



**U.S. Department of Transportation**  
**Privacy Impact Assessment**  
**Federal Aviation Administration**  
**FAA**  
**The National Sleep Study**

**Responsible Official**

Susumu Shirayama  
Email: [Susumu.Shirayama@faa.gov](mailto:Susumu.Shirayama@faa.gov)  
Phone Number: (405) 666-1047

**Reviewing Official**

Karyn Gorman  
Chief Privacy Officer  
Office of the Chief Information Officer  
[privacy@dot.gov](mailto:privacy@dot.gov)





## Executive Summary

The Federal Aviation Administration (FAA) Office of Environment & Energy (AEE) sets the standards for the national aviation noise policy through implementation of [49 U.S.C. 47523](#). The FAA has a robust research program to both understand and ease the impacts of aviation noise on communities. Consistent with this legislation, AEE sponsors the National Sleep Study to promote research, which examines the impact of nighttime aviation noise on the sleep of residents near airports. The FAA partnered with research company Westat<sup>1</sup> and the University of Pennsylvania<sup>2</sup> (UPenn) to execute this study. The data acquisition involved approximately 400 individuals. The FAA will utilize the information from the National Sleep Study to derive the verifiable data to inform of any potential updates to or validation of the national aviation noise policy.

The FAA is publishing this Privacy Impact Assessment (PIA) for the National Sleep Study in accordance with Section 208 of the [E-Government Act of 2002](#) because Westat and UPenn (under FAA research sponsorship) collect and process Personally Identifiable Information (PII) from members of the public, specifically individuals who reside near airports and are exposed to nighttime aviation noise.

### What is a Privacy Impact Assessment?

*The Privacy Act of 1974 articulates concepts for how the federal government should treat individuals and their information and imposes duties upon federal agencies regarding the collection, use, dissemination, and maintenance of personally identifiable information (PII). The E-Government Act of 2002, Section 208, establishes the requirement for agencies to conduct privacy impact assessments (PIAs) for electronic information systems and collections. The assessment is a practical method for evaluating privacy in information systems and collections, and documented assurance that privacy issues have been identified and adequately addressed. The PIA is an analysis of how information is handled to—i) ensure handling conforms to applicable legal, regulatory, and policy requirements regarding privacy; ii) determine the risks and effects of collecting, maintaining and disseminating information in identifiable form in an electronic information system; and iii) examine and evaluate protections and alternative processes for handling information to mitigate potential privacy risks.<sup>3</sup>*

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<sup>1</sup> Westat is a private statistical research organization, headquartered in Rockville, MD, which has significant experience with conducting surveys.

<sup>2</sup> The University of Pennsylvania is an [FAA Center of Excellence \(COE\) for Alternative Jet Fuels and Environment \(ASCENT\)](#).

<sup>3</sup> (OMB's) definition of the PIA taken from guidance on implementing the privacy provisions of the E-Government Act of 2002 (see OMB memo of M-03-22 dated September 26, 2003).



*Conducting a PIA ensures compliance with laws and regulations governing privacy and demonstrates the DOT's commitment to protect the privacy of any personal information we collect, store, retrieve, use and share. It is a comprehensive analysis of how the DOT's electronic information systems and collections handle personally identifiable information (PII). The goals accomplished in completing a PIA include:*

- *Making informed policy and system design or procurement decisions. These decisions must be based on an understanding of privacy risk, and of options available for mitigating that risk;*
- *Accountability for privacy issues;*
- *Analyzing both technical and legal compliance with applicable privacy law and regulations, as well as accepted privacy policy; and*
- *Providing documentation on the flow of personal information and information requirements within DOT systems.*

*Upon reviewing the PIA, you should have a broad understanding of the risks and potential effects associated with the Department activities, processes, and systems described and approaches taken to mitigate any potential privacy risks.*

## **Introduction & System Overview**

Air travel presents many benefits to consumers, but aviation noise can be a concern for communities. Addressing this concern requires collaboration among the FAA, air carriers, airports, aircraft manufacturers, research universities, other stakeholders, industry partners, local communities, and elected officials. Decisions about flight times, number of operations, and aircraft type are in the scope of private industry. Airport location is a function of local land use planning. Runway alignment is determined by the prevailing winds at that specific location. The FAA strives to reduce noise in ways within its purview, including conducting noise research and working with aviation stakeholders and local communities.

