



## Learning from Accessibility Research: An issue of increasing importance to older users

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Janice (Ginny) Redish  
Redish & Associates, Inc.  
Bethesda, Maryland

based on work with Mary Theofanos  
at the National Cancer Institute  
Rockville, Maryland



## Topics for this session

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- Two studies – users who listen to the screen, users who magnify the screen
  - navigation
  - content
  - forms
  - other issues
- Issues for the future: How do we achieve experience equity and universal access?



## The two studies

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- Users who listen
  - 16 users
  - working with JAWS or Window-Eyes
  - 2 hours each, typical usability testing scenarios, different U. S. federal web sites
  
- Users who magnify the screen
  - 10 users
  - working with ZoomText
  - 2 hours, same methodology

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## Goals of our studies

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- Understand the relationship between accessibility and usability
- Understand how users work with web sites – users who listen and users who magnify
- Develop research-based guidelines for accessibility *and* usability
- Assess the usability of specific web sites

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## What did we learn? – Navigation for users who listen

### Users who listen:

- scan with their ears
- want to skip the navigation
- are keyboard-oriented
  
- often listen only to links
- sometimes jump from heading to heading
- occasionally use CTRL-F – Find
- rarely use the Virtual Viewer

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## Scanning with their ears

- Impatient – just like other users
- Want to find what they need quickly

530 Answers Found

	Subject
1	Updated - What documents, identification, paperv
2	Updated - Do I need a license to import somethin
3	Updated - What things should I consider before in
4	Updated - Documents, identification, paperwork re
5	Updated - How to use the HTS, determining duty
6	Updated - Do I need a Customs broker to clear m
7	Updated - How do I, as a traveler, bring back alco
8	Updated - Requirements for importing a car or car
9	Updated - What jobs are currently available with C
10	Pets - cats

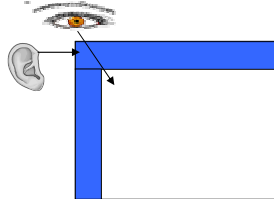
The frequent repetition of "updated" at the front of links in this list makes the list very difficult for screen-reader users to scan.

- [HHS Home](#) alt="Decorative bullet image: Home"
- [Questions?](#) alt="Decorative bullet image: Questions?"
- [Contact Us](#) alt="Decorative bullet image: Contact Us"
- [Site Map](#) alt="Decorative bullet image: Site Map"

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## Skipping the navigation

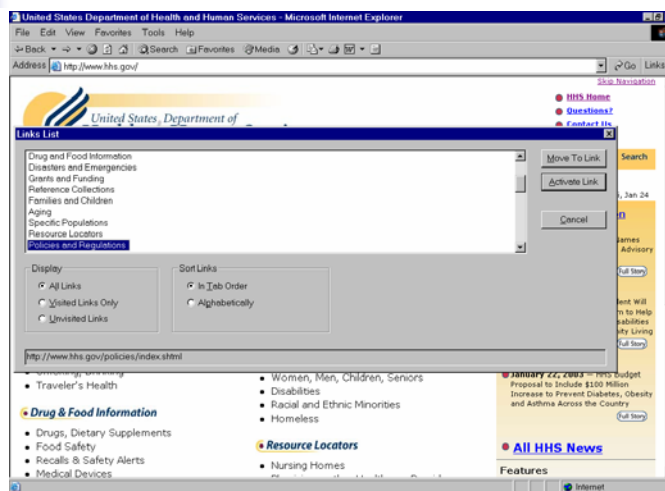
- All wanted to skip the navigation
- Only half – the highly sophisticated half – knew what "skip navigation" means



- ✗ skip navigation
- ✗ skip to content  
(JAWS misreads content)
- ✓ skip to main content

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## Listening only to links



video

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## Listening only to links

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- Benefits:
  - Can be very quick way to access information – if the
    - number of links is not overwhelming
    - link names are meaningful
- Issues:
  - Do not hear the non-linked surrounding text
  - Do not hear the bullets under a link
- Recommendations:
  - Link labels must be meaningful and carry all the information
  - Tricky to obtain the most meaning with best length

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## Jumping from heading to heading

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### Reactions after Smallpox Vaccination [E]

The smallpox vaccine prevents smallpox. For most people, it is reactions to the vaccine, which indicate that it is beginning to take effect.

#### Normal, Typically Mild Reactions

These reactions usually go away without treatment:

- The arm receiving the vaccination may be sore and red where
- The glands in the armpits may become large and sore.
- The vaccinated person may run a low fever.
- One out of 3 people may feel bad enough to miss work, school

#### Serious Reactions

In the past, about 1,000 people for every 1 million people vaccinated were serious. These reactions may require medical attention.

