes every day a new one to look forward to.

I usually tell a person that, depending on their situation, the Segway HT fits a niche in life. For me, it has helped with my disability; for others, it will give an alternative to commuting or just short trips to the corner store. If I can navigate with my tremors and balance problem, most any other person would be able to use a Segway HT after the training session. So go for it, or put another way, "Try it, you'll like it!"

How do I spell relief?
S-E-G-W-A-Y

Mobility

Charles Montgomery

"A personal story"

By Wallace L. Johnston, Ed.D

Charles, A supervisory assistant (Finishing Associates) with 30 years employment in a building products manufacturing facility is responsible for work scheduling for all employees in the manufacturing departments of the plant. The facility, located on ten acres of land has numerous buildings - offices, manufacturing, warehousing and support activities which often require Charles to travel 5-10 miles per day.

Until recently, Charles used a bicycle to locate individual employees to confirm availability of workers for overtime. Due to the nature of worker assignments, those eligible for overtime might be found at any one of several locations throughout the plant and must be "sought out" to confirm availability. He must often seek out 25 or more employees in various areas of the plant in less than an hour so as to confirm the availability of workers to stay over on a shift that day.

Another recurring assignment is to do bi-weekly shop, warehouse and storage inventories of raw materials to be used in manufacturing. Because of the physical layout of the plant, raw materials may be stored in several of many locations, often separated throughout the ten acres. About half of the materials are outside in various locations and the remainder are scattered across various departments and storage buildings over the 10 acres.

Charles had been dealing with the effects of early diagnosed Parkinson's which became increasingly more pronounced affecting balance and mobility. A year ago Charles was no longer able to ride his bicycle due to the combined effects of fatigue and balance. He was prevented from walking or riding his bike the 5-10 miles per day which his job required and an electric cart or other conventional vehicle was too large to negotiate the ramps and aisles in the plant.

To use such a vehicle meant riding part way to the destination, dismounting and walking laboriously and painfully 20-30 yards to an individual and retracing his steps to the vehicle to seek out the next person.

Given the progressive nature of Parkinson's, his choices appeared to be to either be forced into early, (four years before full vesting) disability retirement which would provide him less than half of his annual income. OR to find some form of mobility assistance which would allow him to keep his job.

His research led him to seek a demonstration of the SEGWAY HT, an electrically powered, self balancing mobility assistive device. "I knew from the first time I got on the

SEGWAY that this was the answer to my personal problem."

Charles went to his HR manager and proposed that he buy his own Segway, receive the mandatory training from SEGWAY and meet the company requirements for safe operation in the plant. A "risk analysis" was done to consider the safety and potential for accident to the rider/owner; other workers; and the plant property itself.

After careful analysis, Charles equipped his SEGWAY with a battery powered "flashing strobe lights and a loud horn". Charles wears a Hard Hat in the plant and is considered by OSHA to be in the same category as a fork lift.

"The SEGWAY literally saved my job," Charles stated. "I can now do as much or more than I could in years past. I am safer on the SEGWAY than I was on a bicycle. Forklift operators sometime don't see those things. With my flashing strobe lights they know where I am. Because I am 8" above floor level, I can see things in the plant which I could not before - either while walking or on a bicycle."

"The $5300.00 purchase price of the SEGWAY was one of the best decisions I ever made." The willingness and foresight of the plant management to allow the use of this device benefits the company by retaining the knowledge and experience of a 30 year employee who was enabled to continue his employment in a key position.

Thanks Mr. Johnston for talking with me about my job and my Segway. Maybe this will help other people with some other mobility problems keep there job's and live a more productive life. Like the state of Florida states "*The Segway is A PERSONAL MOBILITY ASSISTIVE DEVICE "....Charles Montgomery*

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ST. LOUIS POST-DISPATCH

IT's so cool, the owners' club is still small

By Jeff Daniel
Of the Post-Dispatch
11/15/2004

Tim Liddy zips by Ellsworth Kelly's "Spectrum II" at the St. Louis Art Museum, where he brought his American art history class. (*Kevin Manning*/P-D)

How perfect that Mike McWilliams is an IT guy. That's IT as in Information Technology, the computer related craft that this downtown St. Louis resident practices each workday at A.G. Edwards.

Why is that perfect? Because McWilliams is another kind of IT guy as well. That's IT - rhymes with "it" – the mysteriously monikered invention that would later come to be known as Ginger and then, during a much anticipated 2001 unveiling, would finally be christened Segway.

"As soon as I heard about it back then, I knew I had to have one," says McWilliams, 36, who has been told that he was among the first 25 members of the buying public to own one of the machines.

If you don't instantly recall the Segway HT, or human transporter, you must at least remember the speculation and hype that swirled around its unveiling. Because noted inventor Dean Kamen kept his new baby shrouded in mystery, wondering minds raced out of control. IT was some sort of magic carpet; an easy-to operate jet pack; a levitation device. For all we knew, Kamen had invented a time machine that could help with the laundry and cure male-pattern baldness. Anything seemed possible.

What the Segway HT turned out to be was a very hi-tech and forward-thinking mode of transportation, a kind of upright scooter that relied as much upon body movement as it did its battery pack. Using gyroscope technology, the Segway checks a rider's center of gravity 100 times per second. To go forward, you lean forward. The same with reverse. To stop, you locate your center. A throttle-like device on the left hand grip controls steering.

For all of its wizardry, however, the Segway HT seemed somewhat of a disappointment after all the "revolutionizing" hyperbole. Critics piled on, some labeling the Segway a glorified scooter, others claiming that the machines weight (approximately 80 pounds) and hefty price tag (approximately $5,000) would prove to be obstacles too difficult to overcome. An early recall due to battery power problems didn't help matters. After the initial hoopla faded, one wondered if Kamen's two wheeled ride would go the way of four-wheeled predecessors such as the Tucker and the DeLorean.

But now, nearly three years after its debut, the Segway continues to roam the earth - or the streets and sidewalks, that is. Not in great numbers (the privately held company declined to give out sales figures), but enough to remind the public that, despite a lower profile, IT's alive.

Growing, slowly

Just last month, the Extreme Toy Store locations in St. Charles and St. Louis became part of a newly announced network of Segway retailers across the country. The machines can also still be found at Brookstone in the Galleria, as well as online at Amazon.com and, for a brief period this holiday season, at the Sam's Club Web site. The original "I" series has also been joined by a smaller and less-pricey "p" series of the human transporters. And get this: A pair of Segways even made their way onto a recent episode of "The Bachelor."

Still, don't expect to head out the door and find the St. Louis landscape littered with Segways: McWilliams estimates that somewhere between 50 and 100 owners probably live in the region.

And if anyone should know, it's McWilliams.

An Effingham, Ill., native who came to St. Louis four years ago, the self-professed technology nut regularly rolls his to work from his downtown Mansion House apartment. Instead of hopping into his car or hoofing it around the neighborhood, McWilliams prefers to step onto the Segway for any brief travels.

"If you're walking somewhere, you try to take the shortest path," he says while balanced on his machine in the Mansion House's circular drive on a recent afternoon. "With this, you can easily go two blocks out of your way and it's nothing. I learned more about downtown St. Louis, the history of it, the first week I had this than I did in the two years prior."

McWilliams zooms around on his tricked-out transporter - blue wheel inserts, carpeted floor board - like the seasoned pro that he is. In his enthusiast role, he serves as a volunteer tester of new products for Segway, and can claim credit as the founder of the web site stlsegway.com. McWilliams has also given instructional demos to approximately 1,500 interested parties.
As for demos, they come with the purchase price, says Segway spokesperson Carla Vallone. But even if a rider figures out the "how" part of the equation, doesn't the "where" question remain tough to figure out?

"To be honest, that has been somewhat exaggerated," Vallone says. "Some 41 states (including Missouri and Illinois) have specific laws that allow Segway machines to operate on the sidewalk." She adds that cities can and have created their own regulations, but that "a vast majority have chosen not to."

"A few have made common-sense regulations," she adds. "Such as specifying a minimum age requirement, speed limits (the Segway maxes out at 12.5 mph) and helmet laws."

Better than a wheelchair

That "where" question becomes a bit more complicated when you're someone like Jerry Kerr.

In 1998, an accident left the Frontenac resident with a shattered C4 vertebrae; "It was crushed, smashed into 17 pieces," says Kerr, 50. Now mostly paralyzed from the neck down, the former real estate developer and home builder adopted a positive attitude: He'd do whatever necessary to regain any movement possible.

"It's been a constant process," he says. "Anything I could find that I thought could make myself better and healthier, that would improve what capacity I did have - well, that's what I've done."

Watching TV's "60 Minutes" one Sunday evening, Kerr saw a piece on Kamen and his latest invention: an adjustable, robotics wheelchair. He thought about how great it would be to have a conversation at eye level again. He stored that info in the back of his mind. Then, a few years later, Kerr caught wind of Kamen's Segway. "I thought maybe I could make use of that," he recalls. Kerr ordered an HT when they first hit the market; and, when he went to Chicago for a training demonstration, the crew took one look at his wheelchair and declared "This isn't going to work."

But it did. In a matter of minutes, Kerr used his gross motor skills and became "really, really comfortable. Just standing up - that was a new and interesting experience." For Kerr, the Segway wasn't a new form of transportation, it was a new form of liberation.
Others with disabilities soon discovered this as well. And Kerr, who had spent time learning about the Americans with Disabilities Act following his accident, quickly realized that the Segway presented a new set of unsolved circumstances. Public transportation; airlines; zoos and theme parks; would these entities recognize the HT as a necessity, rather than label it just another banned motorized vehicle?

Kerr made it his mission to fight the battles that popped up across the country, and in March 2003 he cofounded DRAFT - Disability Rights Advocates for Technology. The national organization has helped bring about policy changes at Continental Airlines and the San Diego Zoo.

"For us, this isn't an alternative transportation," Kerr says. "These (Segways) are truly an assisted mobility device." It's the first thing that Kerr uses when he gets out of bed in the morning, he says. It's the last thing he touches when he hits the sheets at the end of a long day.

Local artist and Fontbonne University art professor Tim Liddy happened to cross paths with Kerr earlier this year. Also the victim of a severe spinal cord injury, Liddy immediately latched onto the idea of supplementing his wheelchair use with a spin on the Segway. He'd seen Kamen on television, as Kerr had, and always had thought the HT held possibilities.

