TECH TRANSFER
R • E • R • C
UPDATE
A PUBLICATION OF THE
REHABILITATION ENGINEERING RESEARCH CENTER
ON TECHNOLOGY TRANSFER

D1. Supply Push Project: Transferring New, Useful, and Innovative Products to the Marketplace through a Supply Push Approach - James A. Leahy

Under the T²RERC's Supply Push Model of Technology Transfer, we work with other RERCs, inventors, researchers, and small companies to bring new and innovative products to the commercial marketplace for people with disabilities. However, occasionally there are obstacles that must be overcome before a product can be introduced into the marketplace. Sometimes the costs associated with a new technology and the ability to protect (patent) the intellectual property delay the introduction of useful new products. The case of Ronald Mace's Accessible Thermostat from the RERC on Universal Design at North Carolina State University illustrates these points quite well.

The late Ronald Mace, a professor at North Carolina State University, coined the term "universal design" and promoted the application of this concept to the design of both products and places. As part of his efforts to promote awareness, Mr. Mace presented and published his work widely, and routinely used household products to demonstrate how easily a product can be designed to be more useful when it is given a wider range of functional capabilities. With a wider range of capabilities, new consumers, including children, seniors, and people with disabilities can operate household products more easily.

Mr. Mace's examples have led to numerous improved products, including a collaboration with Leviton to make their wall switches more accessible, which eventually became a Harvard Case Study. Given this success, in 1995 Mace and the RERC on Technology Transfer jointly explored the commercial potential of many of his other ideas. Among these products, the T²RERC identified the Accessible Thermostat as one prototype with significant market viability. The Accessible Thermostat is an electronic residential thermostat intended for installation in new construction or as part of an upgrade to existing heating systems. Its unique design has distinct advantages over existing thermostats in the marketplace due to its user-friendly operation, voice output, and remote control. The thermostat provides auditory, tactile, and visual feedback to its user, while the interface has controls whose size, shape, color, and position optimize accessibility, visibility, intuitive use, and require low force to operate. The thermostat's remote control also provides an alternative user interface.

Although Mr. Mace had invented the Accessible Thermostat in 1992, the first public disclosure occurred in the mid 1990's, which was followed by a series of presentations in other venues. In late 1998, when the T²RERC became involved with the device, many years had passed since the initial public disclosure of the thermostat. Thus, we were precluded from protecting this idea as intellectual property, due to the "one-year from first public disclosure" time limitation. Our corporate contacts said they would not pursue this device unless they could protect it through a patent. The idea had sufficient merit for us to continue with our commercialization efforts.

In 1999, we received a referral from Dr. Gregg Vanderheiden of the RERC on Electronic Technology Access at the University of Wisconsin-Madison. Mr. Scott Flood had contacted Dr. Vanderheiden because he had invented an auditory accessory to home thermostats that would

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"speak" the temperature readings, which he believed would help people with vision impairments operate thermostats more easily. This referral was particularly valuable because Mr. Flood had secured a patent on the auditory output feature. This became an opportunity to link the two projects and pursue the patent protection companies desired.

Within two months, we had reviewed the auditory output technology and its patent claims, and held teleconferences with the patent holder and the representatives of North Carolina State University (NC State). After nearly a year of negotiating agreements with Scott Flood and NC State, we agreed that combining the features and functions of Ron Mace's accessible thermostat with the patent protection offered by the auditory thermostat would increase our chances of licensing the entire package.

The accessible design of Ron Mace's thermostat was refined with in-depth consumer information gathered through five separate focus groups conducted by the T²RERC in conjunction with the Western New York Independent Living Project. Additional in depth marketing information was also gathered by the T²RERC during this time period in an attempt to provide manufacturers with compelling reasons to introduce such a product into the marketplace.

The T²RERC then combined all of this information into a commercialization package and identified the companies that it believed would be most interested in licensing this technology. From 1999-2001, Honeywell, White-Rogers, Maple-Chase, Hunter and other thermostat manufacturers were approached, but none showed substantial interest.

Despite general receptivity, none of the companies we approached would consider licensing the prototype. The high cost of developing the technology needed by the thermostat, its limited market, and the inability to patent and entirely protect the idea from competitors were major obstacles to overcome. Companies knew their competitors could immediately copy the Accessible Thermostat once it came to market. This eliminated any advantage to being the first to introduce the product into the marketplace.

After this initial failure, we revised the commercialization package and went back to the companies who had first considered Ron Mace's invention. Between 2000 and 2002, discussions continued on and off with multiple companies. At that time, since he possessed the only Intellectual Property that we could license, we allowed Scott Flood to utilize the commercialization package and marketing information we developed in an attempt to solicit interest in the Auditory Accessible Thermostat concept on his own.

