



WebEd: Professional Development & ADA National Network



January 31, 2018

3:00pm ET/2:00pmCT/1:00pmMT/12:00pmPT



The content and materials of this session are the property of RESNA, Great Lakes and Southwest ADA Centers and the presenters and cannot be used and/or distributed without permission. For permission to use training content or obtain copies of materials used as part of this program please contact adaconferences@adagreatlakes.org



Telephone Option: 712-432-6297 Access Code: 558341#

Listening to the Webinar



- The audio for today's webinar is being broadcast through your computer. Please make sure your speakers are turned on or your headphones are plugged in.
- You can control the audio broadcast via the Audio & Video panel. You can adjust the sound by "sliding" the sound bar left or right.
- If you are having sound quality problems check your audio controls by going through the Audio Wizard which is accessed by selecting the microphone icon on the Audio & Video panel



2



Listening to the Webinar, *continued*

If you do not have sound capabilities on your computer or prefer to listen by phone, dial:

1-712-432-6297

**Pass Code:
558341#**

This is **not** a Toll Free number

3



Listening to the Webinar, *continued*

MOBILE Users (iPhone, iPad, or Android device and Kindle Fire HD)

Individuals may listen** to the session using the Blackboard Collaborate Mobile App (Available Free from the Apple Store, Google Play or Amazon)



**Closed Captioning is not visible via the Mobile App and limited accessibility for screen reader/Voiceover users

4

Captioning



- Real-time captioning is provided during this webinar.
- The caption screen can be accessed by choosing the  icon in the Audio & Video panel.
- Once selected you will have the option to resize the captioning window, change the font size and save the transcript.

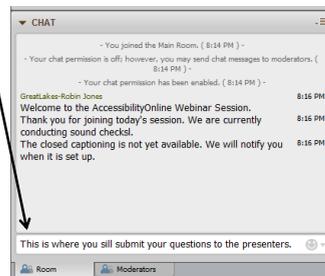


5

Submitting Questions



- **You may type and submit questions in the Chat Area Text Box or press Control-M and enter text in the Chat Area**
- **If you are connected via a mobile device you may submit questions in the chat area within the App**
- **If you are listening by phone and not logged in to the webinar, you may ask questions by emailing them to info@adaconferences.org**



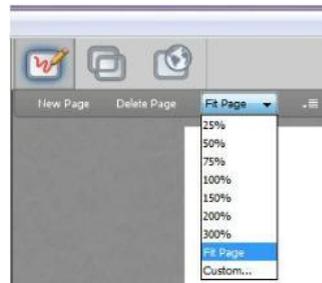
Please note: This webinar is being recorded and can be accessed on the website at www.adaconferences.org/RESNA/Archives within 24 hours after the conclusion of the session.

6

Customize Your View



- Resize the Whiteboard where the Presentation slides are shown to make it smaller or larger by choosing from the drop down menu located above and to the left of the whiteboard. The default is “fit page”



7

Customize Your View *continued*



- Resize/Reposition the Chat, Participant and Audio & Video panels by “detaching” and using your mouse to reposition or “stretch/shrink”. Each panel may be detached using the  icon in the upper right corner of each panel.

8

Technical Assistance



- If you experience any technical difficulties during the webinar:
 1. Send a private chat message to the host by double clicking “Training-Other” in the participant list. A tab titled “Training-Other” will appear in the chat panel. Type your comment in the text box and “enter” (Keyboard - F6, Arrow up or down to locate “Training - Other” and select to send a message); or
 2. Email info@adaconferences.org; or
 3. Call 877-232-1990 (V/TTY)

9

CEUs



- The RESNA Catalyst Project will offer .1 CEUs for this webinar session. The RESNA Catalyst Project is an approved authorized provider for CEU credits by the [International Association for Continuing Education and Training \(IACET\)](#).
- You can receive 0.1 CEUs for a sixty to ninety minute webinar. There is a \$28 fee to receive credits for this webinar. An application for CEUs was included with the materials for download for the webinar and will be available after via the archive as well.
- To apply for CEUs or for information please contact: **Charlie Raphael Director of Certification and Education** at [571.257.3268 ext. 316](tel:571.257.3268) or via email: craphael@resna.org or via fax to: 703-524-6630. There is a \$28 fee to receive credits for each webinar.or via fax to: 703-524-6630.