- A vaccinia rash or outbreak of sores limited to one area. This is vaccination site and then touching another part of the body or where it can damage sight or lead to blindness. Washing hands (inadvertent inoculation).
- A widespread vaccinia rash. The virus spreads from the vaccination site (generalized vaccinia).
- A toxic or allergic rash in response to the vaccine that can take

#### Life-Threatening Reactions

Rarely, people have had very bad reactions to the vaccine. In the first time experienced potentially life-threatening reactions

- Only works if headings are coded properly.

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## Problem with scanning links quickly and jumping from heading to heading

- On content pages, questions make excellent headings, and, therefore, good anchor links; but questions don't start with the key words. Ideas?
  - [What is literacy?](#)
  - [How is adult literacy measured?](#)
  - [How literate is the adult population?](#)
  - [Where can I find out about literacy rates in my area?](#)
  - [How does literacy in the US compare with other countries?](#)
  - [How can I get funding for my adult literacy program?](#)
  - [How do I find a nearby literacy program?](#)
  - [How do I start an adult literacy program?](#)
  - [Where can I find tutoring materials?](#)
  - [Where can my organization donate books?](#)
  - [Where can I get a poster about literacy?](#)
  - [Where can I volunteer to work with adult learners?](#)
  - [What are learning disabilities and what is their relationship to literacy?](#)
  - [Where can I learn about literacy-related policy in my state?](#)
  - [Is there a National Literacy Day?](#)
  - [What is International Literacy Day?](#)
  - [What has NIFL done to raise public awareness about literacy?](#)

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## What did we learn? – Navigation for users who magnify

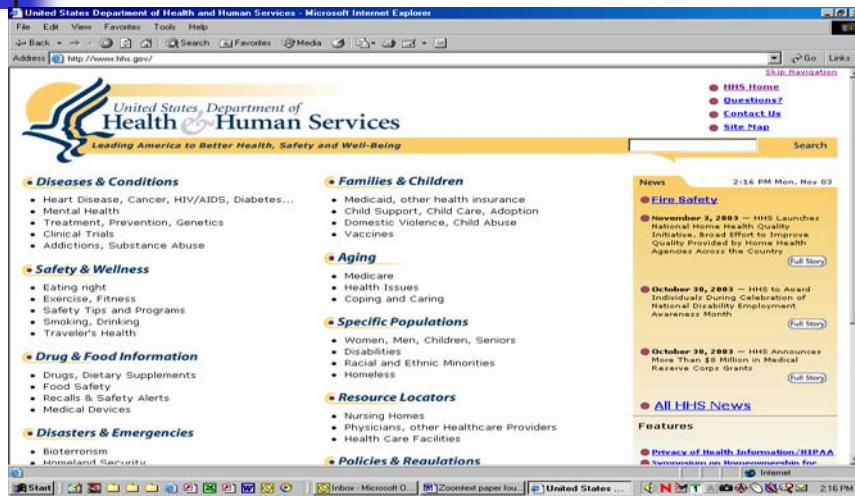
### Users who magnify

- may develop strategies for getting an overview of the page – or not
- may use the scroll bar and have problems orienting themselves
- may not use the scroll bar and may never get to the right side of the screen
- are mouse-oriented

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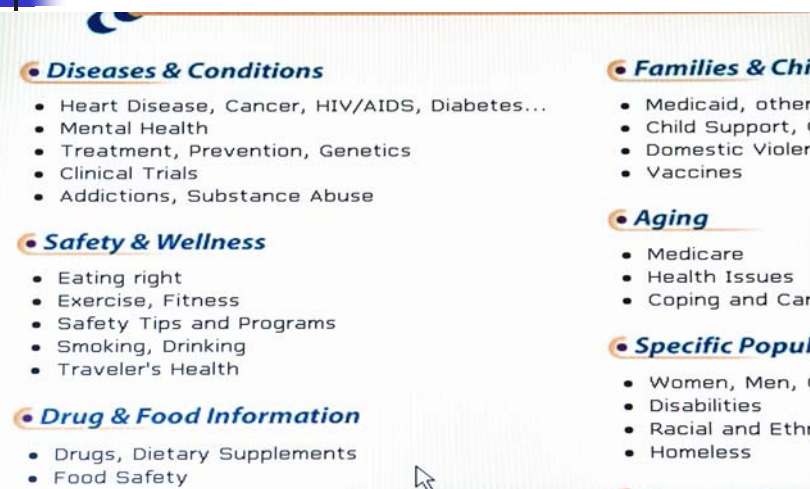
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## Seeing the page – at no magnification