In 2001, Scott Flood showed the concept to the National Federation of the Blind (NFB), who recommended that he contact Marvin Sandler, president of Independent Living Aids. Mr. Sandler, upon seeing the concept, immediately pledged his support and went about attempting to find an appropriate manufacturing entity for the technology. Initially, Mr. Sandler approached manufacturers with voice capabilities but was unable to find a suitable match. He then contacted Innotech, the manufacturer of the voice interactive remote control, Accenda, for assistance. Innotech recommended a different approach in identifying a manufacturer. Instead of approaching voice technology manufacturers, they recommended approaching thermostat manufacturers to see if they could add voice technology to their thermostat line.

This approach ultimately proved to be successful. Two years after the initial meeting between Scott Flood, NFB, and Marvin Sandler, a new thermostat company called Action Talking Products was formed. During this extended timeframe, over 10 years from Ron Mace's first invention,

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voice feedback and voice activation technology costs had decreased significantly. The new thermostat would not only have voice feedback but also would possess voice activation at a reasonable cost. A prototype of the new technology was first shown in July 2004 at the United States Department of Commerce's ADA Anniversary celebration in Washington, D.C.

Conclusion:

At the Assistive Technology Industry Association (ATIA) conference in January 2005, "Kelvin", an interactive-voice thermostat, was officially released by Independent Living Aids, Inc. of Jericho, NY. This new thermostat is equipped with touch-free technology and adjustable voice control based on Scott Flood's patented thermostat. Kelvin allows the owner to set and control the temperature of his/her residence with only the sound of his/her voice.

Kelvin will speak the current time, current room temperature, and current temperature setting when a button is pressed or when activated using its touch-free technology. Kelvin comes with large ergonomic buttons that provide for easy recognition and activation. It has settings for heating and cooling, and it has a fan control. In addition, it is seven-day programmable with four programmable time periods for each day: morning, day, evening, and night. The digital thermostat display includes the day of the week, time, and the room temperature.

Kelvin is designed to significantly reduce the amount of effort expended by all consumers, including the elderly, people with disabilities, the visually impaired, and the blind.

More information about Kelvin can be found at http://www.independentliving.com/products.asp?dept=71&deptname=Thermometers%20and%20Temperature%20Control

Kelvin, the voice interactive thermostat, was on display in the T²RERC's booth at this year's RESNA conference in Atlanta, GA. ■

Robyn Washousky demonstrates how to use the Kelvin voice interactive thermostat.

On a Personal Note: After 3 years of dedicated, loyal service as a Marketing Research Analyst, Robyn Washousky has left us and has moved to Hawaii with her fiancé. She will be working as a marketing representative at AlohaCare in a new program to benefit the elderly and people with disabilities. We are both sad to see her go and happy for her as she has a bright and promising future ahead. Robyn, best wishes from all of us here at the T²RERC.

R1. RERC Case Studies - When Missions Collide

Joseph P. Lane

The R1. Case Study project, as originally conceived, was to provide us lessons from prior projects that will be useful to future funded undertakings. It includes a retrospective study of all technology transfer activity conducted by RERC's since 1998. It is important to note that technology transfer was not part of the RERC's original mission. Since the 1970's, RERC's conducted research and development projects as centers of academic excellence. This mission was expanded during the 1990's, when consumers and their elected representatives called for more "relevance" in the project outcomes. Since the mid-1990's, RERC's have been expected to transfer resulting technologies to practice and to participate in the product commercialization process.

Was this additional transfer and commercialization (T&C) mission a fair and reasonable extension of the research and development (R&D) mission? What are the similarities and differences that make these two missions complimentary or contrary? Our study of how RERC's reconcile these two missions caused us to examine the fundamental assumptions, expectations, and requirements underlying each one. The following discussion summarizes the results of this examination.

R&D versus T&C

The acronym "R&D" signifies the close relationship between activities defined as research and those activities defined as development. Research activity generates new knowledge using an established set of methods, both quantitative (experimental) and qualitative (quasi-experimental). Research seeks to answer a question (test a hypothesis) in a manner that substantiates the concept with facts (evidence). Development activity creates new objects and processes through the tools of science and engineering. Development seeks to demonstrate the feasibility (proof) of transforming (operationalizing) knowledge into tangible form. The R&D process combines mental and physical labor to yield a proof-of-concept prototype.

R&D happens in a laboratory, which is derived from the Latin word laborare which means "to labor." The laboratory may be located at a university, a corporation, or a government agency, but they all share the common goal of generating new knowledge and transforming that knowledge into something with practical utility. R&D laboratories operate in the academic model. RERC's are typically located in institutions of higher education and are directed by people with graduate degrees at the Masters or Doctoral level. The academic context is closely aligned with the academic model for R&D.

