

## 2002 ECONOMIC ELECTRONIC STYLE GUIDE

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### ABSTRACT

The upcoming 2002 U.S. Economic Census will give businesses the option of submitting their data on paper or electronic media. If reporting electronically, they may report via Windows-based Computerized Self-Administered Questionnaires (CSAQs). The U.S. Census Bureau is creating an electronic forms style guide outlining the design standards to use in electronic form creation. Census is to offer electronic reporting for over 650 different forms to all respondents.

The purpose of a style guide is to foster consistency across the various analysts who may be working on different pieces of a software development project, in this case, a CSAQ. To ensure quality and consistency in the design of more than 650 electronic forms, a cross-divisional team was assembled to develop a style guide for Windows-based CSAQs. The team determined that the style guide should include standards for layout and screen design, navigation, graphics, edit capabilities, help, feedback, audit trails, and accessibility for disabled users.

Members of the team signed up to develop various sections of the style guide. The team met weekly to discuss and review the sections. Members of the team also conducted usability tests on edits, and subject matter employees provided recommendations to upper management. Team members conducted usability testing on prototype forms with actual respondents. The team called in subject matter experts as necessary to assist in making decisions about particular forms when the constraints of the electronic medium required changes from the paper form.

The Style Guide will become the standard for all CSAQs for the 2002 Economic Census to ensure consistency across survey programs.

KEY WORDS: style guide, Computerized Self-Administered Questionnaires (CSAQs), usability testing

### 1. INTRODUCTION

The economic census provides a detailed portrait of the Nation's economy once every five years. Data collected in the Economic Census are essential for government, business, and the public<sup>2</sup>. For example, business establishments use Census data to make business decisions and to evaluate their performance. Trade associations and news media study economic indicators and projections based on Census data. Legislators at local, state, and national levels use Census data in the preparation and evaluation of new laws. Consultants and researchers use Census data to analyze changes in industrial structure and location. To meet these many and diverse needs, the data collected must be as complete and accurate as possible.

In 2002, for the first time, the Census Bureau will offer all respondents the option of reporting their data on electronic media as well as paper. Electronic technology offers the opportunity to streamline the process of collecting data. However, any change in data-collecting techniques must result from a detailed design-and-development process that includes user testing.

Paper forms are to be mailed to approximately 3.5 million establishments in December 2002, with a due date of February 12, 2003. These establishments will also be sent a letter containing a username and

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<sup>2</sup> <http://www.census.gov/epcd/www/econ97.html>

password to access the Census Web Site to download a CSAQ and any prelisted information. Respondents who opt to do so will install the CSAQ on their personal computers to complete the form(s). Respondents will have the option of mailing a diskette back to the Census Bureau containing their completed data or sending the data via Internet.

## 2. LAYOUT AND SCREEN DESIGN

In the absence of any standards for the design of electronic questionnaires, the team consulted available user-interface design guidelines (e.g., Compuware, 1998, Microsoft, 1995). The team also consulted an in-house report on research into user-interface guidelines (Ciochetto, 2000). The guidelines and the research report helped the team identify topics to provide a general overview of approaches to the design and layout of visual elements. This section provides team decisions and design guidelines on the screen panels, dimensions, placement and content, screen formatting, color, font, and main panel layout and screen design. The team designed and labeled various parts of the screen panel. See Figure 1 – First Page Screen.

The screenshot shows the first page of the 2002 Economic Census web form. The layout is divided into several sections:

- Agency Seal:** Located at the top left, featuring the U.S. Department of Commerce seal.
- Navigation Instructions:** A list of links on the left side: [Welcome](#), [Mailing Address](#), [Item 1-2](#), [Item 3](#), [Item 4-5](#), [Item 6](#), [Item 7-17](#), [Item 18](#), [Item 19](#), [Item 20-21](#), [Item 22-23](#), [Item 24-27](#), [Item 28](#), [Item 29-30](#), [Remarks](#), [Review](#), [Add Establishment](#), and [Help](#).
- Site Title:** "2002 ECONOMIC CENSUS RT-44401(X) BUILDING MATERIALS AND SUPPLIES DEALERS".
- Page Title:** "DUE DATE FEBRUARY 12, 2003".
- Main Panel:** The central area containing the form fields:
  - Name: [Text Input]
  - Address: [Text Input]
  - City: [Text Input] State: [Text Input] ZIP Code: [Text Input]
  - EIN: [Text Input]
  - CFN: [Text Input]
  - Store/Plant: [Text Input]
- Navigation Buttons:** Located at the bottom of the main panel, including "Form In-box", "< Previous", and "Next >".
- Agency Designation:** "U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration U.S. Census Bureau".
- OMB Number:** "OMB No. 0607-XXXX: Approval Expires XX/XX/XXXX".
- Navigation Panel:** A vertical bar on the left containing the "Add Establishment" and "Help" buttons.