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## Seeing the page – at 2x



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## Seeing the page – at 5x




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## Developing strategies for seeing the page

- Of our 10 low-vision users
  - 3 used the same magnification throughout
  - 1 sacrificed ease of reading for seeing more
  - 1 used the "lens" option – like a magnifying glass
- 5 had strategies for moving between ease of reading and seeing more
  - rapidly change size in ZoomText
  - use CTRL - scroll wheel on mouse
  - change window size to avoid horizontal scroll
  - copy and paste material into Word and enlarge

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## What did we learn? – Content for users who listen

### Users who listen

- do not understand words when the software mispronounces
- find empty tags like [Click here](#) useless
- get confused if the ALT tag and the words on the page differ

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## Not understanding mispronounced words

- Screen readers do an amazing job of reading English but they are not perfect
  - Words with more than one pronunciation –  
cóntent, contént
  - Web words – homepage
  - Unusual words – preparedness
  - Made up words – MedlinePlus, LiveHelp
  - Acronyms – NLM, FY
  - Abbreviations – VA

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## Not understanding mispronounced words

- What you can do to help the screen reader
  - Use Skip to main content.
  - Write home page as two words.
  - Avoid unusual words.
  - Do not make up new words.
  - Use the <Acronym> and <ABBR> tags to let the screen reader know what you mean.

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## Finding empty tags useless

[Click here](#)

[More...](#)

- General questions
  - What is MedlinePlus? [Answer](#)
  - Can you give me some statistics on MedlinePlus? [Answer](#)
- Using MedlinePlus
  - How do I find information about my disease or condition? [Ansy](#)
  - I'm not sure how to spell the name of my disease/medical con
  - How do I find the most current research information on my dis
  - I found my topic on MedlinePlus, but I really needed treatment
  - Why isn't my topic on MedlinePlus? [Answer](#)
  - What is Go Local? [Answer](#)

video

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## What did we learn? – Content for users who magnify

### Users who magnify

- with magnification and color change, users may mistake left navigation for main content
- if content is done as graphics, it may not magnify
- if a page is not coded well, it may not all magnify
- users may miss items even when the items are next to each other

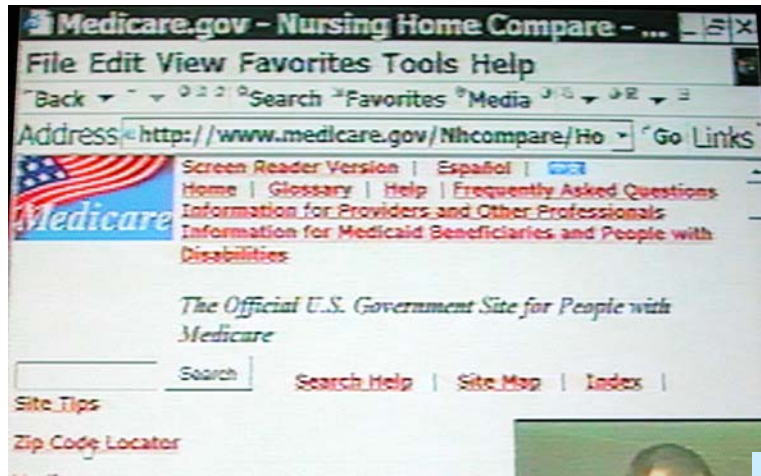
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## Mistaking navigation for content – color separates navigation from content



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## Mistaking navigation for content – with no color, the difference is not clear



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## Losing the magnification – because content is done as graphics



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## Losing the magnification – because content is not well-coded

The smallpox vaccine prevents smallpox. For most people, it is safe and effective. Most people experience normal, typically mild reactions to the vaccine, which indicate that it is beginning to work. Some people may experience reactions that may require medical attention.

### Normal, Typically Mild Reactions

These reactions usually go away without treatment:

- The arm receiving the vaccination may be sore and red where the vaccine was given.
- The glands in the armpits may become large and sore.
- The vaccinated person may run a low fever.
- One out of 3 people may feel bad enough to miss work, school, or recreational activity or have trouble sleeping.

### Serious Reactions

In the past, about 1,000 people for every 1 million people vaccinated

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## Missing items even when they are close to each other on the screen

### with no magnification

Please select a state/territory where you would like to search for nursing homes.