"I kind of thought this might be something for me," Liddy says. Then, with a laugh, he adds: "From being in the wheelchair to standing tall on the Segway, you kind of go from stigma to superhuman." He also jokes about getting called "lazy" by passers-by who have no idea that Liddy has a disability. "They see me riding and my wife walking and give me a hard time," he says.

But it was no laughing matter when Liddy discovered that his new device wasn't always welcomed. On a trip to Portland, Ore., a bus driver refused to allow him to ride, and a trip on the city's transit train became a headache when a bureaucratic miscommunication delayed his ability to board. Locally, Liddy says that his first trip to the Art Museum resulted in his being told that the Segway wasn't allowed. It took a call to museum personnel, he says, to straighten the matter out.

"When you ride these things, a whole new door opens up for us, especially around kids," Liddy explains. "It's just a different feeling entirely." This past week, Liddy returned to Art Hill, leading one of his Fontbonne art classes on a school field trip. He guided the tour from his Segway.

Segway envy

Back at the Mansion House, over the roar of the noisy fountain out front of the apartment complex, McWilliams gets razzed by a fellow resident who jokingly says, "That's Mike's chick magnet - how many girls can you get on that thing anyway?"

McWilliams shrugs off the line with a smile as he rocks his HT back and forth. He's then asked if he ever gets some real razzing - the not so friendly type - from those he encounters on the city's streets and sidewalks.

"There are some people who don't understand at first, but then they get closer and say 'Wow, that's pretty cool,'" he responds. "Then there is the occasional heckler." McWilliams pauses for a bit.

"But that's OK," he finally continues with a grin. "Because those are always the first people I go up and
talk to."

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Characteristics of Emerging Road Users and Their Safety

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U.S. Department of Transportation
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Research, Development, and Technology
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Table 13. Speed—active vs. in situ participants.

USER TYPE	ACTIVE N	ACTIVE MEAN (km/h)	IN SITU N	IN SITU MEAN (km/h)	NOTE
Bicycle	114	19	235	16	S
Golf cart	0	–	1	20	NA
Hand cycle	24	15	9	11	–
Inline skates	24	17	25	16	–
Kick scooter	11	12	5	15	S
Manual wheelchair	6	6	6	11	S
Pedestrian	0	–	30	7	NA
Power wheelchair	8	10	2	7	–
Recumbent bicycle	9	21	12	25	–
Segway	4	15	0	–	NA
Skateboard	4	13	6	13	–
Stroller	2	3	5	6	–
Tandem	2	17	1	23	NA
Other	1	16	5	13	NA

NOTES: This table includes both active and in situ participants.
S = Significant at the 0.05 level.
– = Not significant.
Blank = Mean not calculated because N=0.
NA = Statistical significance not tested because N<2.

Stopping Distance

The AASHTO Green Book (pp. 111-113) recommends a perception-reaction time of 2.5 seconds for motorists.[29] It cites research by Johansson and Rumar, who found a mean reaction time of 0.66 seconds, after collecting data from 321 drivers who expected to apply their brakes.[30] About 10 percent of drivers had reaction times of 1.5 seconds or longer. Also in that study, when drivers did not expect to apply their brakes, their reaction times increased by approximately 1.0 second. Based on that study and other research, the AASHTO Green Book concluded that a value of 2.5 seconds exceeds the 90th percentile perception-reaction time of all drivers and takes into account the additional time required for unexpected braking vs. expected

braking.[29] The AASHTO *Guide for the Development of Bicycle Facilities* (pp. 40-42) uses a perception-reaction time of 2.5 seconds.[2]

For this study, the perception-reaction time was measured from when the STOP sign was displayed to when the participant started braking. At the upstream acceleration station, participants were told in advance that at some point along the course they might be presented with a STOP sign, and if so, they were to stop as quickly as is comfortable. (In fact, all participants were asked to stop.) In addition, "dummy" stop stations were set up to reduce the anticipation at a particular location.

Table 14 shows that the mean perception-reaction time for bicyclists was 0.9 seconds. This is consistent with the mean reaction time of 0.66 seconds for motorists, as reported by Johansson and Rumar.[30]

Table 14. Perception-reaction time.

USER TYPE	N	MEAN (sec)	STD DEV (sec)	85TH PER (sec)
Bicycle	130	0.9	0.7	1.3
Hand cycle	32	0.9	0.6	1.2
Inline skates	20	1.2	0.5	1.4
Kick scooter	14	1.2	0.8	2.3
Manual wheelchair	8	1.1	0.3	1.5
Power wheelchair	6	0.8	0.5	1.3
Recumbent bicycle	6	0.8	0.3	1.0
Segway	5	1.1	0.6	1.5
Other	24	1.3	0.2	1.5

NOTES:
1. This table includes only active participants.
2. AASHTO value = 2.5 sec

The 85th percentile for bicyclists was 1.3 seconds. Adding 1.0 second to this value results in a value of 2.3 seconds for bicyclists who do not expect to stop. Consequently, the AASHTO value of 2.5 seconds seems adequate for the majority of bicyclists, including those who are not expecting to stop. In fact, with the possible exception of kick scooters (whose riders had an 85th

percentile perception-reaction time of 2.3 seconds), the AASHTO value of 2.5 seconds seems appropriate for the majority of other users, including those who are not expecting to stop.

Table 15 shows the braking distance, *i.e.* the distance traveled from the time that the user initiated braking to the time that the user came to a complete stop, for user groups with five or more users. The calculated friction factor is also shown, using the following equation from the AASHTO *Guide to the Development of Bicycle Facilities* (p. 42):[2]

$$S = \frac{V^2}{30(f \pm G)} + 3.67V \quad (2)$$

where: S = stopping sight distance, ft
V = speed, mi/h
f = coefficient of friction
G = grade

The first term $\frac{V^2}{30(f \pm G)}$, is the braking distance (denoted by d), and the second term, 3.67V, is the distance traveled during the perception-reaction time.

In this analysis, G has a value of zero because data were collected on level trail sections. The second term, 3.67V, is not part of the braking distance.

Therefore, the preceding equation simplifies to a braking distance equation:

$$d = \frac{V^2}{30f} \quad (3)$$

where: d = braking distance, ft

Rearranging the preceding equation gives:

$$f = \frac{V^2}{30S} \quad (4)$$

The friction factor shown in table 15 is that associated with the act of braking. It was calculated by using these values of V and S:

V = 85th percentile speed for that user type, from when the user entered the stopping sight distance station to when the STOP sign was displayed.

S = 85th percentile braking distance for that user type, as observed at the stopping sight distance station

The deceleration rate was calculated as follows:

$$a = -\frac{2d}{t^2} \quad (5)$$

where: a = acceleration, ft/sec^2

d = braking distance, ft

t = braking time, sec

and the negative sign denotes deceleration

For each individual participant, his/her braking distance and braking time were used to calculate his/her deceleration rate. The aggregated deceleration rate for each user type is shown in table 16.

Table 15. Braking distance and friction factor.

USER TYPE	N	MEAN (m)	85TH PER (m)	FRICTION FACTOR
Bicycle	130	4.8	7.0	0.32
Hand cycle	32	3.9	7.1	0.24
Inline skates	20	8.4	10.8	0.20
Kick scooter	14	4.9	8.9	0.09
Manual wheelchair	9	1.0	1.7	0.23
Power wheelchair	6	2.3	4.6	0.13
Recumbent bicycle	6	3.9	5.3	0.30
Segway	5	2.7	3.1	0.49
Other	24	3.7	6.6	0.28

NOTE: This table includes only active participants.

Table 16. Deceleration rate.

USER TYPE	N	MEAN (m/sec^2)	85^{TH} PER (m/sec^2)
Bicycle	130	2.3	3.3
Hand cycle	32	2.3	3.6
Inline skates	20	1.5	2.0
Kick scooter	14	2.4	2.6
Manual wheelchair	8	1.0	1.8
Power wheelchair	6	2.2	3.2
Recumbent bicycle	6	2.9	4.0
Segway	5	3.1	4.7
Other	24	1.9	2.4

NOTE: This table includes only active participants.

The implications of these findings are covered in the "Discussion" section below, under the heading "Sight Distance."

Sweep Width

The AASHTO *Guide for the Development of Bicycle Facilities* (pg. 22) recommends a minimum width for bike lanes as 1.2 m (4 ft).[2] Additionally it recommends (pp. 35-36) a minimum width of 3 m (10 ft) for a two-way shared use path (and a wider path is desirable where there is substantial use and/or a steep grade), notwithstanding the procedures given in the *Highway Capacity Manual* for calculating the number and effects of passing events.[26] In other words, the AASHTO recommendation does not explicitly account for user volumes or passing hindrance resulting from user encounters or overtaking/passing events.

The sweep width was measured as each user traveled through an 8-m (26-ft) section of the course (figure 32). Table 17 shows that the mean max sweep width for bicyclists is 1.0 m (3.3 ft). The 85^{th} percentile max sweep width was 1.2 m (4.0 ft). Hence, the AASHTO values of 1.2 m (4 ft) for bike lanes and 3 m (10 ft) for a two-way shared use path accommodates most users traveling single-file in opposite directions to pass each other, though some only barely.

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Managing Personal Mobility Devices (PMDs) On Nonmotorized Facilities

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Abstract

This paper explores the appropriate way to manage the diverse range of transport modes on nonmotorized facilities, particularly *Personal Mobility Devices* (PMDs) and *Electric Personal Assistive Mobility Devices* (EPAMD) such as the Segway Human Transport. PMDs are becoming increasingly common, resulting in new conflicts and opportunities. This paper examine the broader context of these issues, includes results of a recent survey of the legal status of EPAMDs, and develops general principles and guidelines for managing PMD use on nonmotorized facilities.

For additional information see "Managing Nonmotorized Facilities," *Online TDM Encyclopedia*, Victoria Transport Policy Institute (www.vtpi.org/tdm), 2004.

Introduction

In theory, managing transportation facilities is simple. Wheeled vehicles should use roadway and pedestrian should use nonmotorized facilities, including walkways, sidewalks and paths. But in practices these categories don't always work. An increasing variety of wheeled *Personal Mobility Devices* (PMDs) such as wheelchairs, skates and skateboards may use both roads and non-motorized facilities. Recently, several new types of *Electric Personal Assistive Mobility Devices* (EPAMD) have entered the market, such as those illustrated in Figure 1. These are technically innovative, energy efficient and attractive to many people. Proponents have lobbied to allow their use on sidewalks and other nonmotorized facilities. This has generated considerable debate.