10

CUSTOM ASSISTIVE TECHNOLOGY SOLUTIONS FOR EMPLOYMENT

Ray Grott, MA, ATP, RET
Director: The RET Project

© 2018

11

Rehabilitation Engineering & Assistive Technology (RET) Project at SF State University

- Providing technology solutions for people with disabilities since 1992 throughout the Greater SF Bay Area
- Work with public & private agencies and companies, and individuals
- Primarily with adults through the California Dept. of Rehabilitation

12

WHY IS THE WORKPLACE DIFFERENT?

- Multiple primary stakeholders – employee and employer
- Co-workers are part of the dynamics
- Productivity is the priority
- High stakes in both the short & long term
- Need is often immediate/short timeframe
- Cost IS a concern

13

KEY STEPS TO A SUCCESSFUL WORKPLACE ACCOMMODATION

- Set the stage for positive collaboration
- Approach problem solving systematically
- Be creative and flexible in implementation

14

► Setting the stage for collaboration

- Acknowledge the disability
- Communicate needs
- Collaborate
- Be positive
- Don't fear change



15

►► Acknowledge the disability & Communicate Needs

- Employee has right to accommodation
- Employee has to take the initiative—disability issues are not always obvious
- Employer is responsible for creating a positive, responsive, & supportive environment



16

▶▶ Collaborate

- Employee will know a lot about accommodating her disability and may have solutions to offer
- Employer knows the needs, systems and resources of the company
- Avoid dictating solutions
 - Increases likelihood of success
 - Improves acceptance of chosen accommodations

17

PROBLEM SOLVING METHODOLOGY

- Define the problem
- Analyze and clarify the problem
- Establish goals and criteria for a solution
- Generate solution ideas
- Evaluate & select the best solution
- Implement solution
- Follow up, refine, and evaluate

18

Problem Solving Methodology:

► Problem Analysis

- Job tasks, tools, materials, methods
- Employee's abilities and limitations
- Productivity goals
- Environment
- Personal preferences
- Anticipated changes
- Interpersonal issues (motivation, frustration, bias, etc.)

19

Problem Solving Methodology:

► Generate, Evaluate & Select Solutions

- Prioritize need
- More clearly define the problem
- Establish design criteria
- Generate ideas
- Evaluate (Cost and time to implement?)
- Select solution to pursue

20

Problem Solving Methodology: ► Implement Solutions

- Acquire items
 - Purchase
 - Custom modify or custom design
- Install and test with employee
- Modify as needed
- Provide training
- Follow-up

21

CUSTOM DESIGN AND FABRICATION OF AT

- Cost hierarchy of technology solutions
- Why is custom work needed?
- Guidelines for success



22

► Hierarchy of Technology Solutions

1. Existing general-use product
2. Existing “disability-specific” product
3. Custom modification of existing product
4. Custom design and fabricate from scratch



23

► Hierarchy of Technology Solutions

- Not just a question of lowest cost
- Consider durability, repairability & replaceability
- Initial cost is less important than what works best for the employee over the longer term

24

► Why is custom work needed?

- Off-the-shelf products often do not meet all the criteria
- Individuality is the nature of disability
- World is designed for able-bodied
 - Built environments
 - Tools and Equipment
 - Inflexible methods



25

Guidelines for Success: ► *User-Centered Design*

- Understand users, task, and environment
- Involve users throughout design and development
- Iterative design process
- Consider the whole user experience
- Design team includes various perspectives

(from ISO Standard on Human-centered design for interactive systems)

26

Guidelines for Success:

- ▶ Don't assume that how something *has* been done is how something *must* be done



With one functional hand, she couldn't tie up the trash bags as has been the practice. Talked to trash pickup folks—learned that she didn't need the bags tied up, just closed.

27



- Clamp the bag to the janitor cart.
- Give the bag a spin and toss in trash.