The acronym "T&C" signifies the close relationship between activities defined as transfer and those activities defined as commercialization. Transfer activities shift ownership and control over intellectual property from one state of development or field of application to another. Commercialization activity transforms proof-of-concept prototypes into products that can be manufactured repeatedly within an established set of parameters. The T&C process applies legal and economic rules governing transactions, to introduce a product for sale and purchase in a marketplace.

T&C happens in a market, which is derived from the Latin word mercari which means "to buy." The market may be situated within a university, a corporation, or a government agency, but they all share the common goal of transforming something of practical utility into something that generates commerce. T&C markets operate in the business model. Our RERC was intentionally organized around a business model given its focus on T&C, though it is also located in a major research university.

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Academic Rigor vs. Business Rigor

Academic Rigor

The academic model of R&D is focused on process rather than outcome. Experimental research methods are designed to isolate variables under study and block the influence of variables not under study. The expected (hypothesized) effect of the independent variable on the dependent variable must happen spontaneously and without interference from anyone. Obtaining the expected effect may initiate a development project, while other outcomes may require revising the hypothesis. Regardless of the outcome, new knowledge is generated from the research results.

The validity of the research results depend on the quality (rigor) of the research methods applied. The measure is absolute because the methods are fixed. Only new knowledge generated through sufficiently rigorous methods is deemed worthy of public dissemination, with peer-reviewed journal publication being the pinnacle of success.

Academic researchers build their careers around their personal interests in research topics. They receive promotion and tenure chiefly on their record of peer-reviewed publications and their standing among peers working in their field of expertise. Sufficiently rigorous work is well documented for replication by others as further verification of the results.

Business Rigor

The business model of T&C is focused on outcome rather than process. Business planning methods are designed to protect and nurture the intellectual property of interest and block interference from competing interests in the marketplace. The expected (planned) outcome of a new or improved commercial product in the marketplace is orchestrated and manipulated in every way possible.

The utility of the ensuing product depends on the success (rigor) of business methods applied. The measures are relative because the methods are varied. New products may be commercially successful for a variety of reasons, with corporate profits being the pinnacle of success.

Business professionals build their careers on adding value to the business. They receive promotions and raises chiefly on their record of generating revenues for their own company and the job offers from competing firms. Sufficiently profitable commercial projects are closely guarded for internal replication.

Internal Focus versus External Focus

R&D activity has an internal focus. R&D projects are led by "principal investigators" who pursue projects incorporating their personal interests and expertise. The critical issue for R&D projects is securing funding, typically through grant or contract proposals. Once funded, Principal Investigators are relatively autonomous, holding decision-making authority over project topic, design, and execution. R&D timeframes are largely under the project's control since they depend upon internal staff and equipment.

The deliverable for R&D projects is new knowledge demonstrated in tangible form. This deliverable can be accomplished without additional input, funding, or approval from any external entities.

T&C activity has an external focus. T&C projects are typically led by "project managers" who pursue projects likely to generate profits for their business unit. The critical issue for T&C projects is securing approval, typically through higher levels of management. Initial approval leads only to the first of many progress reports, monitored by higher levels of management and from their peers in competing business units. Timeframes are typically outside the project's control, since they rely on input and cooperation from external entities.

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R1. RERC Case Studies

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For T&C projects, the deliverable is a new product or process available in the marketplace. Accomplishing this deliverable requires input, funding, and approval from one or more external entities.

RERC Task Environment

RERC's are "research centers" by name and definition, so their primary orientation, capabilities, and perspective falls within the R&D domain. The NIDRR criteria for competitive grant proposals at the front end and for performance evaluation at the back end, are heavily weighted toward the academic model of research discoveries, knowledge dissemination, conference presentations, and journal publications. In contrast, these NIDRR criteria contain scant reference to the business model and award few points for transfer and commercialization plans and activities.

RERC's always conduct R&D projects. However, RERC's sometimes extend this work into a T&C project. RERC's propose to transfer and/or commercialize four types of R&D deliverables: 1) Protocols and Standards, 2) Instrumentation, 3) Product Improvements, and 4) New Products (Devices or Services). The first two types of deliverables are most closely associated with the academic model, requiring the least amount of consent or investment from external entities. The last two types are most associated with the business model, requiring substantial participation from external entities.