Figure 1 **Electric Personal Assistive Mobility Devices**

Seated Electric Scooter **Standing Electric Scooter** **Segway Human Transporter**

Sidewalks and paths, by law or custom, accommodate various types of wheeled devices, including wheelchairs, skates and often bicycles. It can be difficult to determine exactly which devices should be allowed or prohibited since some mobility devices have features of both pedestrians and vehicles. For example, there are numerous incremental steps from a pedestrian with a cane, to a pedestrian with a walker ("rollator"), to a human powered wheelchair, to an electric powered wheelchair, to an electric scooter, to an electric cart, to a gasoline-powered cart, to a small car.

PMDs provide can provide a variety of economic, social and environmental benefits, but they also create new problems, including congestion and risks to other nonmotorized facility users. They raise questions about which use should have priority.[1] It is therefore increasingly important to define the role of PMDs and the rules they must follow. This paper explores various planning issues presented by PMDs. It investigates the role that PMDs play in the transport system, and their performance and design features. It identifies general principles that planning professionals can use when developing specific policies, management practices and guidelines concerning the use of PMDs on public facilities intended primarily for pedestrians.

Defining PMDs and Pedestrian Facilities

A *Personal Mobility Device* (PMD) is any relatively small, wheeled device that provides personal mobility and can operate on nonmotorized facilities. PMDs include skates, skateboards, wheelchairs, powered scooters, and Segway-type scooters. For the purposes of this paper, PMDs also include bicycles, although many jurisdictions define them as vehicles and prohibit their operation on sidewalks. *Nonmotorized facilities* include hallways, store aisles, walkways, courtyards, sidewalks, bicycle and multi-use paths, trails, and pedestrian streets. There are many types of potential nonmotorized facility users, including some that can be considered "pedestrians" and some that are considered PMDs, as summarized in Table 1.

Table 1 **Nonmotorized Facility Users**

Pedestrians	Personal Mobility Devices
Human	*Human-powered:*
People standing (viewing, talking, etc.)	Hand-powered wheelchairs
Sitting on benches and sidewalk café tables	Skaters and roller blades
Individuals walking (transportation or recreation)	Skateboards
Groups walking	Push scooters
People playing games	Bicycles
People using mobility aides ("walkers" and "rollators")	Bicycles with trailers
Pedestrians with strollers	Pogo sticks
Joggers	
	Motorized:
Multi-Species	Electric powered bikes
Pedestrians with pets	Motorized wheelchairs
Equestrians	Electric powered scooters
	Gasoline powered scooters
Other Sidewalk Activities	Segway-type scooters
Sidewalk vendors	
Panhandling	

This table shows various types of nonmotorized facility users.

These various users can be categorized in many different ways. For some types of analysis they type of user or trip is important. For example, for equity and social analysis, trips that provide basic mobility or substitutes for automobile travel provide more benefit than purely recreational use. Similarly, from a physical function perspective, people sitting on a bench or at a sidewalk café table are similar, but from an economic development perspective they are very different, since people sitting at a sidewalk café directly contribute to local employment and tax revenues.

In the past PMDs had relatively few conflicts with other nonmotorized facility users primarily because they were rather uncommon and slow. But PMDs are increasingly diverse, numerous, faster, more agile and more powerful. Many can travel significantly faster than normal pedestrian flow. An increasing portion have mechanical propulsion (electric or gas). Design standards to accommodate wheelchair use, such as the Americans with Disabilities Act (ADA), have resulted in nonmotorized facilities that better accommodate PMDs, and allow them to obtain higher speeds. PMDs are becoming an increasingly large portion of nonmotorized facility traffic in many areas. For example, some large retailers now offer customers the use of electric powered scooters with shopping baskets, and some people commute by skateboard or scooter. Los Angeles area transit planners estimates that 0.2% of daily users, more than 1,000 riders, access transit by PMDs such as skateboards, scooters and roller blades (not including wheelchair users).

As a result, the number and complexity of conflicts between different types of nonmotorized facility users is also growing. The recent introduction of the Segway, and lobbying by its manufacturer to allow its use on sidewalks, has raised concerns by many nonmotorized facility users, and objections from some pedestrian advocacy groups. Pedestrian advocates have worked hard to gain professional respect and political support for walking improvements, and many are concerned that PMDs such as Segways may crowd out or endanger pedestrians.

Transport Planning Principles

Below are some basic principles that can be used to help determine the role and management practices for a particular PMD in a particular facility.

Social Value

One principle used to prioritize the use of public facilities is the relative value that an activity provides to society. By this principle, facility management should give higher value activities priority over lower value activities. In general, transportation that provides "basic mobility" (access to essential services such as health care, basic shopping, employment and education, and a certain amount of social activities, particularly if users are physically, economically or socially disadvantaged, and have few viable transport alternatives) is considered to have higher social value than discretionary and purely recreational travel.[2]

PMD's range from those that clearly provide basic mobility, such as wheelchairs and electric scooters, to those mainly used for recreation, such as skateboards and pogo sticks. Many PMDs serve both transport and recreation functions, so it may be important to consider the *use* and *user* as well as the device when evaluating their value to society. For example, Segway use by a person with disabilities may provide high value to society, and so would be allowed on a particular nonmotorized facility, but the same device used by physically able people for recreation or sport may provide less value, and so could be legitimately prohibited in the same situation. Similarly, society may place a high value on bicycle commuting, particularly when users have few alternatives (providing basic mobility) or it substitutes for automobile travel (and so reduces problems such as traffic congestion, parking costs and pollution emissions), and a lower value on purely recreational cycling.

This may require that PMD users be licensed, based on some definition of need, such as being physically disabled. Some users may be offended that they must prove that they are sufficiently disabled to be allowed a license to use a PMD on a particular facility. However, this is no different from the requirements for use of special parking spaces.

Personal Mobility Devices tend to be faster and require less effort than walking. In many situations they allow non-drivers to travel several times farther than is possible with just walking. PMDs can therefore increase transport system efficiency by providing mobility to non-drivers and substituting for automobile travel.[3] This suggests that it is appropriate to accommodate PMDs as much as possible, as with other travel modes. For example, there is no obvious reason that society should spend less to allow somebody to access transit by skating or Segway than would be spent on a park & ride facility.

External Costs (Negative Impacts On Other Facility Users)

Another principle for managing public facilities is that users should not impose undue negative impacts on others. By this principle, activities that impose lower external costs should have priority over those with smaller external costs.

When PMDs substitute for automobile travel they tend to reduce many external costs, such as roadway traffic congestion, road and parking facility costs, accident risk imposed on others, and pollution emissions. But shifts from nonmotorized travel (walking and cycling) to motorized PMDs (scooters and powered bicycles) may increase some external costs, such as sidewalk congestion, and reduce users' physical activity and fitness. PMD's tend to require more space than pedestrians, in part because they are physically larger, and in part because they are faster and so require more "shy distance" between other facility users. PMDs also tend to be heavier and harder (most have a hard metal or plastic frame) than pedestrians, and so impose injury risk to others. A crash between a scooter and a pedestrian is more likely to cause injury than a crash between two pedestrians, and in such a collision, the pedestrian is most likely to be injured.

Summary

Table 2 summarizes a subjective attempt to compare some of the key features of various nonmotorized facility users. Of course, actual social values and external impacts will vary depending on specific circumstances. For example, cycling for transportation by people who have no alternatives has higher social value than purely recreational cycling, and a cautious, low speed cyclist imposes less congestion and risk than one who takes risks and rides fast. As a result, it may be useful to disaggregate these into subcategories for more detailed analysis. For example, it may sometimes be appropriate to have separate categories for commuter and recreational cycling, or children and adult scooter users.

Table 2 **Nonmotorized Facility Users Compared**

User Type	Social Value	Speed Range	Congestion Impacts	Risk to Others
People standing	High-Medium	0	Minimal	None
People sitting, on benches & cafes	Medium	0	Minimal	None
Vendors with cars and wagons	Medium	0	Medium to large	Low
Individual walkers	High	2-5 mph	Minimal	Low
Walkers in groups	High	2-4 mph	Medium	Low
Walkers with children	High	1-3 mph	Medium	Low
Children playing	Medium	2-4 mph	Medium	Medium
Walkers with pets	Medium	2-4 mph	Medium to large	Low
Human powered wheelchairs	Very High	2-4 mph	Medium	Low
Motor powered wheelchairs	Very High	3-6 mph	Medium	Medium to high
Joggers and runners	Medium	5-12 mph	Medium	Medium
Skates, skateboards and push-scooters	Low	5-12 mph	Medium	Medium
Powered scooters and Segways	Medium	5-15 mph	Medium	Medium
Human powered bicycle	Medium	5-15 mph	Medium to large	Medium to high
Motorized bicycle	Low	5-15 mph	Large	High
Equestrians	Low	5-10 mph	Large	Medium to high
People with hand carts and wagons	Medium	1-3 mph	Medium to large	Low to medium

This table compares various nonmotorized facility users. Social value reflects the degree to which it provides basic mobility or other external benefits. Congestion impacts reflect size and travel speed. Risk to others reflects ease of control, size, speed, mass and hardness.

Evaluation

The principles described above can justify both opposition and support of PMD use on nonmotorized facilities. Opponents can point out that most PMDs are primarily used for recreation rather than transport, and people who commute by a PMD usually have other travel options, such as walking, cycling on roadways, public transit, or driving. PMDs generally impose more congestion costs and risks than other nonmotorized facility users. Increased PMD use on nonmotorized facilities will almost certainly cause some conflicts and crashes.

Supporters could point out that PMDs are faster and more convenient than walking, and so provide transportation benefits. They generally require only a little more space than walkers, and far less than automobiles. Nonmotorized facilities are usually uncongested and can accommodate pedestrians and PMDs with minimal conflict. PMDs can substitute for driving and support public transit use. By substituting for automobile travel, increases in congestion and risks on nonmotorized facilities may be offset by reduced roadway congestion and risks. Increased PMD travel may increase public support for nonmotorized facility improvements, and more emphasis on alternative modes in transportation planning and traffic management.

Table 3 **Fatalities per 100 Million Passengers in Britain[4]**

	Per Km	Per Trip	Per Hour
Motorbike	9.7	100	300
Foot	*5.3*	*5.1*	*20*
Pedalcycle	*4.3*	*12*	*60*
Car	0.4	4.5	15
Bus	0.04	0.3	0.1

Relative crash risk depends on the unit of measure. Faster modes rank low in crash rates per unit of distance, but not so low when measured by trips or hour of travel.