State / Territory:

### magnified to 5x

Home.asp

State / Territory:

s, FL, NY, OH, TX have

e split these states in ha

ilifornia). If you are not s

unties belonging to each

The users did not think that the button would be to the right and did not know what to do after selecting the state.

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## Helping users who magnify find content on the screen


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### Guidelines:

- Never rely on color alone to convey functional meaning – including background color to define different sections of a web page.
- Do not use graphic images for textual elements like links.
- Use relative sizes for text, not absolute sizes.
- Check style sheets and fonts on actual pages to be sure that all text is enlarging properly – and test on different machines with different browsers and different software.
- Plan the page layout carefully so it works well for users who magnify.

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## What did we learn? – Forms for users who listen

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### Users who listen

- can't find the form if its buried on the page or way on the right
- can't use the form if the field labels aren't "well behaved"
- don't hear text that is not connected to a field
- have problems when pages refresh "arbitrarily"

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## Not finding the form

The screenshot shows the USA Freedom Corps website with a search form titled "Find a Volunteer Opportunity". The form is divided into three steps:

- Step 1: Tell us your interest:** Type in an issue or organization, OR select a category, OR do both. Categories include: Animals & Environment, Arts & Culture, Children & Youth, Civic & Community, Education & Technology, Faith-based Organizations, Health, Human Services, and Public Safety & Disaster Prep.
- Step 2: Choose where to serve:** Within US (recommended), International, or From Home (Virtual). Fields for Zip, State, and City are present.
- Step 3: Find Opportunities Now** (button)

Additional text on the page includes "What's New", "Take Action Now", and "President's Council on Service and Civic Participation".

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## Finding the form difficult to use

**Step 2: Choose where to serve:**

- Within US:  
Zip:   
(recommended)  
-OR-  
State:
- International
- From Home (Virtual)

**Please enter your ZIP Code first.**  
The city name and state will be automatically filled using US Postal Service data.

City:   
State:   
Zip Code:  -   
E-mail Address:   
Phone:

Users who listen want to stay in Edit mode. In Edit mode, they will hear words on the screen only if you put them in the tags.

If users enter their ZIP Code first, the screen refreshes, and the screen reader starts again at the top of the page.

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## Designing forms for screen readers

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### Recommendations:

- Do not put a lot of text on the same page as a form.
- Do not put a form far down on the page or far to the right.
- Make sure that all fields are coded so that users do not have to go in and out of Edit mode. Use the HTML <Label> element. To add more information than is in the label, use the Title attribute.
- Do not put information between fields on a form – unless you include them in the tag for the field.
- Avoid making pages refresh.

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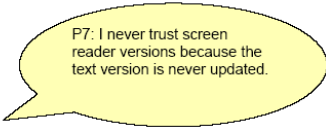
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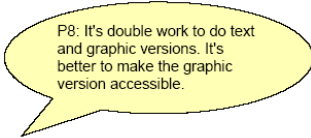
## What did we learn? – Other issues

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- Using assistive software adds a huge mental load.
- Most users do not use all the functionality of their software.
- Many users do not know how to customize all the aspects that they want to change.
- These users are just as impatient as everyone else – but the web is critical to them.
- Separate but equal is not okay.



P7: I never trust screen reader versions because the text version is never updated.



P8: It's double work to do text and graphic versions. It's better to make the graphic version accessible.

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## Discussion – Users are too diverse for simple solutions

- To help users who listen, we can provide some guidelines for web developers.
- For users who magnify, we can provide many fewer – because their needs vary so much.
- And what about other users . . .

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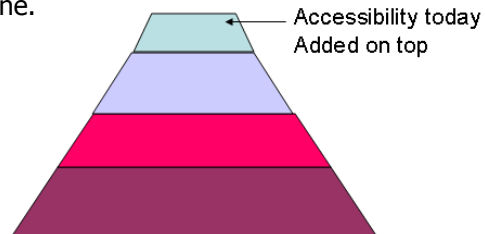


## We are taking the wrong approach

Today –  
Assistive technologies go on top of "regular" sites

First build site for "most" people.  
Then "fix" so site works with "special software."

Can't "fix" enough for everyone.



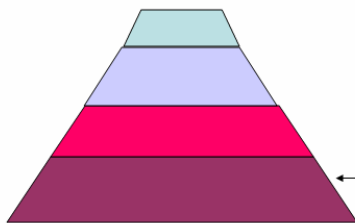
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## We need a new paradigm!