Consistent with the national aviation noise policy as outlined in 49 U.S.C. 47523, the FAA's AEE is sponsoring the National Sleep Study to promote research to examine the impact of nighttime aviation noise on the sleep of residents living within certain noise contours near airports. The National Sleep Study collectively includes: 1) an initial survey to determine eligibility for the study (the recruitment survey); 2) a collection of physiological data from participants and sounds recorded in their bedroom that covers five days; 3) daily morning surveys of participants that correspond with the physiological data collection occurring over five days and 4) a single questionnaire characterizing an individual's sleep overall. Detailed descriptions of each survey component follow below. The data acquisition involves approximately 400 individuals. The FAA utilizes the information from the National Sleep



Study to derive verifiable data to inform of any potential updates to or validation of the national aviation noise policy.

The participants in the National Sleep Study are protected by UPenn’s Institutional Review Board (IRB)<sup>4</sup>. According to Food and Drug Administration’s (FDA) definition, “an IRB is an appropriately constituted group that has been formally designated to review and monitor biomedical research involving human subjects”. In this study, UPenn’s IRB plays a role in ensuring that participants provide informed consent to participate. This is done using an informed consent notice, which advises them of the voluntary nature of the study and of their right and ability to opt-out at any time without penalty and their ability to cancel their prior authorization to use and disclose their information. Additionally, if they have any questions about their rights as a human research participant at any time before, during or after participation, they can contact the UPenn IRB at a provided phone number for assistance.

Additionally, the FAA has requested and received approval for this collection of information from the public with the Office of Management and Budget (OMB) as required by the Paperwork Reduction Act (PRA).<sup>5</sup> A description of the information collection can be found below.

#### **The Sample Pool of Survey Participants (Recruitment Survey)**

The FAA contracted with Westat to facilitate the recruitment survey process. The FAA will provide Westat noise contour data (noise contours depict the distance in which noise travels) around 77 airports in the continental U.S. and U.S. territories meeting selection criteria based on nighttime air traffic. Westat utilizes residential addressees (by use of publicly available information) from within these noise contours.

Westat then, via postal mail, sends a UPenn cover letter and the recruitment survey to the addresses selected from within the noise contours, to request that individuals participate in the National Sleep Study. Participants are informed that the UPenn is performing the analysis. PII on the letter sent by Westat includes postal address, name, and an individualized “Subject ID” and access code that is generated by Westat and tracks to the address. The letter requests an individual at that address (age of 21 or older) participate in the survey in one of two ways: (1) by returning the completed survey via prepaid postal mail; or (2) online by navigating to a provided Uniform Resource Locator (URL), and

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<sup>4</sup> The University of Pennsylvania’s human research protection program (including IRBs) was awarded full accreditation in 2007 by the [Association for the Accreditation of Human Research Protection Programs](#).

<sup>5</sup> Under certain conditions, the (PRA) mandates that government agencies seek prior approval from OMB before collecting information, including PII, from the public. This process provides a platform for public participation and Government transparency. For more information on the PRA visit <https://pra.digital.gov/about/>.



entering their access code and Subject ID to complete the survey.<sup>6</sup> The mailing includes a \$2 cash incentive to encourage participants to fill out and return the survey.

The survey includes questions relating to how individuals rate their sleep quality, how much they are bothered by aircraft noise, whether they have taken sleep medication, whether they have ever been diagnosed with a sleep disorder, their general health in addition to specific medical conditions, whether they have any hearing problems, and how they feel about their neighborhood. The survey also includes a variety of demographic and other questions, including current employment status, level of education, household income, race, ethnicity, how long at that address, whether they must care for someone during the night, shift work, number of individuals in the household, the individual's height/weight, age, and sex.

Once the individual completes the survey, they have the option of inputting their name, phone number, and email address if they would like to be contacted regarding taking part in a "Five-Night in Home Sleep Study." The individual then returns the survey via postal mail, or electronically, as applicable, to Westat. Westat provides the research group at UPenn with the filled-out surveys that were returned completed. UPenn stores the information it receives from Westat in a REDCap<sup>7</sup> database with limited access privileges.

If an individual displays interest in and is eligible to participate in the National Sleep Study, a member of the research group from UPenn establishes contact with the individual by phone or email to describe the study, confirms they are healthy and eligible, obtains written informed consent, requests information missing in the recruitment survey required to determine eligibility (if applicable), and lastly confirms their participation. The informed consent process is captured in the National Sleep Study Informed Consent Form (ICF), which is mailed to the individual or filled out electronically through a REDCap web form.