External entities participate in T&C projects in three ways: managerial commitment, resource investment, and time allocation. All three are outside the RERC's control and may change at any time for almost any reason. It is not surprising that we are finding that RERC's are more successful at accomplishing T&C objectives that are most closely aligned with their internal academic mission, than those requiring alignment with the external business mission. We are exploring the relevant factors and considering how to compensate for the differences. ■

D2. Update on the Demand-Pull Project: Wendy Strobel

Primary Market Research provides the basis of the Demand Pull Team's technology transfer efforts. This year, we begin work on the Demand Pull Project on Education Technology. The primary market research collected through this project allows the Demand Pull Team to ensure that we can target and transfer the critically needed technologies in the field of Education Technology, specifically around technology needs for people with learning disabilities. The T^{2}RERC is proud to partner with the RERC for the Advancement of Cognitive Technologies (http://www.uchsc.edu/atp/RERC-ACT/index.html). This is a newly funded RERC dedicated to the identification and transfer of technologies for people who have cognitive disabilities. Additional assistance on primary market research activities will be performed by the RRTC on Workplace Supports (http://www.work-support.com/), an organization that has worked consistently to include people with disabilities in all aspects of everyday life, including employment, education, and community settings. The RERC-ACT and RRTC on Workplace Supports will assist us in collecting information on needed technology for people with learning disabilities through consumer panels. A number of leading manufacturers, researchers, and people with experience with learning disabilities have also agreed to participate in our expert interviews. The Demand Pull Team is eagerly anticipating the results of this work and will publicize the results

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D2. Update on the Demand-Pull Project

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in the form of problem statements once data collection activities are completed.

The T²RERC currently has on-going Demand Pull Projects for four industry segments including wheeled mobility, hearing enhancement, communication enhancement, and most recently, vision. Highlights of these projects include:

The Wheeled Mobility Project:

The Wheeled Mobility Project began in October of 1998 and was conducted in partnership with the RERC on Wheeled Mobility. The T²RERC has encountered many exciting technologies during the course of the project. In this cycle alone, we have seen the transfer of an exciting new motor technology that operates at a higher level of efficiency than competing technology. We are also working on a number of alternative propulsion systems that promise to reduce repetitive stress injuries in people who currently use rimmed propulsion methods. These Lever Drive Systems promise a more ergonomic propulsion system that will enable people to stay in manual wheelchairs longer, thereby enhancing the associated health benefits of regular exercise. The Power Cheq Battery String Equalizer, transferred in an earlier cycle, has been refined with the addition of easy to replace fuses, a request made by many stakeholders.

The Hearing Enhancement Project:

The Hearing Enhancement Project began in October of 1999 in partnership with the RERC on Hearing Enhancement. Progress includes the transfer of the ConchaLINE™ and CymbaLINE™ open ear molds to Emtech Laboratories, Inc. The ConchaLINE™ and CymbaLINE™ are currently in the early stages of a marketing campaign. The T²RERC staff helped to plan this campaign and developed the marketing literature for Emtech. The Demand Pull team is also working with the RERC on Hearing Enhancement on a Direction Forming - Beam Finding Microphone array that can serve as the front end for an assistive listening system. The DFBF conference microphone uses specially designed direction-finding algorithms and array switching implementation software to effectively and rapidly zoom-in and switch between active speakers. The outcome is better speech intelligibility in the presence of multiple sound sources.

The Communication Enhancement Project:

The Communication Enhancement Project began in October of 2000 in partnership with the RERC on Communication Enhancement. The highlight of this project is the commercial introduction of PointSmart by Infogrip. PointSmart allows you to slow down the speed of the cursor to a snail's pace - great for users with poor motor control. PointSmart also includes Automatic Direction Control. For additional information on PointSmart or to download a demo program, visit Infogrip's web site at www.infogrip.com. The Demand Pull team is also assisting in the transfer of an interface evaluation tool called Compass that was created by Koester Performance Research. Compass will help clinicians to evaluate and recommend appropriate input mechanisms for Augmentative Communication devices and computers and to select the most efficient and effective solution for their customers. The Compass is currently being beta tested by the developer in cooperation with a leading AT manufacturer. The potential of this tool to impact users on a daily basis is presented by some of the participants in the beta test. They stated:

- "In evidence based practice, this gives us our evidence!"
- "I WILL USE this software to assess my students alternative computer needs. It is EXACTLY what I need. THANK YOU!"
- "Piece of cake! You could run this software without ever reading instructions."

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D2. Update on the Demand-Pull Project

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We anticipate the transfer of this easy to use and effective technology in the next few months!

The Vision Project:

The Demand Pull Project on Visual Impairment began in 2002 in partnership with the RERC on Visual Impairment. We are working with a number of exciting technologies including new Braille display technologies. The alternative technology to power Braille displays will represent a significant cost savings for manufacturers and consumers. The Demand Pull Team is also working with some exciting software products, including the Audiomorph (development by the RERC on Workplace Accommodations) and Visiprint (developed by an independent inventor). Both of these exciting technologies will create equal access to information for people with visual impairments.