University of Wisconsin-Stout Vocational Rehabilitation Institute

28



University of Wisconsin-Stout Vocational Rehabilitation Institute

29

Guidelines for Success:

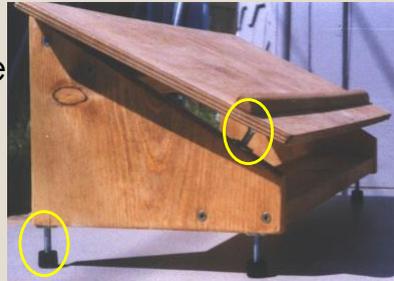
► *KISS*

- Avoid over- engineering or experimenting
- Chose the simplest path (Not everything needs to be 3D printed just because you bought one.)
- Simplifies modifications, repairs, replacement parts, & labor



Guidelines for Success: ▶ *Design for shifting needs*

- Abilities, needs, and preferences can shift over time, even from day to day
- Job tasks, materials, and methods can change
- Build to fit AND make it adjustable
“Make it adjustable or make it again”



31



Keyboard stand with height and angle adjusted by relocating bolts in available holes



32

LOW TECH / LOW COST SOLUTIONS

33

How to open drawers or pull out files without good hand use?



34



Simple rubber loops added to desk drawer for low effort hand pull

Flexible loops added to hanging file folders for those without pinch grip—also to cabinet drawer



35

How could I...

Enable a wheelchair rider to pick up stray video tapes/DVDs from the floor?

- Only has use of 1 hand, with grasping ability but no fine motor control

36



Attached a suction cup to the end of a dowel covered with pipe insulation for better grip

37



Release suction cup by bending the rod down, thereby pulling on the string connected to the cup edge

38

How could I...

Help a part-time social service provider with back pain (and a low budget) assist people while avoiding twisting?



39



Provided better chair

Writing surface placed on open desk drawer created an L-shaped desk for facing the client



40

How could I...

Manage a mop, broom, or similar pole-type tool without good grip or hand control?



41

OFF-THE-SHELF OPTIONS



Motus Hand Grips
www.motus.ca

BACK SAVER
GRIP



Stout's BackSaver Grip
www.backsavergrip.com

42



Patti Barrett, ATP, RET

Custom grip with hand loop using PVC pipe

43



Modified forearm crutch with flat mop system



University of Wisconsin-Stout Vocational Rehabilitation Institute

44

How could I...

Accommodate clerical workers with one functional hand or poor hand control?



45



- Holding clamps, letter openers, and stapler
- Letter folding jig
- Clamp to hold documents in place

46



(Above)Clamp for holding envelopes (Below) Clamp for binder clips



47



Jig to hold and tear off pay stub



Same jig used to hold letters for opening with razor cutter

48



Envelope stuffer jig to slide papers into cardboard envelope



University of Wisconsin-Stout Vocational Rehabilitation Institute

49

How could I...

- Accommodate an office worker with arm weakness who rides a powered wheelchair?

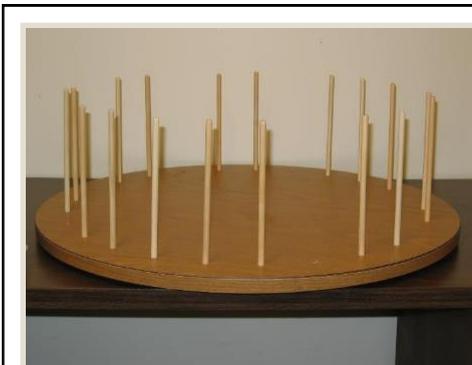


50



Add pull loop to keyboard tray

Loop made of extension cord wire



Rotating lazy susan with vertical dowels to bring more items within reach





Attached rods to light switches for easier access in tight space

Rods were sold for use with venetian blinds

53



Attached loops to file folder drawers and used wheelchair to pull them open





Used venetian blind rod to lift up cover of copy machine

55

MEDIUM TECH / MODEST COST SOLUTIONS

(Medium tech can also be complicated
and costly)

56

How could I...

Help a transcriptionist manage a playback machine without using his foot?



57



Knee-activated
spring switch

Custom
adjustable mount



58

How could I...

Accommodate a movie theater ticket-taker with one functional hand?

