

SUPPORTING STATEMENT
U.S. Department of Commerce
National Institute of Standards and Technology
Research on Evacuating Persons with Mobility Impairments
OMB Control No. 0693-XXXX

A. JUSTIFICATION

1. Explain the circumstances that make the collection of information necessary.

The Final Report on the collapse of the World Trade Center (WTC) Towers recommended that tall buildings be designed for timely full-building evacuations from both building-specific and large-scale events. Since the WTC study, several project efforts have been established, worldwide and within the National Institute of Standards and Technology (NIST) Engineering Laboratory (EL), to better understand the use of elevators for facilitating occupant egress from high-rise buildings, with the goal of improving occupant safety during building evacuations.

The International Code Council (ICC) and the National Fire Protection Association (NFPA) provide requirements for the use of elevators for both occupant evacuation and fire fighter access into the building. To support the development of these standards, NIST's research on elevators has primarily focused on the technical aspects of ensuring safe and reliable evacuation for the occupants of high-rise buildings. However, little guidance is available on how occupants with mobility impairments should effectively evacuate high-rise buildings during fire emergencies. Whereas previous efforts have focused on the technological means necessary to incorporate elevators for occupant usage in high-rise buildings, there is a lack of guidance (and underlying research in elevator usage) on the ways in which these technologies could and should be used for evacuation.

The focus of this research effort is two-fold: 1) to gain an understanding of how building occupants with mobility impairments currently evacuate high-rise buildings in the United States during fire emergencies, and 2) to learn about the concerns of persons with mobility impairments on using elevators during fire evacuations. The data obtained from this research will provide guidance to designers and building managers on aspects of fire evacuation that concern occupants with mobility impairments and on how to improve elevator design and usage during fire emergencies.

2. Explain how, by whom, how frequently, and for what purpose the information will be used. If the information collected will be disseminated to the public or used to support information that will be disseminated to the public, then explain how the collection complies with all applicable Information Quality Guidelines.

Data obtained in this study will be used by NIST/EL to discover how building occupants with mobility impairments currently evacuate high-rise buildings in the United States during fire

emergencies and to learn about the concerns of persons with mobility impairments on using elevators during fire evacuations. This is a one-time study using questionnaires, interviews, and focus groups to develop science-based guidance containing recommendations on use of elevators by occupants with mobility impairments for evacuation during fire emergencies.

The research includes two sets of questionnaires, one set of interviews, and focus groups as follows:

- a) Building managers or designated safety personnel from a sample of four to six federal high-rise buildings in the United States will be contacted to fill out a questionnaire requesting information on the emergency plans and procedures for the high-rise building, including how the building's evacuation plans incorporate the use of the existing elevator system to evacuate occupants with mobility impairments during fire emergencies. The building emergency plan will be requested from either the General Services Administration (GSA) or from the building manager.

The participants will be recruited from a list supplied by the GSA that provides the name, location, square footage, number of floors above and below ground, building height, number of stair descent devices, and property manager for 71 high-rise buildings in the U.S. that are overseen by the GSA. All individuals will receive the same set of questions by logging into a secured online website to provide responses for each question. Participation will be voluntary.

- b) Occupants with mobility impairments in the high-rise buildings identified in part (a) will be contacted to fill out a questionnaire requesting basic information on their mobility with regard to evacuation, previous evacuation experiences, and preferences on how to evacuate during a fire emergency. The main purpose of the questionnaire is to identify the characteristics of individuals who would be willing to participate in a one-on-one interview to discuss these issues in more detail.

To recruit study participants, the building managers who participated in part (a) will be asked whether they have a list of occupants with mobility impairments. If the manager has such a list, he or she will be asked to forward the recruitment letter to members of the list on behalf of the study organizers. If such a list is not available, a recruitment letter will be sent to all occupants in the building. All recruited participants will receive the same set of questions by logging into a secured online website to provide responses for each question. Participation will be voluntary.