In addition to our work on these specific projects, we have a number of on-going technical assistance efforts, including the provision of industry specific market information, SBIR grant review and input, business planning assistance, and evaluation of technologies and prototype devices. ■

R3. Industry Profile Project Update
Wendy Strobel, Stephen M. Bauer

The survey responses are rolling in, and the Industry Profile on Visual Impairment is getting rave reviews. The responses received from this survey have been overwhelmingly positive. One respondent stated:

> "I have spent a good deal of time with the Industry Profile and I think it is a wonderful piece of work. We at the Mississippi State RRTC are teaching a class in access technology to rehab counselors, and I would love to make use of this material for them. Once it is published, I intend to talk to the university bookstore about securing it as a textbook. It is simply the best compilation of information on this subject which I have seen, in a little over twenty years in the field."

Survey respondents are commenting on the exceptional organization, structure, and relevance of this important document in the field of Technology Transfer. Our aim in publishing this important work is to provide a reliable source of market data that will allow manufacturers to identify consumer needs and business opportunities; develop products to satisfy these needs; and prepare grants and secure investment capital to carry out research and development. The T²RERC recognizes that there is a lack of reliable marketing data for assistive technology companies is a major barrier to the successful transfer and commercialization of assistive technology products. The T²RERC has undertaken the Industry Profile research project to create an accurate profile of the specific industry segments in which we seek to transfer technologies through the Demand Pull Technology Transfer Process. The Industry Profile (IP) project allows the T²RERC to specifically dedicate resources to building an understanding of the current market in which we seek to transfer technologies. The recently completed IP on Visual Impairment includes information such as common visual impairments for adults and children, demographics, a review of currently

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R3. Industry Profile Project Update

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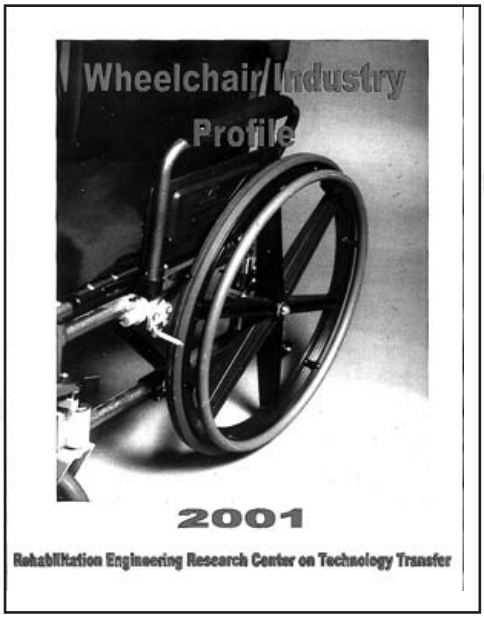
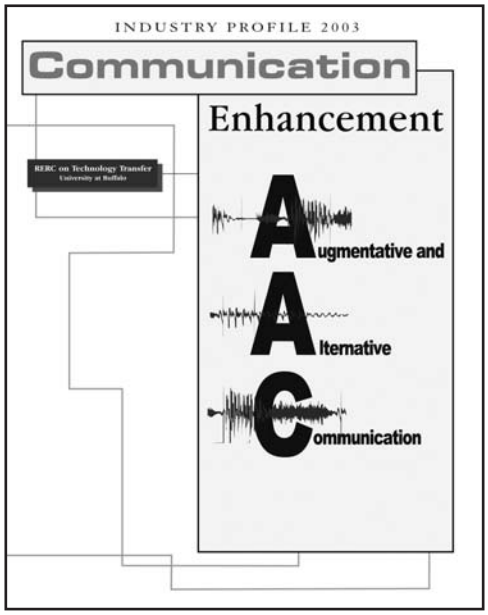
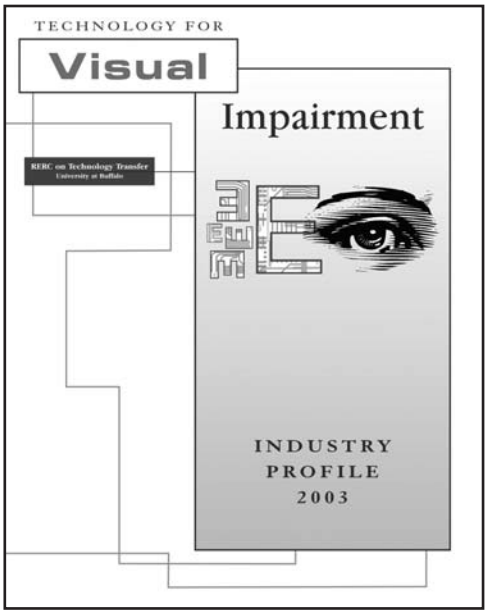
available technologies, legislation, and sources of funding. The extensive appendix provides a compendium on manufacturers, sources of financial aid for eye care, state and provisional services, relevant conferences and trade shows, associations, and publications.

The IP on Visual Impairment is available for sale on the T²RERC website at http://cosmos.ot.buffalo.edu/t2rerc/research/industry-profile/buy.htm.