Figure 1. First Page Screen

This is actually the first page of the electronic form. We developed and designed it parallel with the paper form such as the Agency Seal, Site Tile, and Page Title (actual form number and title), Agency Designation, and OMB Number. The respondent's name and address, Employer Identification Number (EIN), Census File Number (CFN), and store number are preprinted. Respondents can change any

erroneous information. It also has the following: navigation instructions, navigation links, navigation panel, and navigation buttons. Respondents can click on the navigation links to get to specific items within the electronic form. The Remarks area is for the respondent to supply any remarks in regards to their data. The Add Establishment is used when a company has opened up a new establishment, this is where the respondent will provide their data for this new establishment.

Other team decisions were as follows: screen resolution – 800 x 600, surveyor – gray, main panel – light green, button face – gray (text is black), navigation Panel – white, gutter – white, border (area including titles, seal, below main panel where button – white, font size: 10 point Arial, use regular, not bold, for text, use only black fonts, do not use italics, and use underlining only for hyperlinks

The team had a HTML prototype created from the paper form. We used our screen panel design along with the paper prototype as a starting point for designing the electronic form. These electronic prototypes were revised according to style-guide team consensus. Decisions made during team discussions were

function as a tool for the respondent to use to access forms, sort establishments, import and export, and to review the progress of forms.

The following illustrations show the placement and flow of the menu options that will be a part of the Survey In-Box.

2002 Economic Census Form In-Box		File	View	Review	Help
<b>Instructions:</b> <b>To Begin:</b> Double-click anywhere on the line for that establishment to access the form. <b>To Import:</b> You can import your data using the import feature available in the File/Import menu. Import instructions are available in the File/Import menu.					
000000004	FI-52301	Establishment 4	Pittsburgh	PA	Submitted
000000005	FI-52402	Establishment 5	Annapolis	MD	Submitted
000000006	CC-23703	Establishment 6	Portland	OR	Complete - Warning
000000007	MI-21203	Establishment 7	Newark	NJ	Complete
000000008	RT-4401	Establishment 8	San Diego	CA	Not Started
000000009	WH-56781	Establishment 9	Buffalo	NY	Submitted
Address:  1234 Something Road, City, State, 12345			4/9 Forms Complete  <b>44% COMPLETE</b>  Due Date: February 12 <sup>th</sup> , 2003  <b>SUBMIT</b>		

Figure 3. Prototype Survey In-Box

### 3. NAVIGATION

Users should be able to move easily from their point of origin to their destination. Forms design should allow users to work their way sequentially through the entire questionnaire so that no aspect is missed, but also allow shortcuts to navigate quickly. Respondents should have easy access into and out of the CSAQ. The Welcome Screen was generically design to inform and introduce the respondent to the Economic Census. It includes the following: due date, response is required by law, Title 13, how to report in dollars/percents, use of the application, importing data, help, printing, and sending data back to Census (Internet/diskette). See Figure 4 – Navigation Panel of the Welcome Screen.