- c) Selected occupants with mobility impairments who have evacuation experience or training in the identified high-rise buildings (and/or other tall buildings) and who have expressed an interest through the questionnaire in part (b) will be contacted to set up a one-on-one interview. Participants with a range of experiences, evacuation preferences, and characteristics (e.g. sex, age, mobility impairment, and floor of occupancy) will be selected. The interviews will be conducted either in person or by phone. They will request more detailed information on previous evacuation experiences, awareness of emergency procedures, and views and preferences on using an elevator to evacuate during a fire emergency. Participation will be voluntary.

- d) Professionals involved with emergency planning (e.g., GSA, USDA, DHS, building emergency managers, researchers) and building occupants with mobility impairments, if willing, will be invited to participate in one of two focus groups. A preliminary analysis of the data resulting from parts (a) through (c) will be summarized in the form of two sets of potential plans for the use of elevators during fire evacuation by occupants with mobility impairments: one for existing high-rise buildings and one for new high-rise buildings. Members of the focus groups will review both of these potential plans. They will then participate in a discussion that will lead to guidance for designers and building managers on aspects of fire evacuation that concern occupants with mobility impairments and on how to improve elevator design and usage during fire emergencies. The order of the discussion of plans for existing and new high-rise buildings will be switched for the two focus groups to ensure that each plan receives the same amount of attention overall.

Data will be collected, viewed, and analyzed by EL/NIST staff only. Any reports or articles resulting from this study will be approved through the Washington Editorial Review Board (WERB) process, during which the document is reviewed by technical peers, NIST managers, and the editorial review board for content, quality, and adherence to NIST and Department of Commerce publication policies.

This study is intended to collect information that represents a range of views and experiences from federal high-rise buildings that vary by location, layout, and size measured by square footage and number of floors. It will not use statistical sampling methods and will not be amenable to formal statistical analysis. Basic analysis will be performed on the questionnaire datasets to understand the characteristics of the population of participants (e.g., degree of mobility impairment and floor of occupancy), on whether and how elevator systems are being used by this population during fire evacuations, and on their knowledge of options for evacuation. Responses to the one-on-one interviews will be coded and assembled to identify both common themes and outlying opinions and experiences.

3. Describe whether, and to what extent, the collection of information involves the use of automated, electronic, mechanical, or other technological techniques or other forms of information technology.

The two questionnaires will be posted online using a secured website for participants to answer at their convenience.

4. Describe efforts to identify duplication.

A few documents are available on the evacuation of persons with disabilities; however, they either lack guidance specificity [<http://www.nfpa.org/assets/files/pdf/forms/evacuationguide.pdf>] or are out of date (i.e., they do not include newer egress technologies) [Bukowski, R.W., "Protected Elevators and the Disabled," *J. Fire Protection Engineering*, 42 44-46, 48-49, Fall 2005].

GSA and NIST have collaborated for several years on advancing the technology to permit elevators to be used safely by emergency responders to rapidly access fires and other emergencies in high-rise buildings and for building occupants to use elevators for self-evacuation, particularly from very tall buildings. This partnership resulted in 2009 editions of both US model building codes (ICC and NFPA) containing a requirement for a fire service access elevator in all new buildings exceeding 120 feet in height. These model codes further include provisions for occupant evacuation elevators that are not (currently) mandated but can be applied to address a myriad of issues ranging from egress for people with disabilities to assembly areas on upper floors.

A compendium of the NIST/GSA research on elevator safety has been published [Peacock, R. D., and R. W. Bukowski, "Summary of NIST/GSA Cooperative Research on the Use of Elevators During Fire Emergencies," NIST Special Publication 1620 (2009)] included in this submission.

In current research with GSA, NIST is in the process of posting an online questionnaire for the project "Usage of Elevators for Occupant Evacuation." Although the topic is the same, the intent and participants for this research effort are quite different. This questionnaire will ask building managers and designated safety personnel for high-rise buildings in the U.S. to provide information on how occupants are currently using elevators during building evacuations in fire emergencies. A wide distribution of the questionnaire, with 1,500 respondents, is anticipated.

In previous research, an important question remains unanswered. If new elevator technologies are in place, how would they *actually* be used by occupants of a high-rise building? In particular, what are the attitudes and behavior that can be anticipated from occupants with mobility impairments, who may experience difficulty using stairs for evacuation. The proposed project is the first to ask the intended users of the new technology about their experiences, concerns, and preferences, so that engineers and safety officers can design the new technology and procedures for maximum effectiveness during a real fire.

