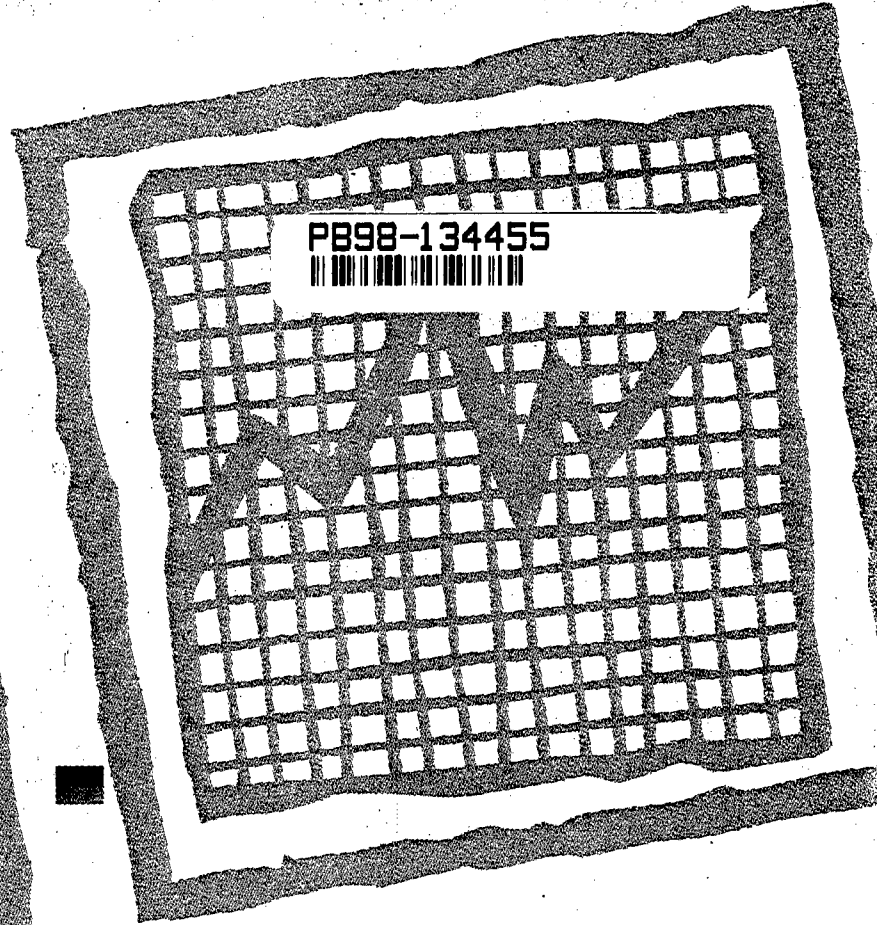
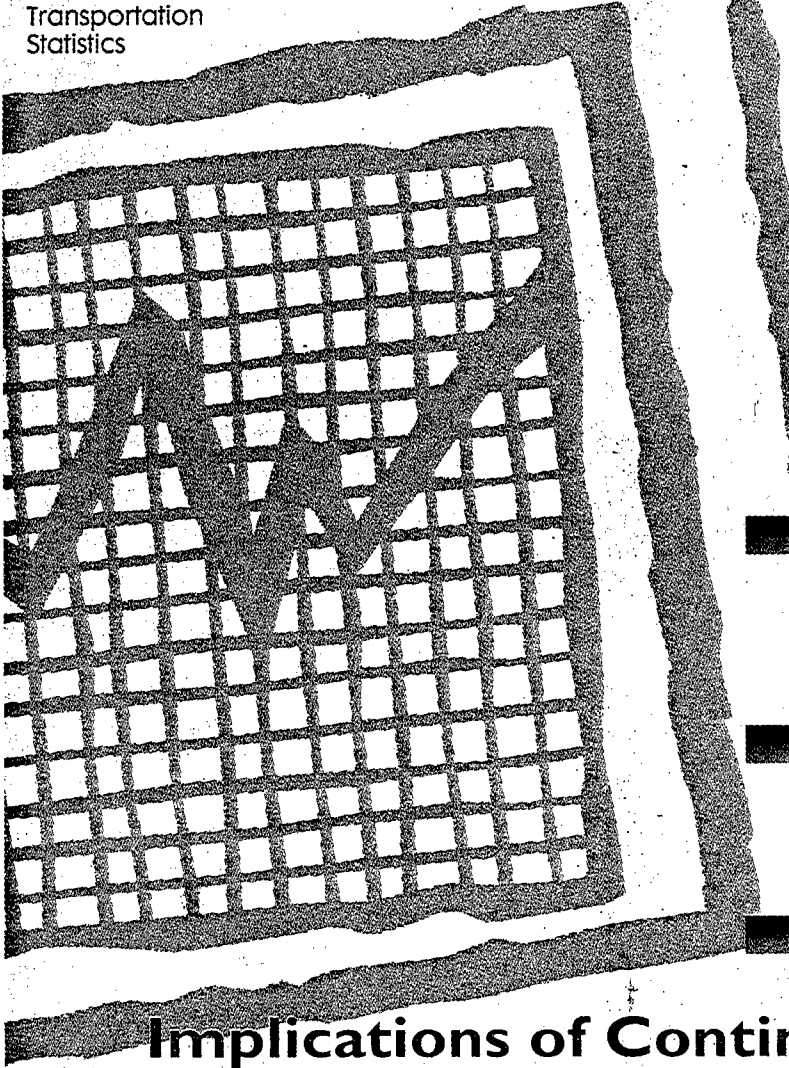




