

# Establishing cutting-edge technology in a federal government usability lab: Eye tracking at the Census Bureau in 2010

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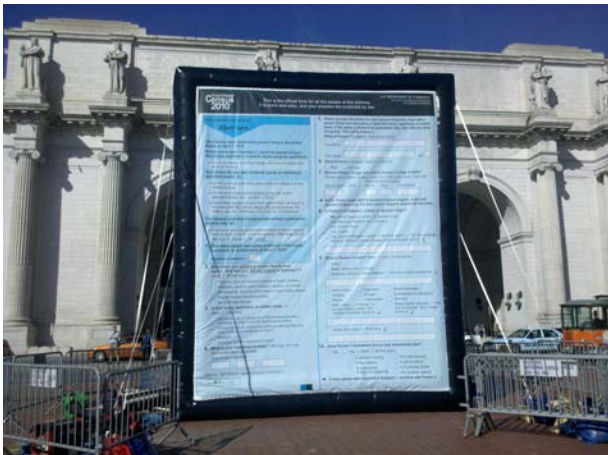
**U.S. Census Bureau  
Statistical Research Division**

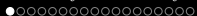
FedCASIC 2010  
Washington, D.C.  
March 18, 2010

# Outline

- 1 U.S. Census Bureau Usability Lab
  - Usability Lab Overview
  - Eye-Tracking Technology
  - Eye-Tracking Capability
  - New Set-Up
  - Tips for Acquiring New Lab Equipment
  
- 2 Thank you

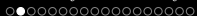
# Census 2010: 10 Questions, 10 Minutes





# Census Usability Lab Overview

- Small laboratory in the Statistical Research Division
- Capabilities:
  - Expert reviews
  - Low-to-High-Fidelity usability studies
  - Card-sorting analyses
  - Eye-tracking studies
  - Accessibility evaluations



# Census Usability Lab Overview

- Used in scientific research for over 100 years
- Will tell you where users are focusing on a stimulus
- Overt attention is important
  - If users do not see features on a survey or Web site, they will not act on them or click on them



## Former Set-up

- Tobii 2250 Eye Tracker
  - 50 Hz sampling rate
- PC w/1 GB RAM
  - Not much hard drive storage
- Tobii Clearview software (no longer supported)

# Lab Research Needs

- Analyze the usability of online surveys, Web sites, and interfaces
- Test usability of paper forms, brochures, and mailing materials
- Accessibility Testing
- Increasing Demand for Eye-tracking data

# New Set-up

- Tobii T120 Eye Tracker
  - 120 Hz sampling rate
  - On-screen stimuli
- New Dell T7500 Workstation
  - 4 GB RAM
  - RAID 5 configuration
- Tobii Studio Software
  - More detailed analysis capability
  - Includes logging capability



# T120 Set-up



# New Set-up

- Tobii X120 Eye Tracker
  - 120 Hz sampling rate
  - Any real-world stimuli
  - Works best for two-dimensional objects
- New Dell T7500 Workstation
  - 4 GB RAM
  - RAID 5 configuration

# Tobii Studio

- Improved calibration capability
- More detailed analysis capability
- Expanded statistics on Average Fixation Duration, Number of fixations, etc.
- Creates comparative tables and charts
- Includes logging capability

# X120 Set-up



# Eye-Tracking Analysis: Quantitative Measures

- Areas of Interest (AOIs): Items we are interested in testing
- Number of Fixations: How often a participant looks at something (AOIs)
- Mean Fixation Duration: How long a participant looks at something (AOIs)
- Time to First Fixation
- Number of mouse clicks
- Order of Fixations : Can tell where a participant looks first, most often, etc.

# Example Eye-Tracking Analysis-T120

Selected Social Characteristics in the United States: 2006  
 Data Set: 2006 American Community Survey  
 Survey: 2006 American Community Survey  
 Geographic Area: Yakima city, Washington

NOTE: Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

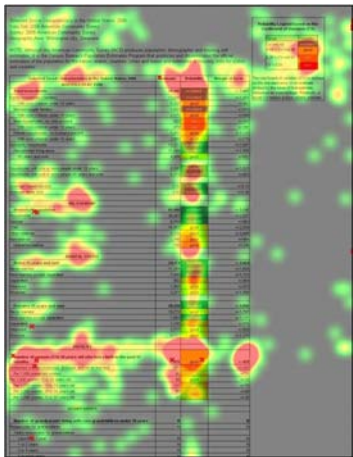
Reliability Legend based on the Coefficient of Variation (CV)

| Range             | Reliability |
|-------------------|-------------|
| CV <= 0.30        | good        |
| 0.30 < CV <= 0.61 | fair        |
| CV > 0.61         | poor        |