The Industry Profile Team has recently begun work on the IP for Educational Technologies. Completion of the IP for Education Technology will set the stage for the future Demand Pull Project on Education Technologies. The IP for Education Technology will be completed in 2005. ■







D3. Fortune 500 Project: Improving Accessibility of New Mainstream Consumer Products through Participatory Development - James A. Leahy

The second year of our grant cycle has started out with a flash for our Fortune 500 Project. Negotiations initiated with the Eastman Kodak Company in year one culminated this past fall in a collaboration between our two organizations. The initial result of that collaboration was our recruitment of consumers for three Alpha focus groups for the purpose of evaluating Kodak prototypes, evaluating Kodak concepts, and the identification of the 'ideal' design and functional features for the next generation of a Kodak product line.

Kodak personnel were in attendance at the focus groups, and the resultant report generated by the T²RERC on the product demonstrations, product evaluations, and the focus groups has been extremely well received within Kodak. In addition to electronic and hard copy bound versions of our report, Kodak received edited DVD copies of all the product demonstrations, evaluations, and focus groups for their review.

Again, the primary objective of our Fortune 500 project is to improve the usability and accessibility features of the next generation of mainstream consumer products. We are now in a hold period while Kodak digests the information we have provided and generates pre-production prototypes for our consumers to evaluate in our Beta focus groups.

On another front, negotiations with two major consumer appliance manufacturers are nearing an end, and both entities are sending in Non-Disclosure Agreements for our signature. One of the product concepts we will be working on is Assistive Technology oriented while the other will be a mainstream consumer appliance. A press release announcing our collaboration with one of the companies will be forthcoming in the next month or so.

While the aforementioned work will eventually be converted into new, more usable and accessible consumer products, we are pleased to announce the introduction of a new product in the consumer marketplace right now. Black & Decker's new Lids Off Open-It All will be making its show debut in the T²RERC's booth at RESNA in June of this year. Introduced this spring in limited quantities for Mother's Day, the Lids Off Open-it-All functions as a jar opener, can opener, and bottle opener all combined into one compact unit. Last year, our consumers identified the need for a combination opening device that would perform the function of these three highly used kitchen appliances. Black & Decker used our listing of consumer generated design and functional features to design the new product.

The very positive response we have received from all of the manufacturers we have collaborated with on the Fortune 500 project leads us to believe that mainstream consumer product companies are very interested in broadening their markets and making the next generation of their products more usable and accessible for all. As technology costs decrease, we anticipate the gradual incorporation of Transgenerational/Universal Design into all future consumer products. This is an exciting time for us all. ■

Black & Decker's new Lids Off Open-It-All.

R4. Taking it to the Consumers
Vathsala Stone, Douglas Usiak

During its third cycle of funding the T²RERC will conduct four efficacy studies that seek to validate the T²RERC's technology transfer process by evaluating the quality of the product in light of end user needs. The **intent** of these studies is to assess, through laboratory and home trials, the *quality and value* of products transferred through the T²RERC in terms of how they affect the consumer's functional capabilities, as compared to products and alternative strategies available to them at the time of transfer. The protocols for this study were developed using experts outside of the T²RERC to ensure that the transferred technologies were evaluated fairly. The Efficacy Project addressed the following two Research Questions:

- *How do products commercialized through the T²RERC's process perform, as compared to the performance of other products/methods available to consumers with disabilities at the time of transfer?*
- *To what extent do end users with disabilities value the products transferred through the T²RERC, compared to alternatives available to them?*

As reported in past issues of "Tech Transfer RERC Update," the T²RERC has transferred over forty products to the Assistive Technology (A/T) marketplace, each intended to either meet an unmet need or improve upon the features/functions of existing products for end users of A/T.

The first T²RERC product to be evaluated for efficacy was the Black & Decker "Lids Off" automatic jar opener. In a six-month study, consumers would successively test the device, first in a laboratory trial and then at home. The process began by developing the instruments that were to be used in the laboratory and the home trials. This included questionnaires to be filled out by the consumers in the laboratory and at home, as well as observation and interview protocols by the research team.

Going beyond the Western New York Independent Living Project's database, we began community-wide recruitment through flyers, press releases, and public service announcements to find 50 people who were willing to participate in a six month study. Over 700 volunteers were initially identified, and from this finite pool, we then selected a random sample of participants using the following exclusion and inclusion criteria.

Individuals we sought for the study were persons who:

- Opened sealed jars with or without the use of an assistive device or assistance from others.
- Experienced pain, discomfort or weakness while opening jars.
- With one or both hands, were able to hold or grasp a jar the size of a mayonnaise jar.
- With one or both hands, were able to hold or grasp a jar the size of a baby food jar.
- Were able to pick up a briefcase by the handle or lift a telephone receiver.