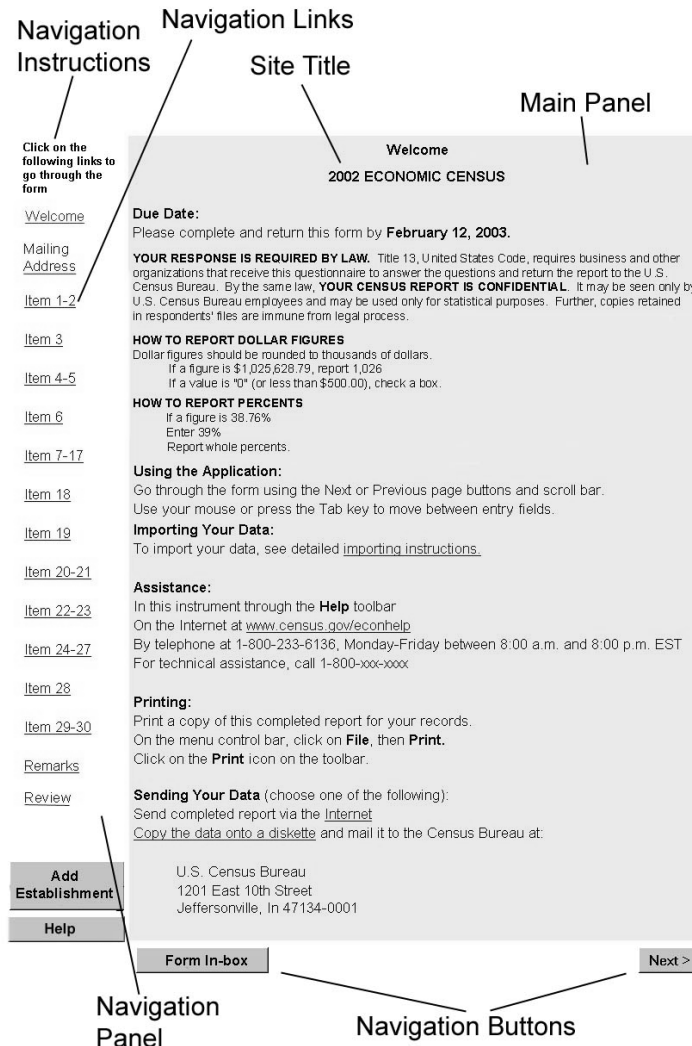


Figure 4. Example of the Welcome Screen and Navigation Panel

## 4. EDIT CAPABILITIES

Embedded edits are included in all electronic instruments designed for the 2002 Economic Census. These edits serve two main purposes. First, they help to ensure that companies send quality data to the Census Bureau. Second, they indirectly reduce respondent burden. Companies sending erroneous data, or data that falls outside of predetermined bounds, are often contacted at a later date by the Census Bureau. Having edits at the time of reporting reduces the likelihood that a Census Bureau analyst will re-contact companies reporting electronically, thereby indirectly reducing a company's reporting burden.

In developing wording for edit messages, the team referred to wording that had been used for the Company Organization Survey (COS), Annual Survey of Manufactures (ASM), Industrial Research and Development (R&D) and the Quarterly Financial Report (QFR) along with edit wording used in the 1997 Economic Census. In those CSAQs, some messages were preceded by the word "Warning" or "Error," depending on the severity of the discrepancy. An early team decision for the 2002 Style Guide was not to use the word "Error" in any message because of its negative implications. The general feeling was that a respondent's data can be correct even if certain entries technically fail an edit check.

Giving the respondent a Remarks section to explain anything that fails an edit check is expected to help the Census Bureau understand the respondent's rationale for not changing values in response to edit messages. In contrast to the paper form, where respondents often write explanations beside an entry instead of going to the Remarks section.

Because of the importance of having embedded edits in an electronic instrument, it is critical that messages relayed to the respondent(s) be as clear, concise, and helpful as possible. Misleading edit messages can cause added burden for respondents, who will spend extra time interpreting the messages as well as possibly being inhibited from submitting their data. Unclear or unhelpful edit messages could lead a respondent to continue to provide erroneous data, leading to lower quality data.

To avoid misleading or ambiguous error messages, members of the style guide team conducted cognitive interviewing and usability testing on proposed messages. This testing resulted in a set of recommended, generic edit messages and a set of recommendations to guide the development of edit messages.

Level	Type	Recommended System Message
Preventive	Format	Enter [Fill Variable Name] as: [Format] ((Fill specifics))
Preventive	Alpha Numeric	A[Fill Entry]@is not valid. Enter a number.
Preventive	Length	You have exceeded the length for this entry field. The permitted length is A [Fill: letters/numbers/lines].
Immediate & Deferred	Range	In Item X, typical values are between A and B. You reported C. If this value is correct, please explain in the remarks section.
Immediate & Deferred	Range: Ratio NOT TESTED	The ratio of Item X/Item Y is typically between A and B. The ratio of the values you reported is C. If your reported values are correct, please explain in the remarks section.

Figure 5. Example of Some Recommended Wording for Edit Messages

## 5. HELP

Currently, ForeHelp Premier 99 is the software package used in the following CSAQs: COS, ASM, R&D and the QFR. ForeHelp Premier 99 which is an online Help will be attached to the CSAQs for the 2002 Economic Census. Respondents can access the Help file through operations provided in the software, such as command menu, Help button, or function key (F1).

The Table of Content will consist of the following: General Information, Construction, Finance/Insurance/Real Estate, Manufacturing, Mining, Retail/Accommodations, Services, Transportation/Utilities, Wholesale Trade.

General information includes the following Help topics: Definition of establishment, Survey Scope and Confidentiality, Software Instructions, Respond to Census, Census Review, Sending Responses, How to Report Dollar Figures, Closing and Saving, Importing Instructions, Exporting Instructions, Economic Help Desk Website, Glossary of Terms, and State Abbreviations.