It is difficult to predict the overall safety impacts of increased PMD travel.[5] Nonmotorized modes tend to have relatively high per-mile crash rates, indicated in Table 3, and PMDs probably have similar or higher crash rates. However, such figures do not indicate total risk because:

- Nonmotorized trips tend to be shorter than motorized trips, and so can reduce total person-miles.
- High casualty rates for pedestrians and cyclists result, in part, because people with higher risk factors tend to use these modes, including children and elderly people. A skilled and responsible adult who shifts from driving to these modes is likely to face less additional risk than average values suggest.
- Communities with higher rates of non-motorized travel tend to have lower total traffic fatalities, apparently due to safer facilities and greater care by operators. Pedestrian fatalities per billion km walked are less than a tenth as high, and bicyclist fatalities are only a quarter as high, in the Netherlands and Germany as in the United States.[6]

A key question in evaluating PMDs relative benefits and costs is their travel impacts, specifically their net impacts on the total amount of motorized and nonmotorized travel that occurs. Critics argue that PMD's will reduce walking, directly by substituting for walking trips, and indirectly by creating less pedestrian-friendly facilities (for example, one PMD user could discourage two walkers). At this point, it is difficult to predict what these impacts are likely to be.

Nonmotorized Facility Management[7]

Much of the debate about PMDs attempts to determine whether they should be considered good or bad, acceptable or unacceptable, legal or illegal on nonmotorized facilities. Another approach, and one that is probably more productive, is to assume that at least some PMDs will be allowed on at least some nonmotorized facilities, and so the emphasis should be on determining when, where and how this should occur.[8, 9] This helps insure that PMDs do not displace other nonmotorized travel.

Put another way, rather than focusing on evaluating each mode or device, it may be more helpful to focus on user behavior. For example, rather than debating whether or not skates, Segways and bicycles should be allowed or prohibited on all sidewalks, it is often more better to determine when and where they should be prohibited, which mode or device must yield when they meet, what maximum speeds are allowed, which types of users may be allowed, and what education and enforcement practices should be applied. These issues are explored below.

When, Where and Who

On crowded facilities, PMDs tend to impose congestion and risk on other users. As a result, it may be appropriate to limit use of discretionary PMDs (i.e. excluding wheelchairs and other aides for people with physical disabilities) on certain nonmotorized facilities at certain times, such as central business district sidewalks when crowded, and recreational paths during busy weekends. Similarly, it may be appropriate to limit them to certain users, either people with physical disabilities who need them for basic mobility (as opposed to purely recreational users, who have other mobility options), or to people who are trained and tested for responsible use.

Information on such restrictions should be clearly posted, and the rules enforced as needed. If PMD prohibitions are not really justified, these rules will often be ignored by users and law enforcement officials. This is common with bicycles. The result is ambiguity, inconsistent enforcement, and reduced value from, or respect for such laws.

Below are some possible guidelines for determining under what conditions PMDs should be allowed on nonmotorized facilities.

- When and where there is adequate space and minimal risk. For example, PMDs with low social value and high congestion costs or risk to others, such as skateboards and electric bicycles, may be allowed during off-peak periods but prohibited on crowded facilities.
- When and where PMD operating speeds are controlled to protect other users. For example, maximum speeds might be set for cycling or Segway use on a particular trail.
- When and where there are not reasonable, comparable alternative routes for high value users. For example, cycling may be allowed on a path or sidewalk where there is no suitable route on the roadway (this tends to be particularly important on bridges and parallel to busy highways).
- When and where reasonable safeguards can be demonstrated to minimize conflicts. For example, cycling or Segway use may be allowed on trails if there is adequate education and enforcement of traffic rules.
- For users who are certified as physically disabled, or who have taken a knowledge and skill test of their ability.

Hierarchy of Uses

Traffic on a road or path is a complex dance regulated by a set of rules which indicate who should yield. Although these rules are well defined and enforced for roadway traffic, they are less clear on nonmotorized facilities. Nonmotorized facility management therefore requires defining who should yield under particular conditions, with education and enforcement. Possible hierarchy guidelines are listed below.

- Modes that provide basic mobility (such as walking and wheelchairs) and public services (police, postal personnel, etc.) should have priority over other modes if conflicts exist.
- Users with physical disabilities should have priority over able-bodied users.
- Lower-speed, smaller modes should have priority over higher-speed, larger modes. For example, bicycles should yield to scooters, and scooters should yield to walkers.
- If facilities cannot accommodate all potential modes, higher-priority modes should be allowed and lower-priority modes should be required to use roadways. For example, cycling, skating and equestrians may be allowed on pedestrian facilities at uncrowded times and locations, but not at busy times and locations.
- Special efforts should be made to accommodate a wide range of users (including cyclists, skaters and runners) where there are no suitable alternative routes (e.g., adjacent roadways are unsuitable for such modes)
- All facility users should take extra caution when passing children and pets.
- Special consideration may be given to equestrians where permitted, since horses are easily frightened and difficult to maneuver.
- At least some public trails should be designed to accommodate people with physical disabilities, including people in wheelchairs. These should have washrooms and drinking fountains that meet accessibility standards.

Figure 2 "Share The Trail" Signage Example

This sign indicates who should yield to whom, and that horses are prohibited on this particular stretch.

Maximum Allowable Speeds

Because space requirements and risk increase with speed, speed regulation is an important part of PMD facility management. Below are some possible guidelines.

- Maximum speeds should be established for each mode, based on the physical design of the facility (i.e., some facilities may only accommodate 10 mph cycling but others 15 mph cycling). Maximum allowable speeds should decline as a pedestrian facility becomes more crowded or narrower.
- Cyclists, skaters and motorized modes should reduce their speed when using mixed use paths (6-12 mph maximum, depending on conditions) and yield to nonmotorized modes. Faster travelers should use roadways.
- If enforcement of maximum speeds is not a realistic possibility, PMDs that have the capability of moving faster must be prohibited from pedestrian facilities where they might endanger other users.

Education and Enforcement

Effective education and enforcement activities are likely to be important for effective sharing of nonmotorized facilities among diverse users. Signs, brochures and maps with additional information can help educate users concerning how to share facilities.

An effective enforcement program must overcome various barriers. Police officers may be unfamiliar with traffic rules and laws as they apply to bicycles, cyclists' rights to use the roadway, or how to effectively enforce bicycle traffic laws. Nonmotorized traffic violations, particularly by children, tend to be considered a low priority by officials and the general community. Standard traffic fines may appear excessive for children. Cyclists and pedestrians may ignore citations unless police departments develop a suitable processing system. In some locations, traffic enforcement in general is a very low priority for the police. This must be taken into consideration before a management system that depends heavily on enforcement is adopted.

Figure 3 Trail User Information Signage Examples

This sign indicates rules for dogs.

This kiosk provides information to trail users.

Legal and Legislative Status

A survey was performed concerning the legislative and legal status of PMDs in various U.S. jurisdictions. Some of this information was readily accessible through the Internet (www.segwaychat.com/forum/legal_states.asp and www.segway.com/general/regulatory.html), and in other cases planning staff were contacted by telephone. Forty states and several municipal governments have passed legislation regulating PMD use. Most state laws include a definition of EPAMDs, and allow their use on sidewalks, reflecting Segway lobbying efforts. Some include special provisions and restrictions, such as helmet requirements, or restrictions on operating speed and age. This is a typical definition: *An Electric Personal Assistive Mobility Devices (EPAMD) is a self-balancing two non tandem wheeled device designed to transport only one person with an electric propulsion system with an average power of 750 watts (1 h.p.), whose maximum speed on a paved level surface is less than 20 m.p.h.* The table below highlights legislative and legal status in selected jurisdictions.

Table 4 **Selected PMD and EPAMD Legal Status**

Jurisdiction	Status	Special Features	Allowed on sidewalks & paths	Allowed on Roads	Helmets Required	Min. Age
European Union	Uncertified and therefore illegal as a vehicle.[10]	Allowed on sidewalks up to 6 km/hr. Will require certification as a vehicle (probably as a moped) to be allowed on roads. Segway organization is trying to change the classification system.	If less than 6 km/hr.	No		
France and Italy	Allowed on sidewalks, not roads.	May be used on sidewalks at 6 kilometer-per-hour maximum.	If less than 6 km/hr.	No		
States						
Alabama	HB128	Municipalities may prohibit EPAMD use on public highways where the speed limit is greater than 25 mph, but shall not otherwise restrict the operation.	Yes	Yes	No	No
Arizona	Senate Bill 1193	A person who uses an electric personal assistive mobility device or a manual or motorized wheelchair is considered a pedestrian unless the manual wheelchair qualifies as a bicycle.	Yes	Yes	No	16
California	SB 1918, signed into law September, 2002.	Requires a sound-making device, reflectors and use of lights during night. EPAMD use may be restricted by local ordinance.	Yes	yes	No	No
Florida	Chapter 316.2068	A person who is under the age of 16 years is required to wear a bicycle helmet while operating an EPAMD. A county or municipality may prohibit the operation of EPAMD on any road, street, or bicycle path under its jurisdiction if the governing body determines that such a prohibition is necessary in the interest of safety.	Yes	Yes	Yes	16
Georgia	Senate Bill 37, passed 2003	Electric personal assistive mobility devices may be operated on highways and on sidewalks where a 48 inch clear path is maintained for access for persons with disabilities, provided that any person operating such a device shall have the same rights and duties as prescribed for pedestrians.	yes	yes	no	16
Illinois	Public Act 92-0868	Every person operating an electric personal assistive mobility device upon a sidewalk or roadway has all the rights and is subject to all the duties applicable to a pedestrian. Allows local governments to regulate use.	8 mph on sidewalks.	Yes	No	No