--Need to cut the ticket in half and retain one half for later

59





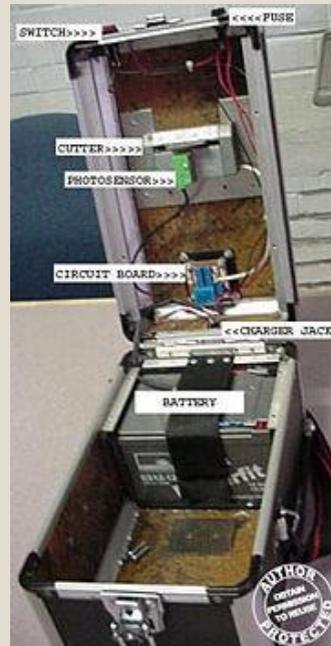
Battery operated scissors with external D-cell battery pack and rotary switch

61



This ticket cutter uses commercial rotary cutter with photo-electric sensor to trigger switch

Tom Rybak, RE
 Dept of Rehab Services, Richmond, VA
<http://atwiki.assistivetech.net>



62



Simple solution? One-handed scissors

63

How could I...

Accommodate a short-statured employee with muscle weakness at a store check-out counter? (Had the opportunity to move up from being a bagger)



University of Illinois at Chicago (UIC) Assistive Technology Unit

64



Cart with handrails rolled into place as needed



University of Illinois at Chicago (UIC) Assistive Technology Unit

65



Padded surface to lean on for stability



University of Illinois at Chicago (UIC) Assistive Technology Unit

66

Addressing balance and stability



- Young man with cerebral palsy
- Opportunity for job promotion accessing files
- Unstable on a cart with steps

University of Illinois at Chicago (UIC) Assistive Technology

67



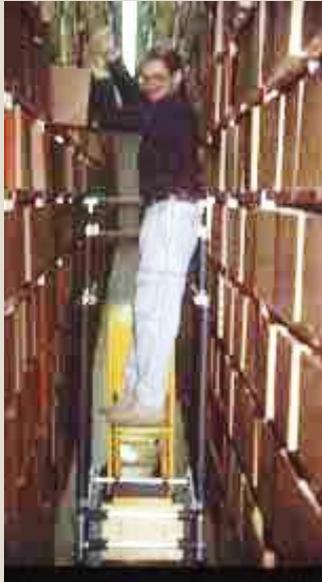
Frame attached to drop steps on a rolling cart



Steps

University of Illinois at Chicago (UIC) Assistive Technology Unit

68



- Handrail system used for high shelves
- Consumer can lean against rails
- Arms free for filing

University of Illinois at Chicago (UIC) Assistive Technology Unit

69

How could I...

- Accommodate a medical records clerk with limited use of one hand?

70



Crowded shelves in medical records department before they went electronic

Thick files are hard to separate and keep upright for insertion or removal with one hand



71



Telescoping, spring-loaded clamp hooks on to top and bottom of the shelf and flat bar holds the files in place

Internal spring made out of bungee cord (very high-tech)



72



Used in pairs to hold files apart

Co-workers wanted to use these as well...



73

Cueing/Counting Jig



Put one item in each top slot. Tip the lever to funnel into box.

Gary M. McFadyen, Ph.D.
Mississippi State University
<http://atwiki.assistivetech.net>

74

How could I...

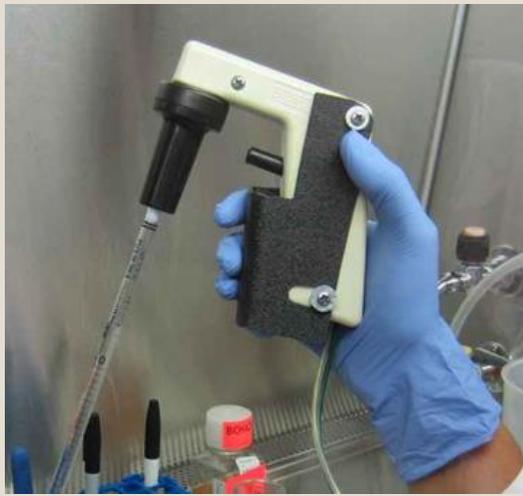
Accommodate a technician in a hospital tissue lab with significant repetitive strain injuries?