Once the individual signs the ICF and returns it to the UPenn, they formally become a participant in the National Sleep Study. The completed hardcopy ICF is stored by UPenn in a locked medical office cabinet on UPenn's medical campus.

### **The Five-Night in Home Sleep Study**

UPenn then mails the participant the research equipment, such as a sound recording device, and a heart rate monitor which they wear for five nights while they sleep. Data expected to be collected by the equipment includes audio recordings that will be used to identify aircraft noise and determine noise levels, heart rate, and body movements. Prior to participating in the National Sleep Study, participants are advised that the sound recording device could

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<sup>6</sup> The online option is available starting with the second out of a maximal of three waves.

<sup>7</sup> Research Electronic Data Capture (REDCap) is a web-based application developed by Vanderbilt University to capture data for clinical research and create databases and projects. It is Health Insurance Portability and Accountability Act (HIPAA)-compliant and highly secure. Further information on REDCap can be found [here](#).



record their voices, or conversations held while the recording is ongoing. Participants are instructed to turn-off the equipment every morning to avoid capturing additional recording.

The participant will also complete a daily morning survey regarding their previous night's sleep. The daily morning survey includes questions about the participant's use of alcohol, caffeine or medications before bedtime, the stressfulness of the previous day, their sleeping arrangements (were windows open or did they share the bed with sleeping partners), the times they went to bed and woke up, how long before they went to sleep, whether they awoke during the night, their perceived feelings about the quality of their sleep, their morning tiredness, and how much aircraft noise disturbed their sleep. In addition, the participants will be asked to fill out a Participant Characteristic Questionnaire about their sleep one time prior to the first study night. This survey asks questions about the participant's general sleep habits, including how long they sleep per night, time they usually go to bed at night and get up in the morning, length of time to fall asleep, factors causing them to have trouble sleeping, feelings about their sleep quality, whether they took medicine to sleep, drowsiness and levels of enthusiasm during the day, questions to determine whether they are a "morning type" or "evening type" of person, how specific noises affect their sleep, actions they took to lessen noise while sleeping (such as closing windows or turning on a fan) and their general sensitivity to noise. After the fifth night, participants return the research equipment and completed daily surveys via postal mail to UPenn in a prepaid box. The participant's name and address are listed under "sender" on the box. The participant receives a pre-paid debit card for up to \$170.00 as an allowance for their participation (their name will not be on the debit card).

UPenn maintains a spreadsheet of National Sleep Study participants, including subject ID, name, and address to track responses and payment and send out measurement devices used in the study. This PII data is kept strictly separate from the survey responses and acoustical/physiological information received and is stored in a database with limited access rights per the ICF. Survey responses will have their PII removed (de-identified) one year after the study ends.

UPenn will analyze the acoustic and physiologic data and return a report to the FAA containing their analyses. The report will not contain any PII.

After the completion of the project, UPenn provides the final report and de-identified survey, acoustic, and physiological data as well as briefing materials to the FAA. The final findings will be published and presented in conferences. Depending on the results, the FAA will use the information from the National Sleep Study to derive the necessary empirical data to inform any potential updates to or validation of the national aviation noise policy.



## Fair Information Practice Principles (FIPPs) Analysis

*The DOT PIA template is based on the fair information practice principles (FIPPs). The FIPPs, rooted in the tenets of the Privacy Act, are mirrored in the laws of many U.S. states, as well as many foreign nations and international organizations. The FIPPs provide a framework that will support DOT efforts to appropriately identify and mitigate privacy risk. The FIPPs-based analysis conducted by DOT is predicated on the privacy control families articulated in the Federal Enterprise Architecture Security and Privacy Profile (FEA-SPP) v3, sponsored by the National Institute of Standards and Technology (NIST), the Office of Management and Budget (OMB), and the Federal Chief Information Officers Council and the Privacy Controls articulated in Appendix J of the NIST Special Publication 800-53 Security and Privacy Controls for Federal Information Systems and Organizations<sup>8</sup>.*

## Transparency

*Sections 522a(e)(3) and (e)(4) of the Privacy Act and Section 208 of the E-Government Act require public notice of an organization's information practices and the privacy impact of government programs and activities. Accordingly, DOT is open and transparent about policies, procedures, and technologies that directly affect individuals and/or their personally identifiable information (PII). Additionally, the Department should not maintain any system of records the existence of which is not known to the public.*

The FAA uses this PIA to provide transparency to all individuals who may be included in the sample pool.