Maryland	HB 869, effective Oct. 2002	A person may not operate an EPAMD on any roadway where there are sidewalks adjacent to the roadway or the posted maximum speed limit exceeds a certain speed.	Yes	Yes	No	No
Michigan	Act 494, effective July 2002	Local governments may require EPAMDs to use a designated bike path if adjacent to the roadway.	Yes	Yes	No	
New Mexico	HB 298	An operator of an EPAMD traveling on a sidewalk, roadway or bicycle path shall have the rights and duties of a pedestrian, shall exercise due care to avoid colliding with pedestrians, and shall yield the right of way to pedestrians.	Yes	yes	No	No
New York	No specific law currently exists.	Bicycle organizations are pressuring state and local officials to regulate use of Segway on streets and roads. The State already regulates bicyclists, pedestrians and motor vehicles, no regulations regarding Segway use are in place				
Oregon	SB 787, 2003	An EPAMD is not a motor vehicle for purposes of the Oregon Vehicle Code, except when specifically provided by statute.	Yes	Yes	No	16
Pennsylvania	SB 1225, 2001	Allows use of EPAMD on sidewalks for people with physical disabilities and government or utility employees. Allows municipal governments to impose restrictions to protect the safety of pedestrians.	Unless locally prohibited	Yes but not on a freeway		age of 12
Texas	H.B. No. 1997, passed 2003.	Allows EPAMD on a residential street, roadway, or public highway with a speed limit of 30 miles per hour or less only while making a direct crossing of a highway in a crosswalk or where no sidewalk is available.	Yes	If no sidewalk is available	No	No
Cities						
Los Angeles	Los Angeles Commission on Disability is conducting research to establish appropriate policies.	*Proposed ordinance*: No person shall operate an EPAMD or motorized toy upon a sidewalk, bikeway, boardway, or highway at a speed greater that is reasonable or prudent having due regard for weather, visibility, pedestrians and other conveyance traffic, and shall yield the right-of-way to all foot pedestrians.	yes			
New York	No current law. Active lobbying for and against.	"Not authorized for public use on the streets or sidewalks" according to city police chief. Some current use and no current enforcement.	No	No		
San Francisco	Passed November 2002 by San Francisco Board of Supervisors.	Section 104, Article 5 of the San Francisco Traffic Code: "It shall be unlawful to operate an EPAMD on any sidewalk in the City and County of San Francisco."	No			
Seattle	The Seattle Pedestrian Advisory Board (SPAB) is concerned about conflicts.	*SPAB recommendations:* Ban Segway operation on Downtown sidewalks. Ban Segway operation on certain specific roads and parks at certain times.				
Washington DC (http://dc-segways.com)	Department of Public Works and shall promulgate rules to exempt EPAMDs from motor vehicle requirements.	No operator's permit shall be required for the operation of a EPAMD. EPAMDs upon a sidewalk or while crossing a roadway in a crosswalk shall have all the rights and duties applicable to a pedestrian under the same circumstances, except that the EPAMD operator must yield to pedestrians on the sidewalk or crosswalk.	Yes. Speed limited to 10 mph or less.	yes		age of 16

This table summarizes the legislative and legal status of Electric Personal Assistive Mobility Devices (EPAMDs) in selected U.S. jurisdictions.

Planning Guidelines for Sharing Nonmotorized Facilities

The report *Conflicts on Multiple-Use Trails: Synthesis of the Literature and State of the Practice* provides guidelines for developing trail sharing programs, which are summarized below.[11] Although primarily concerned with recreational, off-road trails, the guidelines are generally appropriate for managing other nonmotorized facilities, including sidewalks and bicycle paths.

Twelve Principles For Minimizing Conflicts On Multiple-Use Trails

1. *Recognize Conflict as Goal Interference* - Do not treat conflict as an inherent incompatibility among different trail activities, but goal interference attributed to another's behavior.

2. *Provide Adequate Trail Opportunities* - Offer adequate trail mileage and provide opportunities for a variety of trail experiences. This will help reduce congestion and allow users to choose the conditions that are best suited to the experiences they desire.

3. *Minimize Number of Contacts in Problem Areas* - Each contact among trail users (as well as contact with evidence of others) has the potential to result in conflict. So, as a general rule, reduce the number of user contacts whenever possible. This is especially true in congested areas and at trailheads. Disperse use and provide separate trails where necessary after consideration of the additional environmental impact and lost opportunities for positive interactions this may cause.

4. *Involve Users as Early as Possible* - Identify the present and likely future users of each trail and involve them in the process of avoiding and resolving conflicts as early as possible, preferably before conflicts occur. Possible conflicts and their solutions should be addressed during planning and design stages, with involvement of prospective users. New and emerging uses should be anticipated and addressed as early as possible with the involvement of participants. Likewise, existing and developing conflicts on present trails need to be faced quickly and addressed with the participation of those affected.

5. *Understand User Needs* - Determine the motivations, desired experiences, norms, setting preferences, and other needs of the present and likely future users of each trail. This "customer" information is critical for anticipating and managing conflicts.

6. *Identify the Actual Sources of Conflict* - Help users to identify the specific tangible causes of any conflicts they are experiencing. In other words, get beyond emotions and stereotypes as quickly as possible, and get to the roots of any problems that exist.

7. *Work with Affected Users* - Work with all parties involved to reach mutually agreeable solutions to these specific issues. Users who are not involved as part of the solution process are more likely to be part of the current problem and also in future conflicts.

8. *Promote Trail Etiquette* - Minimize the possibility that any particular trail contact will result in conflict by actively and aggressively promoting responsible trail behavior. Use existing educational materials or modify them to better meet local needs. Target these educational efforts, get the information into users' hands as early as possible, and present it in interesting and understandable ways.

9. *Encourage Positive Interaction Among Different Users* - Trail users are usually not as different from one another as they believe. Providing positive interactions both on and off the trail will help break down barriers and stereotypes, and build understanding, good will, and cooperation. This can be accomplished through a variety of strategies such as sponsoring "user swaps," joint trail-building or maintenance projects, filming trail-sharing videos, and forming Trail Advisory Councils.

10. *Favor "Light-Handed" Management* - Use the most "light-handed approaches" that will achieve area objectives. This is essential in order to provide the freedom of choice and natural environments that are so important to trail-based recreation. Intrusive design and coercive management are not compatible with high-quality trail experiences.

11. *Plan and Act Locally* - Whenever possible, address issues regarding multiple-use trails at the local level. This allows greater sensitivity to local needs and provides better flexibility for addressing difficult issues on a case-by-case basis. Local action also facilitates involvement of the people who will be most affected by the decisions and most able to assist in their successful implementation.

12. *Monitor Progress* - Monitor the ongoing effectiveness of the decisions made and programs implemented. Conscious, deliberate monitoring is the only way to determine if conflicts are indeed being reduced and what changes in programs might be needed. This is only possible within the context of clearly understood and agreed upon objectives for each trail area.

Though it well understood that the developers of PMD's have sought access to sidewalks and not bicycle paths, the hierarchy established for sharing bicycle paths has application to the PMD sidewalk discussion. A bicycle path "etiquette" has been developed that appropriately establishes proper user behavior on the bike path. Educating the users of rights and responsibilities has been a key component in making these sharing the path guidelines useful. The boxes on the next two pages illustrate examples of this type of public education.

Sharing the Path
From the League of American Bicyclists' "Sharing the Path Better Bicycling Fact Sheet" (www.bikeleague.org/educenter/factsheets/sharingthepath.htm).

1.Courtesy
Respect other trail users; joggers, walkers, bladers, wheelchairs all have trail rights.
Respect slower cyclists; yield to slower users.
Obey speed limits; they are posted for your safety.

2.Announce when passing.
Use a bell, horn or voice to indicate your intention to pass.
Warn other well in advance so you do not startle them.
Clearly announce "On your left" when passing.

3.Yield when entering and crossing.
Yield to traffic at places where the trail crosses the road.
Yield to other users at trail intersections.
Slow down before intersections and when entering the trail from the road.

4.Keep right
Stay as close to the right as possible, except when passing.
Give yourself enough room to maneuver around any hazards.
Ride single file to avoid possible collisions with other trail users.

5.Pass on left
Scan ahead and behind before announcing your intention to pass another user.
Pull out only when you are sure the lane is clear.
Allow plenty of room, about two bike lengths, before moving back to the right.

6.Be predictable
Travel in a straight line unless you are avoiding hazards or passing.
Indicate your intention to turn or pass.
Warn other users of your intentions.

7.Use lights at night
Most trail users will not have lights at night; use a white front and red rear light.
Watch for walkers, as you will overtake them the fastest.
Reflective clothing does not help in the absence of light.

8.Do not block the trail
For group rides, use no more than half the trail; don't hog the trail.
During heavy use periods (holidays and weekends) stay single file.
Stop and regroup completely off of the trail.

9.Clean up litter.
Pack out more than you pack in.
Encourage others to respect the path.
Place all litter in its proper receptacle.

10.Limitations for transportation.
Most paths were not designed for high-speed, high volume traffic.
Use paths keeping in mind their recreational nature.
It might be faster to use roads and avoid the traffic on the paths during heavy use.

Trail Etiquette (From the *Seattle Bicycling Guide Map* (www.seattle.gov/transportation/bikemaps.htm)

All Users

- Show Courtesy to other trail users at all times.
- Use the right side of the trail except when otherwise designated.
- Always pass on the right.
- Keep dogs on leash (maximum length 8 feet) and remove pet feces from trail.

Bicyclists

- Yield to pedestrians.
- Give audible warning when passing pedestrians or other cyclists.
- Ride at a safe speed. Slow down and form a single file in congested conditions, reduced visibility, and other hazardous conditions.

Pedestrians

- Stay to the right side of the trail except when otherwise designated.
- Watch for other trail users.
- Listen for audible signals and allow faster trail users (runners and bicyclists) to pass safely.

(This map also includes the text of state and local traffic laws related to bicycling, and other helpful cycling information.)

Conclusions

An increasing variety of transport modes are using roads and nonmotorized facilities, including Personal Mobility Devices such as powered wheelchairs, scooters and Segways. PMDs can provide a variety of benefits to users and society, particularly when they provide mobility for people who are physically or economically disadvantaged, or when they substitute for automobile trips. However, they can also create conflicts, particularly when used on nonmotorized facilities.

Some people want to ban categories of PMDs from nonmotorized facilities. However, in most communities there are many uncongested sidewalks and paths, where use of such devices presents little problem. It is inefficient and unfair to impose unnecessary restrictions on new modes. Any prohibition should be based on actual problems resulting from use. Where prohibition is not really justified, rules will often be ignored.

It is important for nonmotorized facility managers to develop clear policies with regard to PMDs. In many cases it is appropriate to prohibit a particular type of PMD from using a particular nonmotorized facility, at least at during busy times when conflicts are likely to occur with other facility users. However, it is best to avoid excessive restrictions. Facility managers should consider alternative strategies that may involve regulations on their use at specific times and locations, education and enforcement of rules for responsible PMD operation. Examples exist of nonmotorized facility management programs that encourage users to share and avoid conflicts.