NIST staff members in the Fire Research Division of the Engineering Laboratory (EL) are aware of efforts to understand and improve the use of elevators during fire evacuations through their work on national and international standards committees. NIST staff serve on a committee developing technical standards for egress using elevators (ASME A17.1, Task Group on the Use of Elevators by Fire Fighters and for Occupant Egress) and on committees developing standards for egress-related performance-based design procedures (ISO TC92/SC4/Working Group 11: Behaviour and movement of people and ISO TC92: Fire Safety, Subcommittee 3: Fire threat to people and environment). In addition, NIST staff provide technical foundation to codes that require the aforementioned standards (NFPA 101 – Life Safety Code - and ICC Means of Egress/Access) through committee membership in both of these organizations.

Within the project itself, steps will be taken to prevent duplication.

- a) As mentioned under Q2(a), a list of 71 federal high-rise buildings (building height 10 stories and above) in the U.S., including location, square footage, number of floors, and building manager names, has been obtained from GSA. The opportunity to participate in

the questionnaire in part (a) of the study will be extended to no more than 20 building managers on this list with a personal email, followed by a small number of email reminders and follow-up phone calls to those who do not respond to the first invitation. Four to six high-rise buildings will be selected for the rest of the study based on building characteristics and the responses to the questionnaire. Geographic diversity is of particular interest – the participating high-rise buildings will be selected from regions throughout the U.S., including east and west coasts, the southern U.S., and the Midwest. GSA property managers from underrepresented high-rise building types or geographical locations in the U.S. will be personally contacted by phone to ask for their participation. Other factors that will be considered in high-rise building selection include the number of people with mobility impairments who work in the building, building layout and size, and emergency procedures. A variety of building layout, size, and emergency procedures will be sought in order to obtain a range of occupant experiences with fire evacuation. The building emergency plan will be requested from either the GSA or from the building manager.

- b) Building occupants with mobility disabilities will be invited to participate in the questionnaire in part (b) of the study with an initial email, followed by a small number of email reminders to those who have not responded. Occupants will be identified with the assistance of building managers who participated in part (a) and/or affinity groups. In the absence of a list of individuals that can be targeted for the study, a blanket email invitation will be broadcast to all building occupants.
- c) The one-on-one interviews in part (c) will be given only to those occupants that have so indicated on their questionnaires in part (b). From these respondents, participants with a range of experiences, evacuation preferences, and characteristics (e.g. sex, age, mobility impairment, and floor of occupancy) will be selected. These are follow-on interviews that will begin with some of the questions asked on the questionnaire but proceed quickly to more in-depth questions.
- d) Participants in the focus groups will be invited personally by email, followed by a small number of email reminders and follow-up phone calls to those who do not respond to the first invitation.

No one will be asked to participate in any one part of the study more than once. Participation in the questionnaires, interviews, and focus groups is strictly voluntary. If an occupant does not want to participate, he/she is not forced to do so.

5. If the collection of information involves small businesses or other small entities, describe the methods used to minimize burden.

NIST will seek responses from occupants and building managers or designated safety personnel in federal high-rise buildings only. No burden to small businesses or other small entities will be imposed.

6. Describe the consequences to the Federal program or policy activities if the collection is not conducted or is conducted less frequently.

This data is necessary to improve current egress procedures for high-rise buildings that will provide a higher level of safety for building occupants. The option of using an elevator for high-rise building evacuation is of particular importance to building occupants with mobility impairments. Without obtaining the viewpoints of the occupants themselves, much needed evacuation procedural guidance on how to design elevators, signage, and procedures enabling occupants to efficiently and safely use elevators during fire evacuations cannot be developed.

7. Explain any special circumstances that require the collection to be conducted in a manner inconsistent with OMB guidelines.

There are no special circumstances that require the collection to be conducted in a manner inconsistent with OMB guidelines.

8. Provide information of the PRA Federal Register Notice that solicited public comments on the information collection prior to this submission. Summarize the public comments received in response to that notice and describe the actions taken by the agency in response to those comments. Describe the efforts to consult with persons outside the agency to obtain their views on the availability of data, frequency of collection, the clarity of instructions and recordkeeping, disclosure, or reporting format (if any), and on the data elements to be recorded, disclosed, or reported.