Information sheets were provided from the survey specific areas (Construction, Finance and Insurance, Retail, Wholesale, etc.) to create Help topics. Although Help will be provided, a design objective is to minimize the respondent's need for Help by making the electronic forms easy to navigate and easy to complete.

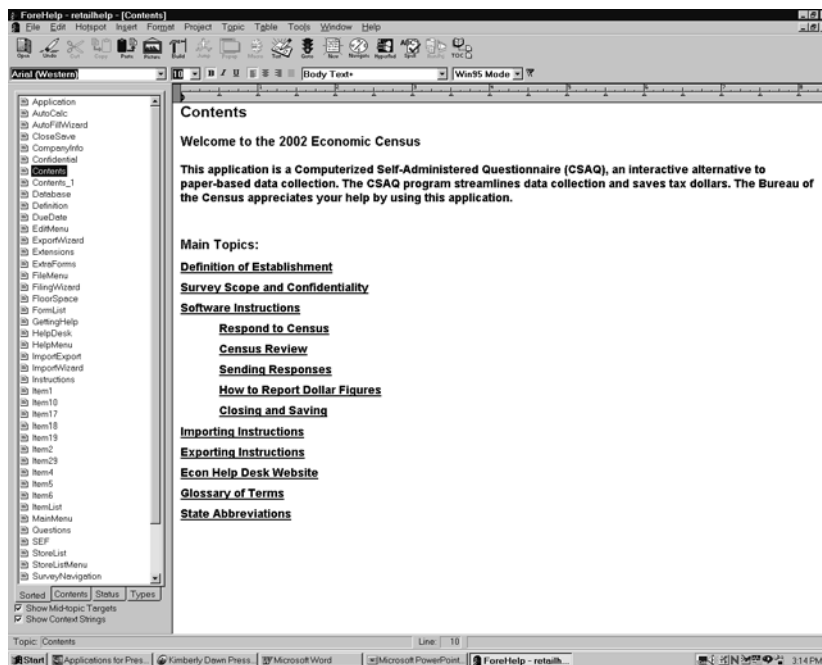


Figure 6. Example of Help Screen

## 6. FEEDBACK

For the 2002 Economic Census CSAQs, we plan to include an evaluation feedback questionnaire. The purpose of this evaluation is to obtain respondent feedback about the electronic forms(s). The evaluation will consist of six questions which will take the respondent approximately two minutes to complete.

Some topics covered by the questionnaire are - overall satisfaction, ease of use, the overall system, accessing software, moving within a screen, backing up, entering data, changing answers, and resolving edit messages.

Respondents are asked to rate the topics on a three-point scale: Easy, Neutral, and Difficult. Neutral means neither easy nor difficult. Respondents can also pick "Did Not Use," if that is an appropriate response.

**Evaluation - 2000 Report of Organization**

**► Evaluation of the Electronic Survey**

Notice: The purpose of this evaluation is to obtain your opinions about the electronic survey. Your responses to this inquiry are protected under Title 13, United States Code, and will be kept strictly confidential.

Although your participation is voluntary, the Census Bureau would greatly appreciate your help in evaluating this data collection system. By learning from you, we can be more responsive to your needs.

This questionnaire consists of 6 questions which should take less than 2 minutes to complete.

**► Overall Satisfaction**

In general, how satisfied were you with the electronic survey?

Neutral  
Very Satisfied  
Satisfied  
Neutral  
Dissatisfied  
Very Dissatisfied

Form In-box

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Figure 7.1 Example of the Feedback Evaluation

**Evaluation - 2000 Report of Organization**

**► Ease of Use**

Please rate the characteristics of the electronic survey listed below in terms of their ease of use. Use the following scale: Easy, Neutral, Difficult, Did Not Use.

The overall system	Neutral	Accessing on-line help	Did not use
Accessing software	Easy	Making comments	Neutral
Moving within a screen	Difficult	Exiting	Neutral
Moving between screens	Easy	Re-entry	Neutral
Backing up	Easy	Importing data	Neutral
Entering data	Neutral	Exporting data	Neutral
Changing answers	Easy	Printing	Difficult
Resolving errors	Difficult		

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Figure 7.2 Feedback on Ease of Use

## 7. CONCLUSION

The style guide will become the standard and ensure the same “Look and Feel” for all 2002 Economic Census CSAQs. This will not only strengthen the success of large scale implementation in the 2002 Economic Census, but also ensure consistency across survey programs. Analysts will have the ability to create electronic report forms that contain standardized items, while retaining the survey specific content. Cognitive interviewing and usability testing were useful in providing human performance data and observations on which to base decisions. The style guide was enhanced using usability testing and respondent feedback.

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