- Engages in multiple tasks requiring the manipulation of small tools and objects
- Required frequent and prolonged fine motor activities

75

Reducing the force required for pipetting

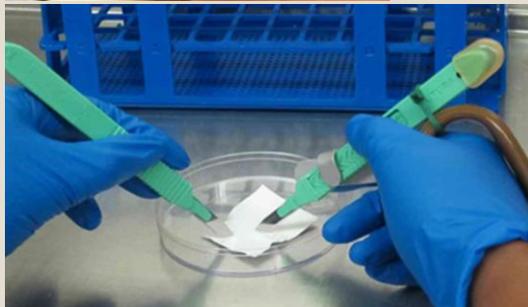
76



A hinged lever over the trigger distributed the effort by pressing with several fingers rather than one



Reducing the effort of tissue slicing



Using a modified Wanchik Writer to hold the scalpel

77

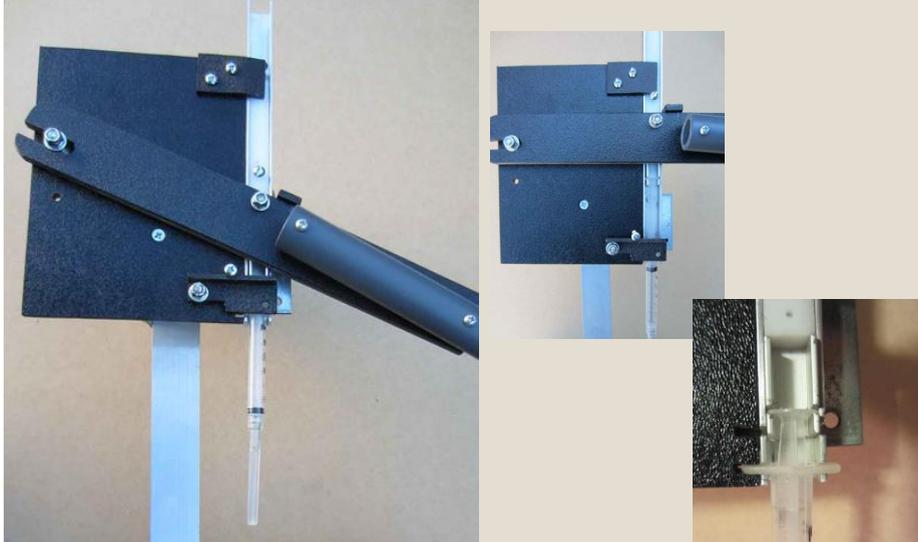
Further reducing the effort of tissue slicing



Going for a "neutral" hand position with a larger grasp by attaching the scalpel to a vertical pipe of the desired diameter

78

Reducing the effort of manipulating a syringe



Stand holds syringe in place while arm activates the plunger to dispense fluid

How could I...

- Help an office worker with dwarfism (but who weighs 220lbs) reach the upper drawers of lateral file cabinets?



Little Giant Step Ladder

- 300lb weight capacity, wider and deeper steps
- **BUT** step height is 10" and employee needs 7" step
- Needs to be easily mobile and quickly deployed

81

Final Product



82



First 7"-high step is integrated into the platform

83



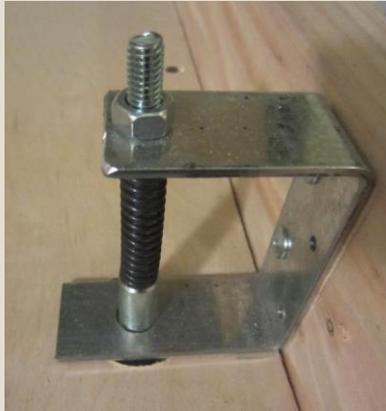
View from above



View from underneath

Mobility provided by 4 retractable casters

84



"Ladder casters" were the solution, but had to customize the brackets and find the right springs

85



Means for attaching extended handles onto odd-shaped frame will allowing for adjustment.