U.S. Department
of Transportation

Bureau of
Transportation
Statistics



Implications of Continuous Measurement

for the Uses of Census Data

in Transportation Planning

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Executive Summary

**IMPLICATIONS OF CONTINUOUS MEASUREMENT
FOR THE USES OF CENSUS DATA
IN TRANSPORTATION PLANNING**

EXECUTIVE SUMMARY

BUREAU OF TRANSPORTATION STATISTICS

U.S. DEPARTMENT OF TRANSPORTATION



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At COMSIS, Robert Winick directed the study, Deborah Matherly was the project manager, and Laureen Hartnett provided technical assistance. The study was conducted under the general direction of Arthur Sosslau, Senior Vice President, COMSIS Corporation.

Marsha Fenn, Advanced Management Technology, Inc., designed and edited the report. Tomara Arrington, Graphic Services, U.S. Department of Transportation, provided the cover design and report layout.

PREFACE

The Bureau of the Census received a great deal of congressional criticism concerning the cost and accuracy of the 1990 census. In response to that criticism, the Bureau extensively evaluated alternative methods for conducting the decennial census. Early in the planning process, the Census Bureau selected a new data-collection system for thorough testing and possible implementation as an alternative to the traditional census in 2000. Under this new system, called "Continuous Measurement," the detailed social, economic, and housing information, including journey-to-work data, traditionally collected decennially with the long-form questionnaire on a sample basis, would instead be obtained by an ongoing, "continuous" monthly survey. The census would obtain only population and housing unit counts and a few basic characteristics.

A change from the traditional long-form census questionnaire to Continuous Measurement could significantly impact how state and metropolitan transportation planners use decennial census data. Pursuant to its statutory responsibility for representing the Department of Transportation and the transportation community in matters of federal statistical policy, the Bureau of Transportation Statistics conducted a study to assess the implications of Continuous Measurement data for the uses of census data in transportation planning.

This study of Continuous Measurement began in mid-1994 and concluded in early 1995. The report presents the findings from that study, and reflects the Census Bureau's proposal for Continuous Measurement at that time. Soon after the study's completion, Census officials received the report so as to inform the Bureau's decisionmaking for the 2000 census. Since then, the Bureau has made minor changes to its plans, but the basic proposal for an ongoing monthly survey remains the same.

On February 28, 1996, the Census Bureau formally announced that it planned once again to use a long-form questionnaire in the 2000 census, but as a bridge to a new Continuous Measurement system in the next decade. The Bureau is conducting an operational test of Continuous Measurement in selected metropolitan and rural areas in 1996 in anticipation of initiating the Continuous Measurement survey, now called the American Community Survey, in 1999. The Bureau of Transportation Statistics' study of Continuous Measurement and this report are, therefore, an important first step in informing the transportation community of the new census data system that it must adapt to after the 2000 census.