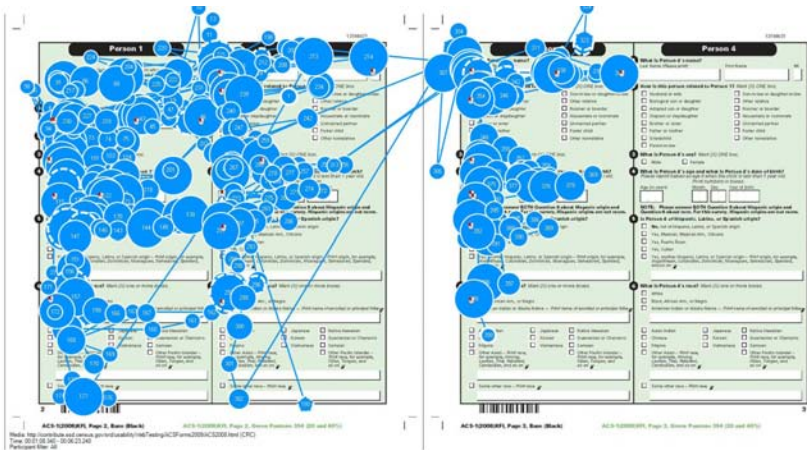
The coefficient of variation (CV) is defined as the standard error of an estimate divided by the mean of that estimate, measured as a percentage. Relatively, a lower CV means a more reliable estimate.

| Selected Social Characteristics in the United States: 2006 | Estimate | Reliability | Margin of Error |
|--|----------|-------------|-----------------|
| <b>HOUSEHOLDS BY TYPE</b>                                  |          |             |                 |
| <b>Total households</b>                                    | 606,121  | good        | +/- 6,121       |
| Family households (families)                               | 18,533   | good        | +/- 1,859       |
| With own children under 18 years                           | 9,430    | good        | +/- 1,448       |
| Married-couple families                                    | 13,316   | good        | +/- 1,572       |
| With own children under 18 years                           | 9,745    | good        | +/- 1,216       |
| Male householder, no wife present                          | 1,152    | good        | +/- 492         |
| With own children under 18 years                           | 540      | fair        | +/- 308         |
| Female householder, no husband present                     | 4,065    | good        | +/- 747         |
| With own children under 18 years                           | 2,436    | good        | +/- 702         |
| Nonfamily households                                       | 11,958   | good        | +/- 1,434       |
| Householder living alone                                   | 9,777    | good        | +/- 1,216       |
| 65 years and over  | 4,515    | good        | +/- 804         |
| Households with one or more people under 18 years          | 10,923   | good        | +/- 1,423       |
| Households with one or more people 65 years and over       | 8,099    | good        | +/- 908         |
| Average household size                                     | 2.66     | good        | +/- 0.14        |
| Average family size  | 3.46     | good        | +/- 0.22        |
| <b>RELATIONSHIP</b>  |          |             |                 |
| <b>Household population</b>                                | 81,113   | good        | +/- 5,974       |

# Eye-Tracking Analysis-T120



# Example Eye-Tracking Analysis-T120



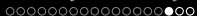


# Example Eye-Tracking Analysis-X120



# Example Eye-Tracking Analysis-X120



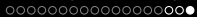


# Tips for Acquiring New Lab Equipment

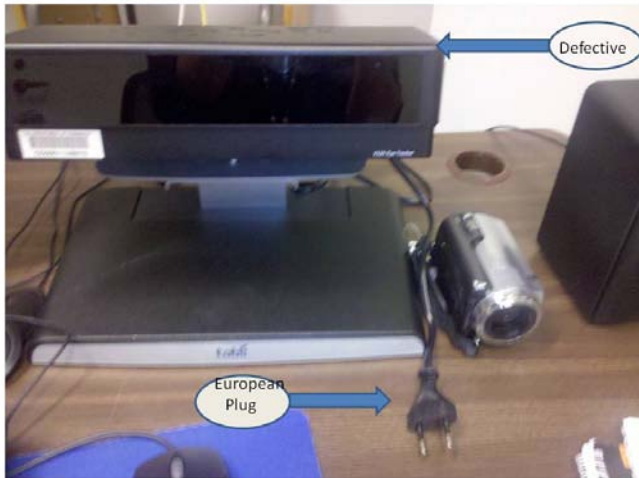
- Federal Desktop Core Compliance (FDCC)
- Required for Federal Desktop Machines
- Software must pass FDCC testing unless Special Purpose Machine
- Tobii Studio does not pass FDCC testing
  - Uses a plug-in to Internet Explorer that is blocked by security settings

# Tips for Acquiring New Lab Equipment

- Ask questions about computer inputs/outputs
  - Digital or Analog output?
  - Network configuration required?
- Ask about issues that similar labs have faced and what the solutions were
- Allow extra time



# Allow Extra Time



# Thank you!



- Thank-you for your attention
- Thank-you to the usability team
- For more information, contact  
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