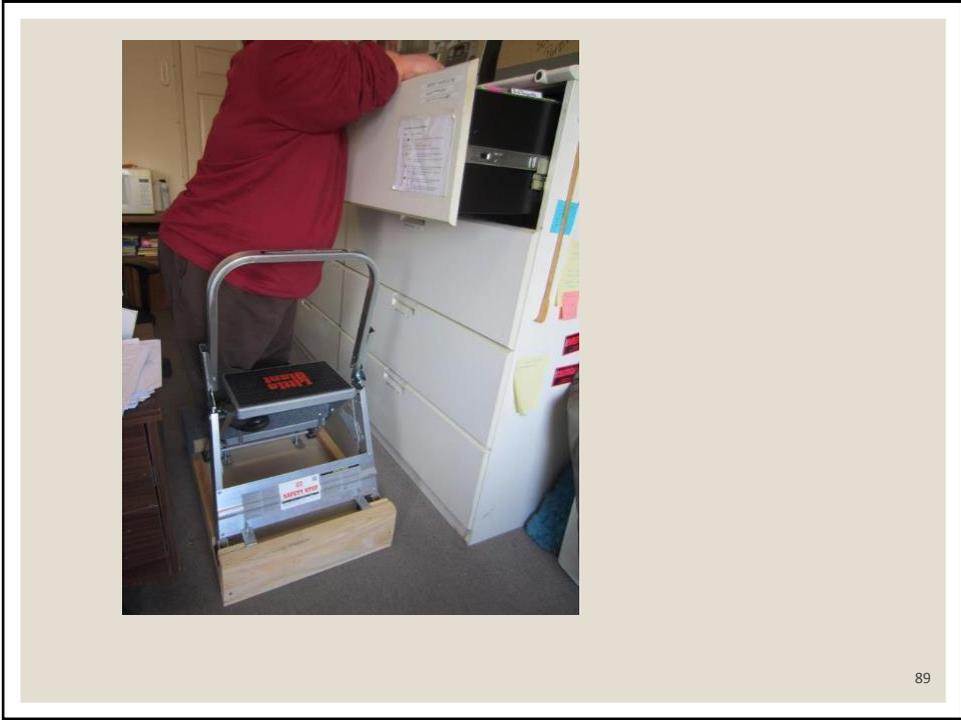
After wheeling the stool platform into place, stepping on it compresses the caster springs, allowing the base to rest firmly on the floor.

87



- The horizontal extensions were not needed and were removed for easier maneuvering.
- The third step facilitated reaching items on the top of the cabinet.

88



89

HIGHER TECH / HIGHER
COST SOLUTIONS

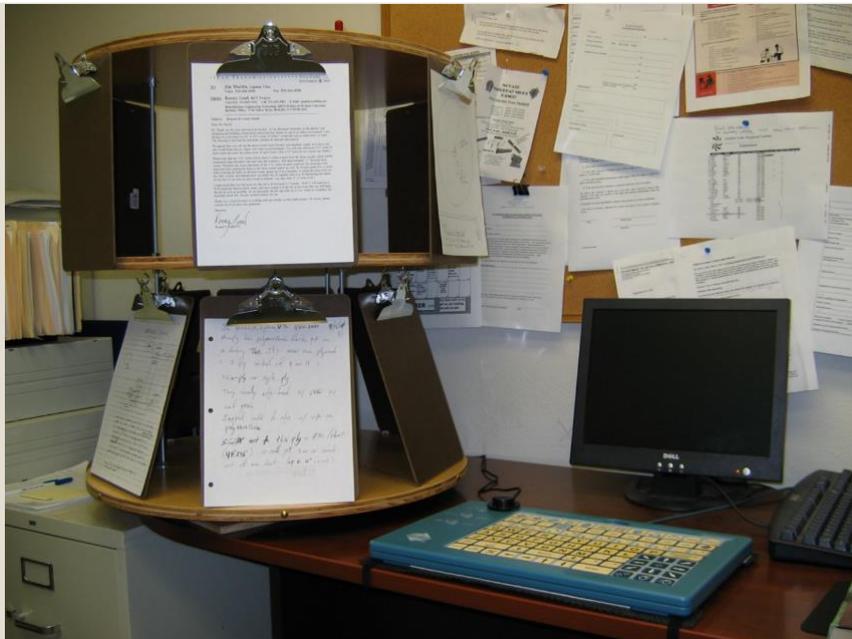
90

How could I...