A Federal Register Notice soliciting public comments was published on February 27, 2013 (Vol. 78 pg. 13325). No comments were received.

During the development of the instruments, the methodology of the study, data collection instrument, and recruitment procedures were discussed with Edwina Juillet, director of the National Task Force on Fire and Life Safety for People with Disabilities and an expert in public safety with many years of experience in data collection, and with David Fable, a fire protection engineer at the General Services Administration and an expert in occupant evacuation.

9. Explain any decisions to provide payments or gifts to respondents, other than remuneration of contractors or grantees.

There are no payments or gifts to respondents.

10. Describe any assurance of confidentiality provided to respondents and the basis for assurance in statute, regulation, or agency policy.

All the information participants provide to NIST, with the exception of non-identifiable quotations, will be kept confidential to the extent permitted by law, including the Freedom of Information Act (FOIA) (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Any reports that are produced based on information provided in interviews will not release any personally identifiable information for example, your name, phone number, and role in the high-rise building.

11. Provide additional justification for any questions of a sensitive nature, such as sexual behavior and attitudes, religious beliefs, and other matters that are commonly considered private.

Not Applicable.

12. Provide an estimate in hours of the burden of the collection of information.

- a) Questionnaire for building managers: It is estimated that 10 respondents will complete the questionnaire and that it will require 15 minutes of each participant's time (2 hours and 30 minutes/3 hours).
- b) Questionnaire for building occupants with mobility impairments: It is estimated that no more than 200 respondents will complete the questionnaire and that it will require 15 minutes of each participant's time (50 hours).
- c) Interviews for building occupants with mobility impairments: It is estimated that no more than 50 respondents will participate in a one-on-one interview and that it will require 2 hours of each participant's time (100 hours).
- d) Two focus groups for professionals involved with emergency planning and willing building occupants with mobility impairments: It is estimated that 20 respondents (total) will participate in the two focus groups and that it will require 2 hours of each participant's time (40 hours).

The total number of hours of the data collection burden is estimated to be **193**.

13. Provide an estimate of the total annual cost burden to the respondents or record-keepers resulting from the collection (excluding the value of the burden hours in Question 12 above).

Not Applicable.

14. Provide estimates of annualized cost to the Federal government.

NIST is funding this project at \$125k in fiscal year (FY) 2013 for data collection and \$50k in FY2014, primarily for data analysis. Up to \$25k of the FY2013 funds will be used for travel related to one-on-one interviews and focus groups. Also, a contract of no more than \$75k of the FY2013 funds will be negotiated with an outside organization to assist with one-on-one interviewing and the transcription of interviews and focus group discussions. The General Services Administration (GSA) is providing \$50k for the development of the data collection instrument.

15. Explain the reasons for any program changes or adjustments.

This is a new collection.

16. For collections whose results will be published, outline the plans for tabulation and publication.

This study is intended to collect information that represents a range of views and experiences from a variety of high-rise federal buildings in the U.S. It will not use statistical sampling methods and will not be amenable to formal statistical analysis. Basic analysis will be performed on the questionnaire datasets to understand the characteristics of the population of participants (e.g. degree of mobility impairment and floor of occupancy). Qualitative analysis, i.e., trend development, will be performed on the interview data to identify trends on whether and how elevator systems are being used by this population during fire evacuations, occupant knowledge of options for evacuation, and concerns about the use of these systems now and/or in the future. During qualitative analysis, responses to the one-on-one interviews will be coded and assembled to identify both common themes and outlying opinions and experiences.

The results will be published as NIST technical reports. Any quotes of individual responses included in NIST reports will be non-identifiable to the person.

17. If seeking approval to not display the expiration date for OMB approval of the information collection, explain the reasons why display would be inappropriate.

Not Applicable.

18. Explain each exception to the certification statement.

None.

B. COLLECTIONS OF INFORMATION EMPLOYING STATISTICAL METHODS

This study is intended to collect information that represents a range of views and experiences from a variety of high-rise federal buildings occupants in the U.S. It will not use statistical sampling methods and will not be amenable to formal statistical analysis.