The individuals included also had one or more of the following conditions related to hand function:

- Paralysis
- Weakness
- Tightness or cramping
- Tremors
- Control issues
- Amputation or absence of extremity
- Joint restriction
- Swelling

We then scheduled the participation of the 50 people in a laboratory trial to do the testing as compared to another jar opener, "Open Up," which was the competing product to Lids-Off at the time of transfer. We transformed the WNY Independent Living Center premises into a laboratory environment for the testing. The Center's

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main conference room was converted into two small labs, one for the testing of the Lids-Off device and the other for the testing of the Open-Up device. Each lab was equipped with two alternative tables to serve as test bench, five jars of various sizes to be opened by the user, the automatic jar opener to be tested, and a video camera to record its performance. Each individual that participated in the study tested both the jars, one after the other, moving from one lab to the next. In each lab, the participant was first shown either the Lids-Off or the Open-Up jar opener, given an opportunity to see if he/she could operate it without instructions, and then asked to attempt to open the pre-selected jars.

As they opened each jar using the two jar openers, participants filled out a questionnaire to obtain their impressions on:

- Their success in opening the five jars with the device.
- How quickly the device opened the jars.
- The ease of inserting and removing the jars from the device.
- How effective the device was in removing the lid.
- The condition of the jar/lid/contents after using the device.

Additionally as the lab trials began, a T^{2}RERC staff member provided instructions and observed each person as they opened each of the five jars, noting specifically the following for each jar attempted:

- Actual time it took to break the seal of the jar.
- Number of attempts it took to open the jar.
- Whether or not the person performed this operation one handed.
- Whether or not there was any spillage/breakage.
- Any signs of pain / discomfort.
- Whether or not the participant needed cues or instructions in the use of the device.

The last part of the laboratory trial was a closing interview of each participant by an assigned member of the research team to gather the participants' judgments based on their interactions with the two jar openers. Our investigation with the participants was focused on how many jars were they able to open with the jar openers, and which of the devices did they feel would most improve their ability to live independently.

We also asked for their impressions as they related to which of the automatic jar openers:

- was more dependable.
- would function longer without wear and tear.
- was safe to use.
- was easy to use.
- had easy to handle the controls.
- was quicker to use.
- provided better feedback.
- was comfortable to use.

The closing questions included:

- Which automatic jar opener would they prefer to use?
- What did they believe the purchase price of the jar openers should be?
- How much would they purchase the jar opener for?

The laboratory trial for each participant lasted one hour, after which the participant was given the “Lids-Off” automatic jar opener to take home and test it for about six months, keeping a weekly diary for the initial two-months.

We are currently integrating data from the laboratory trials while participants are in the middle of the home trial period. Please await the results of this study in a future edition of this newsletter. ■

R2. The Public Policy Project
Stephen M. Bauer

A large body of federal legislation supports research and development, technology transfer, product commercialization, business development, and job creation. With important exceptions, most federal legislation does not focus on assistive technology or the needs of people with disabilities. Federal legislation can be roughly divided into supply-side legislation and demand-side legislation. Supply-side legislation facilitates technology innovation and product development based upon this innovation. Demand-side legislation typically creates business opportunities by providing money to purchase products or by establishing regulations that require certain types of products to be purchased. Examples of the Supply Side and Demand Side Publications can be found in Table 1. The Public Policy Project looks at the impact that supply-side legislation has on the availability of products in the marketplace for people with disabilities and people aging into disability.

Table One: Examples of Supply and Demand Side Legislation	
Supply Side Legislation	Demand Side Legislation
Stevenson-Wydler Act	Individuals with Disabilities Education Act
Bayh-Dole Act	American's with Disabilities Act

Cornerstone supply-side legislation includes the Technology Innovation Act of 1980 (also called the Stevenson-Wydler Act) (PL 96-480) which laid the groundwork for technology transfer into and out of the Federal Laboratories. It recognized that cooperation and information dissemination to private entities was necessary to ensure that the large amount of technology created within the Federal Labs could be transferred to non-government applications. The Stevenson-Wydler Act also established Offices of Research and Technology Application (ORTA) at major federal laboratories to facilitate the transfer of Federal Lab Technology. Subsequent legislation such as the Federal Technology Transfer Act of 1986 (PL 99-502) not only created mechanisms to enforce federal technology transfer, but it also created minimum royalty fees for technologies licensed by federal inventors and created the Cooperative Research and Development Agreement (CRADA) under which a private sector company and federal lab co-develop a technology (intellectual property) with each party having specific rights to use this technology. There are many variations on the basic concepts of technology licensing and CRADA.

A second critical piece of supply-side legislation is the Patent and Trademark Act of 1980 (Bayh-Dole Act)(PL 96-517) which, among other things, gave federally funded US universities ownership of any intellectual property (IP) generated by their faculty and staff. As a result of the Bayh-Dohl Act, university technology transfer offices (TTO) were established to screen university created IP, establish the market value of IP, patent valuable IP, locate private sector partners, and negotiate license agreements (or the equivalent) with these partners. Royalties from license agreements accrue back to the university. A small portion of these royalties is returned to the inventor who created the innovation.