- Give an office worker with spastic cerebral palsy independent access to papers?



91

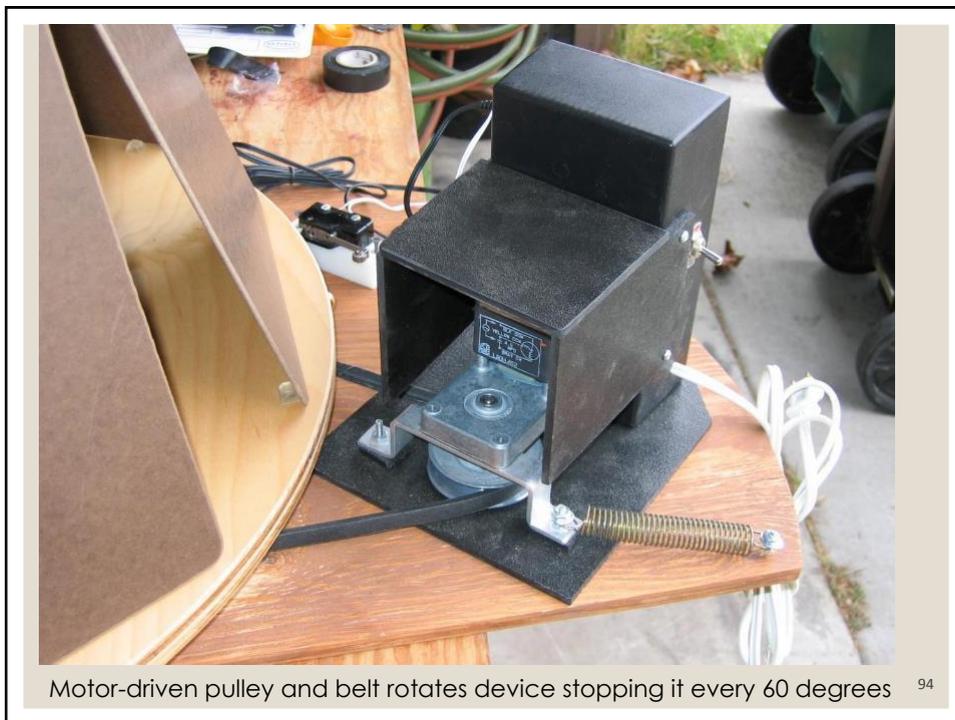


Motorized Lazy Susan with two tiers, holding 12 clipboards with documents ⁹²



"High-tech" cup hooks hold the clipboards

93



Motor-driven pulley and belt rotates device stopping it every 60 degrees

94



After data is entered, pressing a switch rotates the device once again 95

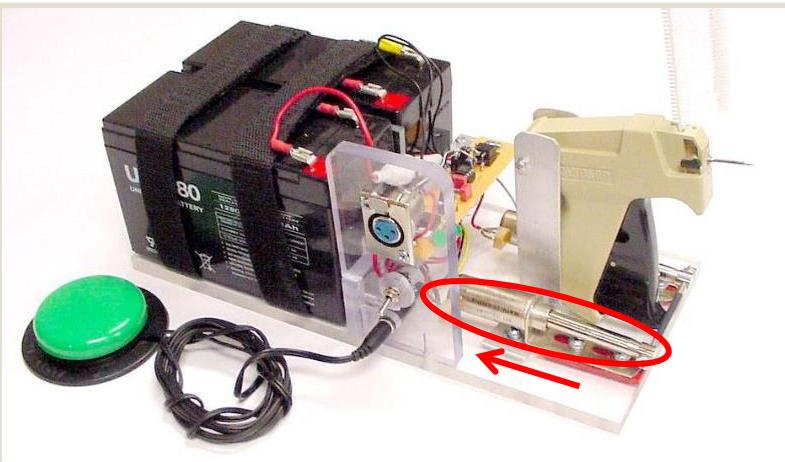
How do you switch operate this Clothes Tagger?

Device requires a fair amount of manual dexterity and grip strength



Woods Services, Langhorne, PA

96



- Battery-powered electric solenoids are used to pull the trigger of the clothes tagger
- Ability Switch-activates the mechanism
- Rechargeable battery pack

Woods Services, Langhorne, PA 97

How could I...