The American Community Survey will be a large monthly household survey independent of the census. For the years 1999 to 2001, the survey will consist of the same questions asked in the 2000 long form, and will go to 400,000 households per month. After 2001, the content can vary and the sample size will likely drop to 250,000 households per month.

The overlap between the decennial long-form data and data from the American Community Survey will allow transportation planners to compare the two data sets to determine the implications of Continuous Measurement for the uses of decennial census data in transportation planning.

Bureau of Transportation Statistics
April 1996

EXECUTIVE SUMMARY

BACKGROUND

State and metropolitan transportation planning organizations rely on the data from the decennial census for a broad array of applications. Data from the long-form census questionnaire, which includes questions covering place of work, mode of transportation to work, carpooling, travel time and time of departure to work, vehicles available, and mobility limitations are used for planning and modeling travel behavior. The Intermodal Surface Transportation Efficiency Act of 1991, the Clean Air Act Amendments of 1990, and the Americans with Disabilities Act all increase the transportation planning requirements and related data requirements of states and metropolitan planning organizations (MPOs).

Congress has expressed concern about the accuracy and the cost of the 1990 census effort. In response to this concern, the Census Bureau is considering alternatives to the traditional long-form questionnaire for the 2000 census. One of these alternatives, called Continuous Measurement, would replace the long-form questionnaire with an ongoing sample survey conducted each month, and the decennial census would only collect the count of the number of persons and housing units and a few key population and housing characteristics.

Continuous Measurement has been heavily promoted by the Census Bureau as a replacement for the long form. Because of the potential for loss of the critical transportation data collected by the long-form questionnaire, and the prospect for collection of such data in a new Continuous Measurement process, the Bureau of Transportation Statistics contracted with the COMSIS Corporation to study the implications of Continuous Measurement for the uses of census data in transportation planning.

DESIGN AND METHOD OF THE STUDY

COMSIS assembled a panel of seven experts on the uses of data in the field of transportation planning to assess the implications of Continuous Measurement. Prior to the first meeting of the group, extensive background materials were sent to all participants describing uses of census data in transportation planning and the methodology of and proposals for Continuous

Measurement. Panel members were asked to identify issues for discussion at the first workshop.

At the first workshop, held in September 1994, representatives of the Census Bureau provided the panel with an overview of Continuous Measurement and presented the Bureau's current thinking on its testing and implementation. The panel also heard a debate on the merits of Continuous Measurement between Dr. Leslie Kish, Professor Emeritus, University of Michigan, and Dr. Stephen Fienberg, Carnegie Mellon University. The panel then identified key Continuous Measurement issues to be developed into position papers for presentation and discussion at the panel's second session.

During the nine weeks between the first and second workshops, each member of the panel prepared a paper analyzing a specific topical area or issue pertaining to the implications of Continuous Measurement for the use of census data in transportation planning. The panel reconvened in November 1994, and presented their papers, discussed and debated issues regarding Continuous Measurement and data needs for transportation planning, determined the findings of the study, and made recommendations.

GENERAL FINDINGS

The transportation planning expert panel assembled for this study found that Continuous Measurement holds promise for providing useful data for transportation planning, but that Continuous Measurement is an untested process, the results of which need to be compared and evaluated against those obtained from a conventional census. The panel questions the advisability of the Census Bureau making a decision in 1996 to eliminate the long-form questionnaire for the 2000 census without sufficient testing, and questions the Bureau's ability to implement new systems to put Continuous Measurement into operation by 1999. The panel believes the Census Bureau should undertake a test for the 2000 census where long-form data are collected nationwide and compared with a parallel collection of Continuous Measurement data for a representative sample of geographic areas. The panel expressed concern about the potential loss of benchmark data at the beginning of a new millennium. The panel also expressed skepticism about congressional funding of Continuous Measurement past the first three years at the sampling rates currently proposed.

DETAILED FINDINGS

Study findings are organized into four major topics of discussion: 1) Data Availability, 2) Data Suitability for Planning Needs, 3) Process/Implementation Issues, and 4) Summary Recommendations.