FAA also provides transparency through UPenn's informed consent notice to individuals who choose to participate in the study. The informed consent notice is mailed to individuals (or can be viewed online) and reviewed with them by UPenn researchers. Informed consent contains information about the purpose and conduct of the study, the voluntary nature of participation, the right to opt-out at any time without adverse consequences, and how the FAA/UPenn will use the survey results. The informed consent notice is a legal and ethical requirement for research involving human participants that is reviewed and approved by UPenn's IRB. The informed consent also advises the survey participants of UPenn's PII processing activities, such as the de-identification of survey responses, which is designed to reduce the project's privacy risks. Each participant must accept the informed consent notice by signing it and returning it.

Additionally, FAA demonstrates transparency by registering this collection of information from the public on the National Sleep Study Survey Instruments Form (OMB Control No: 2120-0798) with the Office of Management and Budget (OMB) as

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<sup>8</sup> [NIST SP 800-53, Rev. 5, Security and Privacy Controls for Information Systems and Organizations..](#)



required by the PRA. A further description of the information collection can be found [here](#).

The FAA receives only de-identified information and does not require Westat to maintain identifying information within a Privacy Act system of records on its behalf. Therefore, the information Westat and UPenn collect is not covered under the Privacy Act, and no system of records notice applies.

### **Individual Participation and Redress**

*DOT provides a reasonable opportunity and capability for individuals to make informed decisions about the collection, use, and disclosure of their PII. As required by the Privacy Act, individuals should be active participants in the decision-making process regarding the collection and use of their PII and they are provided reasonable access to their PII and the opportunity to have their PII corrected, amended, or deleted, as appropriate.*

There are two components to the National Sleep Study: the sample pool, all of whom Westat contacts to recruit participation for a study, and the subset of actual study respondents.

For the recruitment survey participants, the individual about whom the data pertains is the source of the information. The individuals who receive the survey have the right and the opportunity to choose not to participate in the survey. They can ignore the initial mailing and/or not navigate to the URL contained in the mailing.

Should the individual choose to participate in the study and once they meet the eligibility criteria, the UPenn presents them with the informed consent notice, which advises them of the voluntary nature of the study and of their right and ability to opt out at any time without penalty and their ability to cancel their prior permission to use and disclose their information. The participants determine whether they will accept and sign the informed consent and begin the study.

Regarding redress, the informed consent notice that each participant accepts advises participants that they can ask the UPenn study team any questions they have related to participating before agreeing to join the study. If they have any questions about their rights as a human research participant at any time before, during or after participation, they can contact the UPenn IRB at (215) 898-2614 for assistance. Participants are advised they are free to decline or stop participation at any time during or after the initial consenting process. The ICF advises participants that they (participants) will not own the study data provided by them to the UPenn investigators for this research.

### **Purpose Specification**

*DOT should (i) identify the legal bases that authorize a particular PII collection, activity, or technology that impacts privacy; and (ii) specify the purpose(s) for which it collects, uses, maintains, or disseminates PII.*





***Legal Basis:***

FAA is undertaking this study under the authority of 49 U.S.C. 47523, which outlines the national aviation noise policy.

***Purposes for collection, uses, and maintenance of PII:***

The National Sleep Study receives, generates, and maintains PII for different purposes related to the study.

The initial recruitment survey collects information as outlined in the System Overview section under the “Recruitment Survey” heading to recruit and screen participants for eligibility in the National Sleep Study.

In the second phase of the study, UPenn collects the PII and other information from participants as outlined in the System Overview under the “Five Night in Home Sleep Study” to track participants responses to nighttime aircraft noise while they sleep. This PII and information falls into three groups: 1) audio recordings that are used to identify aircraft noise and determine noise levels, heart rate, and body movements, 2) daily surveys regarding participant’s sleep and 3) a one-time Characteristic survey. UPenn maintains a spreadsheet of National Sleep Study participants, including subject ID, name, and address to track responses and payment, and mail out measurement devices used in the study. This PII data is maintained strictly separate from the survey responses and acoustical/physiological information received and is to be stored in a database with limited access rights per the UPenn ICF.