Our proposal for a new vision of the web –

- Flexibility
- Portability
- Graceful transformation of the information to address all of the various users' diverse needs



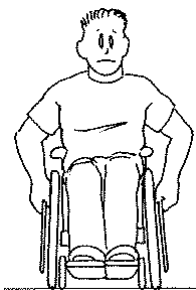
Bottom up  
Individual profiles  
Wheelchair analogy  
Car analogy – and beyond

← Our vision of the future  
Personal profiles with portability

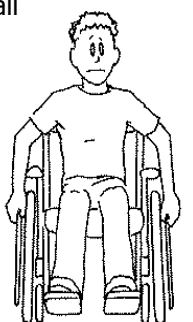
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## Flexibility – part one of our vision

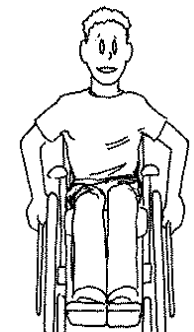
One size does not fit all



Too narrow



Too wide



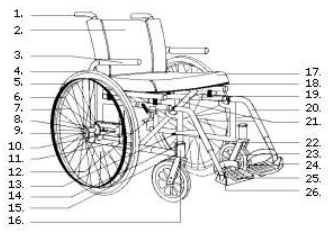
Just right

images from *The Manual Wheelchair Training Guide*  
by Axelson, Chesney, Minkel, and Perr  
© 1998 by PAX Press, a division of Beneficial Designs, Inc.  
used with permission in this presentation

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## Flexibility from customizing components

Manual Wheelchair Components Labeled



Click on name to magnify

1. <a href="#">Push handle bracket tube</a>	10. <a href="#">Axel plate</a>	19. <a href="#">X-Hinge</a>
2. <a href="#">Backrest</a>	11. <a href="#">Frame</a>	20. <a href="#">Swing-away foot rest</a>
3. <a href="#">Swing-away, padded armrest</a>	12. <a href="#">High wheel lock</a>	21. <a href="#">Crossbrace</a>
4. <a href="#">Pneumatic tire</a>	13. <a href="#">Swing-away release</a>	22. <a href="#">Caster fork</a>
5. <a href="#">Aluminum handrim</a>	14. <a href="#">Caster housing cover</a>	23. <a href="#">Caster wheel</a>
6. <a href="#">Aluminum wheel rim</a>	15. <a href="#">Caster plate</a>	24. <a href="#">Caster tire</a>
7. <a href="#">Spokes</a>	16. <a href="#">Caster housing</a>	25. <a href="#">Flip-up foot rest</a>
8. <a href="#">Rear wheel hub</a>	17. <a href="#">Seat cushion</a>	26. <a href="#">Heel loop</a>
9. <a href="#">Release axel</a>	18. <a href="#">Seat sling</a>	

*The Manual Wheelchair Training Guide,*  
[www.wheelchairnet.org](http://www.wheelchairnet.org)  
RERC on Wheeled Mobility

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## Portability – part two of our vision

Users should be able to take their personal profiles to any system, and the system should be able to use that profile to customize itself to meet the individual's needs.

Like a car that adjusts seat height, seat length, mirrors for different drivers – but with portability – the key makes those adjustments on *any* car.



## Graceful transformation of the information – part three of our vision



The information must be the same, even if it looks quite different on the screen. And it must be both accessible and pleasing to the user.

Images from [www.csszengarden.com](http://www.csszengarden.com)

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## Contacts and links

Mary F. Theofanos  
NIST  
100 Bureau Drive  
MS 8940  
Gaithersburg, Maryland  
20899-8940 USA  
voice: +1 301 975 5889  
fax: +1 301 975 5287  
[www.nist.gov/isur](http://www.nist.gov/isur)

Janice (Ginny) Redish  
Redish & Associates, Inc.  
6820 Winterberry Lane  
Bethesda, Maryland 20817 USA  
voice: +1 301 229 3039  
fax: +1 301 229 2971  
[ginny@redish.net](mailto:ginny@redish.net)  
[www.redish.net](http://www.redish.net)

Bridging the Gap Between Accessibility and Usability  
Guidelines for Accessible – *and Usable* – Web Sites:  
Observing Users Who Work with Screen Readers,  
*Interactions*, x, 6, November-December 2003;  
also available in "author's version" as pdf at [www.redish.net](http://www.redish.net)

Helping low-vision and other users with web sites that meet their needs:  
Is one site for all feasible? available as a preprint pdf at [www.redish.net](http://www.redish.net)

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