DATA AVAILABILITY

■ *Timeliness and Currency*

The panel believes that more timely and current data under Continuous Measurement are a major benefit of the proposal. Under Continuous Measurement, the Census Bureau anticipates that data products will be made available within one year of the collection year, and annual updates of data will be available continuously.

■ *Continuity and Cost*

Continued availability of the data collected in the long-form decennial census questionnaire is imperative. Long-form census data provide larger samples at lower costs per person than surveys conducted locally for specific uses. The panel perceives threats to the continued availability of data under Continuous Measurement, such as the potential for congressional reductions in funding, which may reduce Continuous Measurement sample sizes or cancel the Continuous Measurement process altogether sometime in the future.

The panel recommends further evaluation of other options to Continuous Measurement, such as an intercensal long-form collection at mid-decade with appropriate reductions in sample size to keep costs in line with once-a-decade collection. The panel emphasizes the need for a smooth transition between the current method of collection and Continuous Measurement if it is implemented.

■ *Accessibility and Confidentiality*

The trend in transportation planning has been to narrow the focus of analysis in geographic detail, from ZIP Codes to census tracts and even smaller units. Census data from 1990 from Summary Tape Files 1 and 3 and the Census Transportation Planning Package (CTPP) are very important for this level of analysis. Travel and land-use studies make extensive use of cross-sectional data (e.g., travel mode by income and by size of household) available only in the CTPP. The Census Bureau's Public Use Microdata Sample data are also very helpful in this type of analysis, but are geographically limited.

The panel believes that it is important to ensure that data will be readily accessible to users as quickly as pos-

sible after collection. As sample sizes decrease under Continuous Measurement, the panel is concerned that the Census Bureau's Microdata Review Panel may increasingly restrict access to microdata to protect confidentiality. The panel respects concerns about confidentiality, but would like a full examination of alternatives to maintain and increase user access to data, such as deputizing researchers and MPO staff or shielding personal data through creative means of disclosure avoidance. The panel recommends that public use microdata from Continuous Measurement be released for geographic areas of 100,000 or more population.

DATA SUITABILITY FOR PLANNING NEEDS

Data that are collected and made accessible must still pass the test of suitability for the desired task. The panel identified concerns with various facets of data accuracy, both in the Continuous Measurement proposal and in current long-form data collection efforts. The panel was also impressed by promised Continuous Measurement flexibility features.

■ *Accuracy*

With Continuous Measurement, the Census Bureau anticipates greater accuracy in coding and interviewing due to permanent staffing, instead of the temporary staffing associated with taking the census every 10 years. The Census Bureau acknowledges that significant sampling error would be present in annual Continuous Measurement data, which will be alleviated by creating multiyear moving averages. However, representatives of the Census Bureau assured the panelists that annual point estimate data from Continuous Measurement would be released with caveats, because of their high sampling error. Some panel members expressed concern that the high sampling error in annual Continuous Measurement, compared with long-form data, would reduce the suitability of data for various applications, while other panelists asserted that the reduced levels of confidence and increased error are acceptable for the types of applications performed with the data.

The panel also expressed concern for the accuracy of Continuous Measurement's projected response rates and of the representative demographic sampling of those responding. The potential exists for reduced response rates if the data are not collected in a decennial census with its national publicity program and media coverage, which would then negatively impact quality or increase the cost of data collection.

■ *Flexibility in Content and Sampling*

The panel was impressed with Continuous Measurement's potential for flexibility in content and sampling, including experimenting with wording of questions such as journey to work, adding questions for particular needs such as response to a new rail opening or a flood, and increasing sampling rates in a state or region for special purposes. The panel cautions users about the conflict between continuity and flexibility.

■ *Content and Geocoding*

The panel was very concerned about the accuracy of place-of-work geocoding in general (whether or not Continuous Measurement is implemented). The proposed Master Address File continuously corrects and updates residence addresses, but not businesses. The panel strongly recommends that the Census Bureau update business addresses for use in place-of-work coding on a level comparable to that made for household addresses.

The panel expressed concern about the wording of certain questions, such as the journey to work. Asking about the "usual day" rather than a specific day underrepresents lesser used transportation options. The panel recommends experimentation with additional questions such as nonwork trips and trip chaining.