Endnotes

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[8] Ian Boyd, "Pedestrian-Oriented Environments," in *Design and Safety of Pedestrian Facilities: A Recommended Practice of the Institute of Transportation Engineers*, ITE (www.ite.org), 1998.

[9] Charles Zeeger, et al, *Pedestrian Facilities Users Guide: Providing Safety and Mobility*, Pedestrian and Bicycle Information Center (www.walkinginfo.org), Highway Safety Research Center, Federal Highway Administration, Publication FHWA-RD-01-102, February 2002.

[10] Jeroen van Bergeijk, "Segway Stumbles in Europe," *Wired News* (www.wired.com/news/technology/0,1282,61632,00.html/wn_ascii), 18 December 2003.

[11] Roger L. Moore, *Conflicts on Multiple-Use Trails: Synthesis of the Literature and State of the Practice*, Federal Highway Administration, FHWA-PD-94-031 (www.bikefed.org), 1994.

DISABILITY RIGHTS ADVOCATES FOR TECHNOLOGY
500 Fox Ridge Road, St. Louis, MO 63131
314-965-4938

July 2, 2004 VIA: FAX

Peggy O'Dell, Superintendent
Jefferson National Expansion Memorial
11 North 4th Street
St. Louis, MO 63102

Re: Access of people with qualifying disabilities utilizing the Segway HT as their assistive device.

Dear Superintendent O'Dell,

We represent people with disabilities who are, by virtue of new developments in technology and more widespread use of the principles of universal design, finding the opportunity to more fully participate in our society and enhance the quality of their lives. Many new and exciting products are now on the market to assist people with disabilities in achieving these goals, including the iBOT wheelchair recently introduced by Johnson & Johnson, and the Segway HT. The people we represent are using these new technologies as their assistive mobility devices.

Yesterday, I received a telephone call from Mr. Bill Williams, a gentleman in his seventies who suffers from COPD. Mr. Williams advised me that he had been informed by Mr. Frank Mares that he would not be able to use his assistive device while visiting the fair this weekend at the Gateway Arch.

Because Mr. Williams requires the use of his assistive device for mobility he has been effectively denied access to the fair. Efforts by me to contact Mr. Mares by telephone over the last two days have been unsuccessful. This morning, in an attempt to speak with you regarding the situation, I spoke with Victoria in your office. I have faxed to her for your review several documents to help provide some clarity to this situation. Included in those documents are relevant sections of Director's Order #42 , 43 CFR part 17, and a document from the Federal Highway Administration which specifically addresses the use of the Segway HT by people with qualifying disabilities.

In 1998 United States Congress recognizing that "any development in mainstream technology would have profound implications for individuals with disabilities in the United States" passed the assistive technology act of 1998. Recognizing the benefits of "universal design" born out of the disability rights movement, they said "the use of universal design principles reduces the need for many specific kinds of assistive technology devices" and they further described any assistive device as "any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities." The Segway HT was designed utilizing the principles of universal design, and there is no other product on the market today that better represents the vision of the Assistive Technology Act of 1998.

Recently, Dr. Jeffrey Rosenbluth, M.D. Director of Spinal Cord Injury medicine at the University of Utah while examining the iBOT wheelchair, commented that he was most excited about how the Segway HT could help people with incomplete spinal cord injuries, who have difficulty walking. He said "this device is very feasible for these patients and gives them more independence and freedom". Many using the HT as their assistive device suffer from, Multiple Sclerosis, Parkinson's Disease, Spina Bifida, Amputated limbs, COPD, Emphysema, and many other debilitating conditions.

When speaking with Victoria this morning she advised me that because of the Fair everyone was quite busy, and that it may be next week before someone could get back to me. Next week, the Fair will be over, and there will be no opportunity to undo the wrong which has been done. Mr. Williams's civil rights will have been violated. At his age and in his health condition, the opportunity to attend a future Fair at the Jefferson National Expansion Memorial, is not assured.

We ask that you examine the position taken by your staff, a position contrary to Directors Order #42 and Federal law, and allow Mr. Williams access to the Fair utilizing his assistive device. If you have further questions or need further clarification please feel free to call me at 314-965-4938 or by cell phone 314-393-3674.

Sincerely,

Jerry Kerr
Founder

Use of "Segways" on Transportation Vehicles

DEPARTMENT OF TRANSPORTATION

DISABILITY LAW GUIDANCE

USE OF "SEGWAYs" ON TRANSPORTATION VEHICLES

This guidance document concerns the question of whether transportation entities (e.g., transit authorities, Amtrak) should permit the "Segway" personal transportation device to be used on transportation vehicles when used as a mobility device by people with disabilities.

The Segway is a two-wheeled, gyroscopically stabilized, battery-powered personal transportation device. The Segway is not designed primarily for use by individuals with disabilities, nor is it used primarily by such individuals. However, some individuals with disabilities may use a Segway as a personal mobility aid, in lieu of more traditional devices like a wheelchair or scooter.

The Department's ADA rule (49 CFR Part 37, §37.3) defines a "wheelchair" as "a mobility aid belonging to any class of three or four-wheeled vehicles, designed for and used by individuals with mobility impairments..." (emphasis added). By this definition, a Segway is not a wheelchair. However, a Segway, when used by a person with a disability as a mobility device, is part of the broad class of mobility aids that Part 37 intends will be accommodated (see for instance §§37.5 and 37.165). In this way, a Segway occupies a legal position analogous to canes, walkers, etc.

Because a Segway is not a wheelchair, the ADA regulation's provisions for lift and securement use specific to wheelchairs (§37.165(a) – (e)) do not apply to Segways and their users. However, §37.165 (g) requires transit providers to "permit individuals with disabilities who do not use wheelchairs" to use a vehicle's lift or ramp to enter the vehicle. Individuals who do not use wheelchairs commonly use the lift together with their non-wheelchair mobility devices, such as canes, crutches or walkers. Under this provision, an individual with a disability who uses a Segway as a mobility device must be permitted to use the lift.

This is not to say that transportation providers are required to allow all Segway users to bring their devices on board a bus or train. Transportation providers may establish their own general policies regarding Segways and other devices, just as they do with respect to pets or bicycles. However, when a device is being used as a mobility device by a person with a mobility-related disability, then the transportation provider must permit the person and his or her device onto the vehicle. This is analogous

to the situation in which a transportation provider that has a general policy that does not permit pets to enter, but must permit a person with a disability to bring a service animal into a vehicle.

Also, a transportation provider is not required to permit anyone -- including a person with a disability -- to bring a device onto a vehicle that is too big or that is determined to pose a direct threat to the safety of others. With respect to size, a non-wheelchair mobility device that exceeds the size and weight standards for a “common wheelchair” (i.e., 30 x 48 inches, measured two inches above the ground, and not exceeding 600 pounds, including the user) can reasonably be considered too large. The direct threat standard is intentionally stringent (i.e., requiring a determination that there is a significant risk to the health or safety of others that cannot be eliminated by modification of policies, procedures, practices, or by the provision of auxiliary aids or services). A transportation provider seeking to exclude a mobility device on direct threat grounds should first consult with the appropriate DOT operating administration for guidance.

We note that this analysis would apply to other situations. For example, a Federal Highway Administration-assisted recreational trail that normally cannot permit use by motorized vehicles should accommodate Segways when used as a mobility device by someone with a mobility-related disability.

This guidance has been approved through the Department of Transportation’s Disability Law Coordinating Council as representing the official views of the Department on this matter.

September 1, 2005

Last Modified: Thursday, September 01, 2005

Final Report: Segway GT Traffic Study (2005)

Doug Karcher[1] & John Sorochan[2]

1 University of Arkansas

2 University of Tennessee

submitted to Segway, Inc. February 9, 2006

Note: This report has been amended to retain its publishing integrity. The full report is anticipated to be published in Spring 2006.

Introduction: Regular traffic on golf course turf will decrease turfgrass quality over time, particularly in areas used to enter and exit the fairway. The Segway® is a new personal transportation unit that is a possible replacement, or partner, to traditional golf carts. Our hypothesis was that the Segway® does not cause the significant wear associated with traditional golf carts.

Objective: To compare turfgrass wear caused by standard golf cart traffic versus Segway® traffic.

Methods: ***Experimental area.*** The proposed study was conducted on two sites maintained as golf course fairways. Site one was in Knoxville, TN. Site two was in Fayetteville, AR. The experimental areas were 15 ft. long plots of established 'Tifway' bermudagrass (the most commonly used golf course fairway species in the southern U.S.). Plots were mown three times per week at a 0.5 in. height.

Treatments. A standard Club Car® golf cart or a Segway® unit was used to traffic turf plots two days per week. On days when traffic was applied, 30, 60, or 90 passes were made with each vehicle. A traffic pass consisted of the golf cart or the Segway® pulling onto the plot and stopping at a fixed point, then starting rapidly and then turning sharply at another fixed point to exit the plot. Traffic treatments were discontinued when significant wear damage was present on the experimental area. Each treatment was replicated, three times in Knoxville and four times in Fayetteville.

Evaluations. The following evaluations were made on each plot at each fixed start/stop and turning point: 1) weekly visual or digital imagery to precisely quantify percent green turf cover, average turf color, and quality, 2) surface hardness using a Clegg Impact Soil Tester at the conclusion of the study, and 3) weekly visual quality ratings using a 1 to 9 scale with 9 representing no visual wear and 1 representing no turf cover.

Data analysis. For each evaluation, a repeated measures of two-way analysis of variance was computed to determine if the effects of the vehicle (Segway vs. golf cart), traffic type (turn vs. start stop), and their interaction were significant ($P < 0.05$). When effects were significant, treatment means were separated using Fisher's Protected Least Significant Difference test (alpha = 0.05).

Results: ***Percent Green Cover.*** There were significant vehicle and vehicle x traffic type interaction effects beginning at seven days after initial traffic treatments at the 90 passes rate and continuing throughout the duration of the study. In addition, there was a significant traffic type effect on 18 August. Vehicle x traffic type means are shown in Figure 1 below.

Turf trafficked with the Segway® in Fayetteville, AR maintained greater than 92% coverage throughout the study, whereas golf cart traffic reduced turf coverage below 76% by the end of the study. Turf trafficked in Knoxville, TN began with only 90% cover. At the conclusion of the study, Segway® start/stop traffic (82%) was significantly better than the start/stop golf cart traffic (73%). In addition, Segway® turning traffic (57%) was significantly better than the golf cart turning traffic (8%).