Help and engineer with high level SCI independently position a QuadJoy mouth driven mouse?

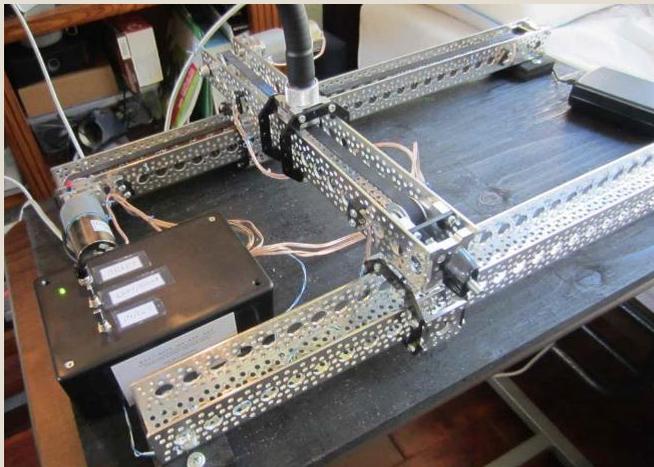
98

Solution: a voice-controlled X-Y motorized mount



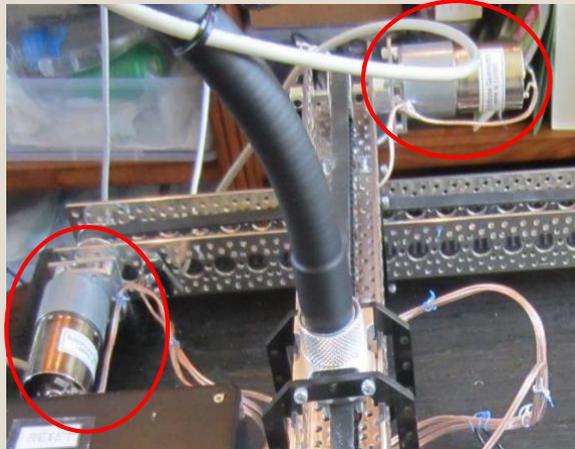
99

Used two sets of motorized sliders to support and control the movement of the Quadjoy gooseneck



100

Used two DC gearmotors with different speeds, for faster travel left and right and slower in the more critical in/out directions.



101

Arduino microprocessor board controlled a set of relays determining the direction of rotation of the two motors



Arduino Uno Board



SainSmart Relay Modules

102

A “slide right” voice command would send a “6” to the Arduino’s software control. The Arduino code would then open or close the associated relays.

```
case '6': //RIGHT
  digitalWrite (5, LOW);
  digitalWrite (6, LOW); //Relay 6 & 7
  digitalWrite (10,HIGH);
  break;
case '7': //Move LEFT for .25 second
  digitalWrite(6,HIGH);
  digitalWrite(5,LOW);
  delay (250);
  digitalWrite(5,HIGH);
  break;
```

103

Manual switch control of the motors was provided as a back-up



Lot of wires!



104



It's all about the people!

105

CONTACT

Ray Grott
415-338-1333
rgrott@sfsu.edu

© 2018

106

CEUs



- The RESNA Catalyst Project will offer .1 CEUs for this webinar session. The RESNA Catalyst Project is an approved authorized provider for CEU credits by the [International Association for Continuing Education and Training \(IACET\)](#).
- You can receive 0.1 CEUs for a sixty to ninety minute webinar. There is a \$28 fee to receive credits for this webinar. An application for CEUs was included with the materials for download for the webinar and will be available after via the archive as well.
- To apply for CEUs or for information please contact: **Charlie Raphael Director of Certification and Education** at [571.257.3268 ext. 316](tel:571.257.3268) or via email: craphael@resna.org or via fax to: [703-524-6630](tel:703-524-6630). There is a \$28 fee to receive credits for each webinar.or via fax to: [703-524-6630](tel:703-524-6630).

107



Thank you for participating in today's session titled:
Custom Assistive Technology Solutions for
Employment

This session was recorded and the archived recording will
be available within 24 hours at:
www.adaconferences.org/RESNA/Archives



108