PROCESS/IMPLEMENTATION

The panel expressed misgivings about Continuous Measurement as a "moving target." The Continuous Measurement process is evolving, and a final Continuous Measurement proposal may be far different from the proposal evaluated by this panel, and possibly far less appealing.

■ *Costs and Implications of Maintaining and Updating Data*

The panel recognized the increase in data maintenance that will occur under Continuous Measurement. The panel questioned who would incur the costs if the Census Bureau relies on continuous updating of geographic information by states and MPOs. This may be an unacceptable burden if funding is not provided, particularly for small MPOs.

Concern also existed about changing geographic boundaries on a constant or annual basis. Annual data must be coded to a consistent geography from year to year to be valuable, or, if updated, flagged in a reference file associated with the zone. Annexations and other boundary changes could make analysis much more difficult. Implementing the plan without working out such

details with the transportation community, states, and MPOs is not advisable.

■ *Intergovernmental Cooperation*

A smooth transition from decennial long form to Continuous Measurement demands the participation of interested parties. The Department of Transportation, groups such as the American Association of State Highway and Transportation Officials, committees of the Transportation Research Board, and others need continued involvement in testing data, content, and methods, and in identifying products. The panel suggested that the U.S. Department of Transportation (DOT) and the Census Bureau establish a mechanism for interested parties to receive continued updates on plans and procedures, such as electronic bulletin boards and newsletters.

SUMMARY RECOMMENDATIONS

Several recommendations were made by the transportation planning expert panel for consideration by the Census Bureau, federal decisionmakers, and the transportation community.

CENSUS BUREAU

1. Set up a process to allow transportation experts access to the results of its Continuous Measurement simulation project.
2. In cooperation with the transportation planning community, implement a design and content effort for journey-to-work and related questions. In addition to research on the wording of the journey-to-work question itself, the expert panel also recommends testing questions on access and egress modes from the "major" commuting mode (e.g., driving or walking to a bus stop or rail station). Distinguishing among the combinations of modes used to get to and from work, which may often differ for many people, is an important concern to transportation planners.
3. Improve transportation data user access to census data, such as deputizing researchers and MPO staff.
4. Emphasize the continual update of business addresses, including geocoding and test methods.

Other issues that the Census Bureau needs to consider include proper representation of rare populations, development of procedures for more cooperative interaction with MPOs, and potential improvements to trans-

portation models. The panel expressed concern about lower or biased response rates. The panel recommends that the Census Bureau conduct research during the testing to determine whether response rates are consistent across a broad spectrum of the population, and what steps could be taken to reduce bias from nonresponse.

FEDERAL AND CONGRESSIONAL DECISIONMAKERS

1. Invest in research and experimentation, including parallel long-form collection in the decennial year along with Continuous Measurement, to ensure availability of needed data at appropriate levels of accuracy.
2. Consider total costs to the user community (i.e., state and local governments, and MPOs) of changing collection methods, not only costs of the Census Bureau. The transportation planning expert panel believes it would be valuable to study what the different approaches would cost various levels of government. One example is the need for various agencies to continually maintain geographic referencing systems and other data, in order to keep the Census Bureau Master Address File current for Continuous Measurement implementation. Federal decisionmakers need as complete an estimate as possible of the full cost differences for the collection methods, and not just the costs to the Census Bureau and to other federal government agencies, in order to choose the best option.

DEPARTMENT OF TRANSPORTATION

DOT needs to intensify the research and training it provides for various users of census data in the transportation community. The transportation planning expert panel recommends, in particular, establishing specialized training oriented to the needs of small and medium-size MPOs. The panel expressed concern that the staffs at such MPOs might try using data from a Continuous Measurement approach in the same way that data developed for one point in time had been used from the previous decennial censuses.

CONCLUSIONS

Continuous Measurement has the potential for increasing the utility and timeliness of census data for transportation planners if:

- it is tested in parallel to the regular decennial long form in the year 2000 to provide users with comparative data;
- users determine that Continuous Measurement data are an acceptable alternative to the conventional census; and
- it is carried out as planned and promised with full continuous surveys, with the promised data products provided in a timely manner, and with flexibility for special requests honored and completed at a reasonable cost.