The Small Business Innovations Development Act of 1982 (PL 97-219), which was reauthorized again until September 30, 2008 by the Small Business Reauthorization Act of 2000 (P.L. 106-554), required that all large federal agencies (defined as any agency providing extramural research funding that exceeds 100 million dollars per year) must commit a few percent of their extramural funding as grants to small US businesses (less than 500 employees) by way of Small Business Innovation Research (SBIR) grants. The purpose of the SBIR program is to stimulate private sector technology development that might help the sponsoring federal agencies achieve their missions. The SBIR program creates shared IP, allowing the federally agency and the small business that created the innovation to share IP rights. In many cases, the small business manufactures products based upon this intellectual property for the private sector while the government retains a non-exclusive right to the technology for governmental use.

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R2. The Public Policy Project

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The principle investigator for an SBIR grant must be employed by a small business. Within guidelines established by the SBIR Act, participating agencies are free to set rules for administration and funding levels for their SBIR programs. Most programs have both Phase I and Phase II grants, and an unfunded Phase III grant. The Phase I grant are typically funded for six months at up to $100,000. Phase I grants are used to complete work on a technical proof of concept. The Phase II grant are typically funded for up to two years at up to $750,000 per year. Phase II grants are used to refine the prototype and demonstrate commercial viability. Phase III SBIR grants do not provide government funds but focus on the successful commercialization of the innovations developed within the SBIR program. The Small Business Technology Transfer Act of 1992 (Public Law 102-564, Title II), and reauthorized until September 30, 2009, by the Small Business Technology Transfer Program Reauthorization Act of 2001 (P.L. 107-50) established a mechanism that is very similar to the SBIR program except that the principle investigator for an STTR grant must be university-based and the grant must include a private sector partner in the form of a small business.

The 1978 Amendments to the Rehabilitation Act of 1973 established the National Institute on Disability and Rehabilitation Research (NIDRR). NIDRR subsequently established a system of about twenty Rehabilitation Engineering Research Centers (RERC, current name). Along with Veteran's Administration, Research and Development Centers (VA R&D); and the National Institutes of Health, National Center on Medical and Rehabilitation Research (NCMRR) the RERC's take a lead role in research and development activities focused on the needs of people with disabilities. In particular, the RERC on Technology Transfer facilitates the development of technology benefiting people with disabilities, and the transfer of this technology to the private sector. The RERC on Technology Transfer has several well-established development projects to support these objectives.

Stevenson-Wydler, Bayh-Dole, SBIR, the Rehabilitation Act Amendments have been amended and remain active today through revisions and reauthorizations. They are critical pieces of legislation under which technology transfer is supported. Under these Acts, federal dollars committed to government and academic research will directly or indirectly stimulate product development in the private sector and become economic drivers for the US economy. However, the specific impact that these pieces of legislation have on the needs of people with disabilities and people aging with and into disability is uncertain.

The Public Policy Project will evaluate the impact of six programs linked to federal supply-side legislation. The central question that we seek to answer is, "What is the impact of each program (and by implication the parent federal legislation) on the availability of assistive technology in the marketplace?" The six programs to be evaluated include: 1) SBIR; 2) STTR; 3) university-based technology licensing; 4) federal laboratory-based technology licensing; 5) federal laboratory CRADA; and 6) the RERC on Technology Transfer. Work to date has focused on the SBIR and STTR programs of the National Institutes of Health, US Department of Education and National Science Foundation for 1996 through 2003. Time permitting, the Department of Transportation and Department of Agriculture SBIR programs will also be evaluated. Information being gathered includes: grant title, grant number, granting agency, phase (I/II), award total, principle investigator, abstract (when available), and disability focus. Initial evaluation of the SBIR and STTR programs will be completed by the fall of 2005. Evaluation results are being placed into a database and made available online. Summary reports will also be provided to industry association (e.g. the Assistive Technology Industry Association); federal agencies (e.g. NIDRR, NIH, and NSF); and the Interagency Committee on Disability Research. ■

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Volume 7, Issue 1 • 2005

A publication of the Rehabilitation Engineering Research Center on Technology Transfer (T²RERC)

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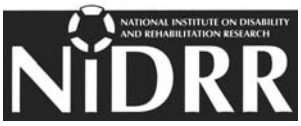
This is a publication of the Rehabilitation Engineering Research Center on Technology Transfer, which is funded by the National Institute on Disability and Rehabilitation Research of the U.S. Department of Education under grant number H133E030025. The opinions contained in this publication are those of the grantee and do not necessarily reflect those of the Department of Education.



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