In Fayetteville, AR there were no significant differences in turf coverage between stop/go and turning traffic throughout the study for turf that was trafficked with the Segway®. In contrast, turf that was trafficked with the golf cart had significantly less green cover at the turning point (68%) compared to the start/stop point (75%) by the 9 September evaluation date.

In Knoxville, TN there were significant difference in turf coverage between traffic types on all five dates rated after traffic treatments were initiated. After 90 traffic passes, golf cart turning traffic had significantly less turfgrass cover (65%) than all other traffic types (82% – 90%). Unlike Fayetteville, AR, turning traffic type for both the golf cart and Segway® resulted in less turf cover. Start/stop golf traffic resulted in significantly less turf cover than Segway® start/stop traffic.

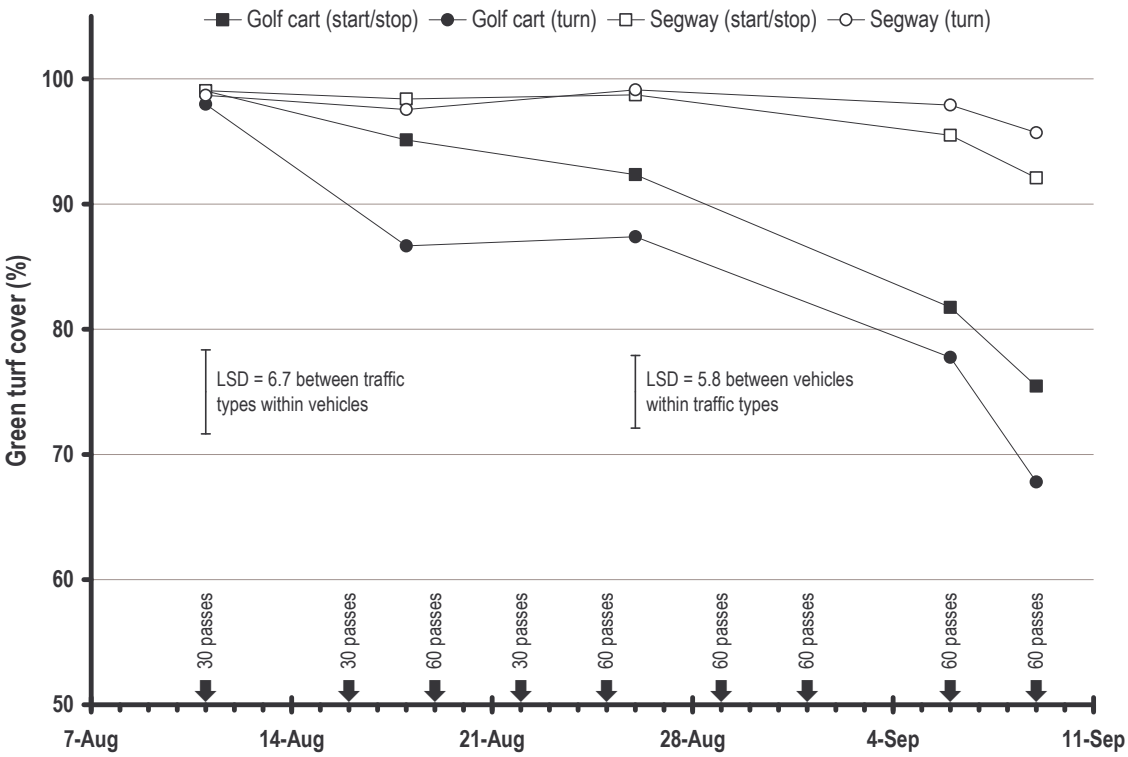

Figure 1. Percent green cover as affected by vehicle and traffic type. Arrows along the x-axis indicate dates of traffic application. Fayetteville, AR.

Turf color. There were significant vehicle and vehicle x traffic interaction effects on dark green color on all evaluation dates except 11 August. In addition, there was a significant traffic type effect on the 18 August and 9 September evaluations dates.

From 18 August through the end of the study, turf trafficked with the Segway® had significantly darker green color than turf trafficked with the golf cart.

On the final two color evaluation dates, turf at the turning point had significantly darker green color than the start/stop point when trafficked with the Segway®; however traffic type did not effect green color on these evaluation dates for golf cart traffic. In contrast, on 18 August turf trafficked with the golf cart had darker green color at the start/stop point compared to the turning point. Traffic type did not affect green color with the Segway® on 18 August.

Surface hardness. Following five weeks of traffic, for both locations, there were significant main effects of vehicle and traffic type on surface hardness.

When averaged across traffic types, turf trafficked with the golf cart had an average Gmax value of 117 & 97 (Fayetteville, AR & Knoxville, TN), whereas turf treated with the Segway® had an average value of 91 & 81 (Fayetteville, AR & Knoxville, TN).

When averaged across vehicles, start/stop traffic resulted in an average Gmax value of 113 & 94 (Fayetteville, AR & Knoxville, TN), which was significantly higher than turning traffic (95 & 84 (Fayetteville, AR & Knoxville, TN)).

Turf quality. For both locations, there were significant vehicle and vehicle x traffic interaction effects on all five evaluation dates throughout the study. In addition, there was a significant traffic type effect on the 12 August and 2 September evaluations dates in Fayetteville, AR and all dates in Knoxville, TN.

Throughout the study, turf trafficked with the Segway® had significantly higher average quality rating scores (5.6 & 6.4 (Fayetteville, AR & Knoxville, TN)) than turf trafficked with the golf cart (3.9 & 5.0 (Fayetteville, AR & Knoxville, TN)).

Throughout the study, start/stop traffic with had significantly higher average quality rating scores (5.1 & 6.6 (Fayetteville, AR & Knoxville, TN)) than turning traffic (4.4 & 4.8 (Fayetteville, AR & Knoxville, TN)).

In Fayetteville, AR, there were no significant differences in visual turf quality between traffic types throughout the study for turf that was trafficked with the Segway®. In contrast, turf that was trafficked with the golf cart had significantly lower average quality ratings at the turning point than the start/stop point on the 12 and 19 August, and 2 September evaluation dates. In Knoxville, TN, significant differences in visual turf quality occurred between golf cart turning and golf cart stop/go traffic.

Conclusions: Prior to traffic treatments, the bermudagrass at the Knoxville, TN location had lower green cover (less dense, 90%) than the Fayetteville, AR location (100%). As a result, turfgrass cover and quality ratings were much lower at the Knoxville, TN site. In addition, 120 passes were applied during the first two days of testing in Knoxville, TN versus 30 in Fayetteville, AR this resulted in more rapid decline in turf cover and quality in Knoxville, TN. However, regardless of location, golf cart traffic significantly decreased turfgrass cover and quality versus Segway® traffic. Golf cart traffic also increased surface harness (soil compaction) at both locations.

www.Segs4Vets.org

In September 2005 Disability Rights Advocates For Technology launched the Segs4Vets program with the goal of providing Segways to every United States Soldier whose service to our country resulted in disability and difficulty walking.

As a 501 (c) (3) Public Charity DRAFT's programs are funded entirely by donations, bequests, and gifts. Donations to DRAFT are deductible under the IRS code. For more information visit our website or call 314-965-4938.

DRAFT

DISABILITY RIGHTS ADVOCATES FOR TECHNOLOGY
www.draft.org

Segs4Vets Washington D.C. Presentation Ceremony
September 22, 2005

Pictured (L-R)
Jerry Kerr, Senator Jim Talent, Hilbert Caesar, Leonard Timm, Stephanie Davis (Corporal Keith Davis's mother) General Ed Eberhart, Kevin Pannell, Fred Kaplan

Staff Sergeant Hilbert Caesar

4th Battalion, 27th Field Artillery
United States Army
South Ozone Park, New York

On April 18, 2004 on a road near Baghdad Iraq, Staff Sergeant Hilbert Caesar, a field artillery section chief with the fourth Battalion, 27th Field artillery unit, was traveling in a convoy when anti-coalition forces detonated four bombs they had buried on the side of the road. Several members of the convoy were injured but in that explosion Sergeant Caesar lost his right leg.

Staff Sergeant Hilbert Caesar was one of the first soldiers called to serve in Operation "Enduring Freedom" a duty he proudly considered a privilege. "I just love what I do... I'm a soldier fighting for the United States," said Caesar. “I knew with such great honor as serving this country, came great risks... I have accepted that... I would do this all over if asked,"

Sergeant Caesar after being admitted to Walter Reed Hospital, despite his pain and the extreme nature of his injury refused the use of a wheelchair and made amazing progress learning to walk much quicker than the majority of the amputees of Walter Reed.

The loss of Caesar's leg could not prevent him from continuing to be a leader of soldiers of the United States Armed Forces. He inspired others in the Amputee Patient Care Center at Walter Reed in spirit and in action. One case involved a soldier who lost a leg in an explosion who wouldn't find the will to walk or even try to, that is, until he saw Caesar walking proudly in front of him. The two recovered together standing tall and walking side by side.

Seven months after his injury Sergeant Caesar competed, using a hand crank wheelchair, in the New York City marathon completing the race in 1 hour 53 minutes 4 seconds, and one year to the day after his injury he finished the Boston Marathon.

Hilbert Caesar’s family seeking better opportunities for their son immigrated to the United States from Guyana and settled in New York, when he was 11 years old. And almost 8 years later when he was 20 he became a proud member of the United States Army, something he claims he was meant to do.

On August 2, 2004, an American hero, who had left Guyana 15 years earlier, became a United States citizen in a ceremony in Arlington, Virginia. Caesar who was proud to be an American citizen to finally, said he didn't feel any different, "I knew I was an American before this," he said. "I always knew I was an American."

Corporal Keith Davis

United States Marine Corps
Lumberton, Texas

Corporal Davis was born on April 18, 1983 in Pasadena Texas. By his ninth birthday it was already clear to him that he wanted to serve in the United States military. While attending high school he was a member of the Civil Air Patrol and after graduating in 2001 he became a member of the United States Marine Corps.

Corporal Davis had always been fascinated with machine guns, and as a machine gunner attached to the first Battalion, fifth Marine Regiment out of Camp Pendleton in California he has seen more of life at the age of 22 than most people will ever see in a lifetime. After voluntarily serving two tours in Iraq, Corporal Davis sought special permission to extend his service for a few extra months so that he could return to Iraq for a third tour of duty. Rather than a hardship he considered it an honor and a privilege to be back with his company serving his country.

While serving his third tour, on July 14, 2005, Corporal Davis was struck by an improvised explosive device causing shrapnel wounds to his left ankle. Continuing his service, Davis while on patrol on August 3, 2005 was shot through his back. The bullet pierced his abdomen and after doing extensive internal damage, shattered his femur. After valiant attempts to save his leg at the National Naval Medical Center in Bethesda Maryland, Corporal Davis's leg was amputated at the hip on September 13, 2005.

Corporal Davis with Iraqi Children

Corporal Davis's decorations and awards include, two Purple Hearts, Navy/Marine Corps Achievement Medal, Combat Action Ribbon, Iraq Campaign Medal, Global War on Terrorism Service Medal, and the Global War on Terrorism Exemplary Medal.

Corporal Davis's family members in Texas are his parents Stephanie and Terry Davis, sisters and brothers-in-law, Layna and Scott Burns, Amber and Kevin Cracknell and a total of five nieces and nephews: Garrett, Hannah, Caleb, Riley, and Brody.

Prepared by Disability Rights Advocates For Technology, www.draft.cc.

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Specialist Kevin Pannell

39th Infantry Brigade
Arkansas Army National Guard
1st Cavalry Division, United States Army
Dierks, Arkansas

Kevin Pannell joined the Arkansas National Guard when he was still a junior at Dierks High School in Dierks, Arkansas a community in the southwestern corner of the state. After graduating Kevin became a certified plumber and contemplated opening his own utility business. Pannell was first called to active-duty to serve in Kuwait for five months in 1999. He was again called to active duty in September of 2003. 26 year old Specialist Kevin Pannell as a member of the Arkansas Army National Guard's 39th infantry brigade was attached to the first cavalry division arriving in Iraq on April 1, 2004.

2 1/2 months later on Friday, June 13 Specialist Pannell, one of a 12 man team while patrolling "Little Fallujah" a rundown insurgency ridden neighborhood in central Baghdad, insurgents threw two grenades at Pannell and three of his company. All three were injured but tells injuries were the most serious. One of the grenades had rolled against Pannell's right foot and exploded knocking him down and ripping both his legs apart. Specialist Pannell also had incurred massive soft tissue damage with an enormous amount of shrapnel embedded in his arms, legs and buttocks. After tourniquets were applied by his buddies to know was transported in a Humvee to the 31st combat support Hospital in Baghdad's Green zone.

Specialist Pannell was transported to Walter Reed Army Medical Center, where he would undergo 13 operations including the amputation of both of his legs one below the knee and one above the knee. Here at Walter Reed Kevin Pannell would learn to walk over again utilizing the very finest prosthetic rehabilitation engineering in the world.

Today Kevin Pannell has not only learned to walk but has also become an inspiration to others who have lost limbs in battle. He continues to visit Walter Reed and encourage new amputees and said "just because you lose a letter or two don't lose your life. You gain a lot, really. I've gained more than I've lost with these two legs. I've got a complete new appreciation for life,"

On November 7, 2005 Kevin competed in the hand cycle division of the New York City Marathon completing the 26 mile course in 2 hours 45 minutes 48 seconds. He continues to motivate others speaking at a recent landmines survivors' convention, Pannell told the audience that disabilities are a state of mind. He said he had just watched the movie, "Warm Springs," which centers on a pivotal time in President Franklin Delano Roosevelt's life. "In FDR's day, if you were in a wheelchair you weren't even taken seriously," Pannell said. "We should be grateful for all the disabled people years ago who helped raise the awareness of disabled people today."

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THE alliance REVIEW

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With friends at his side, Southeast grad continues personal struggle

By JONI BOWEN
The Review

Marine Corps Cpl. Ryan Groves adjusts his current apparatus, a torso cast attached to his leg via a rod system, which holds the leg rigid, allowing it to heal faster. Groves is undergoing therapy at the Bethesda Naval Medical Institute in Maryland. He was injured in Iraq in October after being hit with a rocket-propelled grenade.
Submitted Photo

A local Marine serves as a reminder of the dangers that our armed forces face every day.

Portage County Marine Corps Cpl. Ryan Groves has spent the last several months at Bethesda Naval Medical Institute in Maryland, recovering from injuries he sustained in October while serving in Iraq.

Groves, from Charlestown, near Ravenna, and a 1999 Southeast High School graduate and former Mount Union student, joined the Marines in September of 2001, doing his basic training at Marine Corps Base Hawaii Kaneohe Bay. Groves was in Hawaii for the first few years of his enlistment, being deployed on a ship twice. As the battalion was prepared for its third deployment, Groves and several others volunteered to go to Iraq.

"Our nickname was Third Battalion Third String. We felt kind of useless with the war going on. A lot of people volunteered to go to Iraq instead of getting back on the ship," Groves said. "Me and five buddies walked into the colonel's office and told them we were going."

Groves, the only person from his platoon to go to Iraq at that time, was stationed with 3rd Battalion 1st Marines in Fallujah, Iraq, last June. Groves' unit had several missions, including "security and stability operations."

Living in fear

"Our mission was to gain the confidence of the Iraqi people and protect them, but at the same time to search and destroy," Groves said.

Groves said that being in Iraq had its ups and downs.

"After the first month or so of being terrified every minute of the day, you kind of get used to it. You just kind of wait for your time," Groves said.

Three and a half months later, Groves learned that his original battalion, 1st Battalion 3rd Marines, had also been stationed in Iraq to help with cleanup in Fallujah. He went to visit them, but not everyone had arrived yet. Groves went back to visit the next day. He stopped on the side of the road inside the camp, got out of his truck and ran up to the vehicle in front to tell them what was going on. He then made his way back to his own truck.

"As soon as I got back to my truck, right before I could take off my flack and helmet, the rocket attack started and the first one got me," Groves said.

Rocket destroys leg

"I can't move. I can't stand up. I'm gonna die. I feel really tired like I want to go to sleep but I can't cause I'll die," were some of the thoughts going through Groves' mind after the attack. "All I could say was, 'Get me to BAS (Battalion Aid Station).'"

Groves' left leg was amputated in a Baghdad hospital, and all of the bones in his right leg were shattered by the blast. The right leg was ripped open from a couple of inches above his ankle to his mid-thigh. Due to shrapnel, the leg has contracted several infections.

Groves has endured 38 surgeries in an attempt to save his right leg. He had been released from Bethesda Naval Hospital in Maryland and was going to Walter Reed Hospital for therapy when his wheelchair was caught in a sewer grate. Groves fell and broke his good leg, which caused another serious infection. He is now back at the Naval Hospital in Bethesda undergoing treatments and therapy. He goes to Baltimore every day to receive hypobaric

chamber treatments.

Celebrity status

Since he returned to the United States, Groves has become somewhat of a celebrity. He met President Bush in December, and he has met dozens of famous actors, athletes, journalists and politicians. Famous visitors include Cher, Wynonna Judd, Adam Sandler, and players from the Denver Broncos and Boston Red Sox. He has also made appearances on CNN and the Wolf Blitzer Show.

Groves received a Purple Heart in November for the injuries he sustained in Iraq. On Memorial Day he took part in a private ceremony along with the president, helping to lay a wreath on the Tomb of the Unknown Soldier. His father, Roger Groves, attended the ceremony as well.

Groves' mother, Terri Hutson-Groves, has been at the hospital in Maryland with her son since he arrived back in the United States.

"His goals are still the same," Hutson-Groves said of her son's post-injury plans. "The only thing that has been taken away is his athletics."

Mother's pride

"I'm so proud of him right now. I think it's the biggest fight of his life," Hutson-Groves said of her son's struggle.

Rachel Testa, Groves' girlfriend, said that although she was able to keep in contact with Groves while he was in Iraq, it was still a difficult time.

"It was tough to watch everything on TV and see what was happening and still go on with your everyday life hoping that when you heard something it wasn't him," Testa said.

Testa goes to Maryland to visit Groves every few weeks and said it's nice to have him back in the United States.

"The circumstances aren't wonderful but as long as he's home that's all that's important," she said.

Testa voiced her frustration with the situation in Iraq.

"It's been difficult watching solider after soldier getting injured, and it doesn't seem like the situation is changing much," Testa said.

Friend from Mount

Ryan McCamon, Groves' Phi Kappa Tau fraternity brother from Mount Union, lives in Maryland and sees Groves every week or so. McCamon serves as a liaison between Groves and the rest of the fraternity brothers, regularly e-mailing updates on his condition.

"I have never heard him say, 'Why me?'", McCamon said. "He never says he's mad, he says 'I'm one of the lucky ones, I'm still alive.'"

"He (Groves) still works out and takes care of himself so well. He has one of those 'I'm down but I'm not out' attitudes," McCamon said. "It's this survivor attitude."

"The fact that he volunteered (to go to Iraq) shows an amazing courage and strength. It's touching that someone would leave Hawaii and volunteer to go to Iraq," McCamon said.

Friends' support

Nick Pope, a 1998 graduate of Southeast who played football with Groves, commented on his friends' service in Iraq.

"It's amazing to see what these guys do over there. They put their lives on the line every day for us. It's rough to think about," Pope said. "Ryan is definitely upbeat and keeping good spirits - he's always been like that. He was quarterback of the football team, and it takes a leader to do that."

Jeff Mason, who played baseball and football with Groves at Southeast, is stationed in Mosul, Iraq, as part of a civilian private security company called "Blackwater USA." Mason described the mindset of many of the people he works with.

"Everybody over here knows that anything can happen to any of us at any time. Everybody has their own personal reasons for why they're here and continue to do the job. You kind of put it out of your mind. You focus and do what you have to do and control what you can at the time," Mason said.

Positive outlook

Colleen Wheeler, a 2003 graduate of Mount Union, knew Groves in college but has recently gotten to know him better. Wheeler lived in Washington, D.C., and visited Groves at Bethesda Hospital in January.

“He has had some setbacks, but he has always been positive. When we would visit, even when he was in excruciating pain he was always very cheerful and would talk with us,” Wheeler said.

“It’s so hard to see anybody like that, especially someone that you know,” Wheeler said. “To see them injured and not able to do normal things right now is really hard. It leaves an impression on your heart as you leave, that’s for sure.”

Once he is released from the hospital, Groves plans to go back to school at Mount Union and finish his degree in political science and legal studies.

Groves reflected on the bonds he formed with fellow soldiers.

“It really is a brotherhood like no other; nobody can understand unless they go through it,” Groves said. “If you ever hear a phrase like ‘We die for each other,’ that’s really the epitome of it.”