**Data Minimization & Retention**

*DOT should collect, use, and retain only PII that is relevant and necessary for the specified purpose for which it was originally collected.*

The FAA’s National Sleep Study is designed to collect the minimum amount of information necessary from individuals to support the objective of the study, which is to examine the impact of nighttime aviation noise on the sleep of residents near airports. Furthermore, the UPenn’s IRB validated that the PII data elements collected are required under this research project.

FAA, and its research partners Westat and the UPenn retain the survey project data in accordance with appropriate legal and record retention requirements. The record retention schedules for the survey-related data are as follows:

- Survey or questionnaire response forms, direct respondent or participant names and identifiers, and other textual or electronic records used in data collection and not relevant for further review and analysis are covered under [DAA-0237-2019-0004-0001](#), with a disposition of: Temporary, to be cutoff when survey study is completed, and destroyed 3 year(s) after cutoff.



- Technical data required to reproduce study findings, detailed statistical tables, data analyses, and related records; and electronic copies of the technical reports produced, including the text of the final report and all other electronic records related to the report such as detailed tables, charts, statistical data analyses, and spreadsheets are covered under [DAA-0237-2019-0004-0002](#), with a disposition of: Cutoff when survey study is completed. Destroy 25 year(s) after cutoff.
- Correspondence and related documents generated subsequent to survey completion and used in creation of rules as a result of the survey are covered under [DAA-0237-2019-0004-0003](#), with a disposition of: Cutoff upon creation of final rule. Destroy 25 year(s) after cutoff.

### Use Limitation

*DOT shall limit the scope of its PII use to ensure that the Department does not use PII in any manner that is not specified in notices, incompatible with the specified purposes for which the information was collected, or for any purpose not otherwise permitted by law.*

The FAA, with its research partners Westat and UPenn, undertake the National Sleep Study to collect data from a population exposed to nighttime aviation noise who live within certain noise contours surrounding airports. The study collects data on this population's sleep habits. The FAA will use the information from this collection to derive the empirical data to inform any potential updates to or validation of the national aviation noise policy. To that end, FAA, through its research partners, collects a limited amount of PII to create the sample pool and to facilitate the survey and limits the use of the information consistent with the various notices FAA provides about the survey project.

First, to create the sample pool, Westat receives noise contour mapping information surrounding 77 U.S. airports from the FAA. Westat, using publicly available address sampling techniques, selects addresses within the noise contours to which to send an initial recruitment survey and an invitation to participate in a field study which will collect, for five days, sound recordings, physiological data and associated daily surveys of participants' impression of their sleep. Although the FAA sponsors this research, during the study FAA personnel do not have access to this data and Westat and UPenn do not share this information, which limits the risks of its use for purposes beyond the scope of the study.

Secondly, the UPenn collects the informed consents required for research involving human subjects. To participate in the study respondents must accept the informed consent notice by signing, dating, and returning the agreement to the UPenn. The UPenn maintains this PII separately to satisfy IRB requirements, and this PII is not associated with the study responses.

The FAA receives only de-identified information and does not require Westat to maintain identifying information within a Privacy Act system of records on its behalf. Therefore, the



information Westat and UPenn collect is not covered under the Privacy Act, and no system of records notice applies.

### **Data Quality and Integrity**

*In accordance with Section 552a(e)(2) of the Privacy Act of 1974, DOT should ensure that any PII collected and maintained by the organization is accurate, relevant, timely, and complete for the purpose for which it is to be used, as specified in the Department's public notice(s).*

FAA and its contract research partners, Westat and the UPenn, take reasonable steps to confirm the accuracy of PII in the National Sleep Study by collecting information directly from individuals. Because individuals directly input their PII, it is presumed accurate. In addition, FAA, in cooperation with its contract research partners Westat and the UPenn, further manage privacy risk by minimizing the amount of PII collected through the creation of standardized survey forms used in the National Sleep Study. These forms, utilizing check boxes, provide a standardized way for survey participants to submit information that could otherwise be submitted in an ad hoc manner to Westat and UPenn. Using these forms limits the chance that a survey participant submits unnecessary or irrelevant PII to Westat and the UPenn.

### **Accountability and Auditing**

*DOT shall implement effective governance controls, monitoring controls, risk management, and assessment controls to demonstrate that the Department is complying with all applicable privacy protection requirements and minimizing the privacy risk to individuals.*

The DOT/FAA implements effective governance controls, monitoring controls, risk management, and assessment controls to demonstrate that the Department is complying with all applicable privacy protection requirements and minimizing the privacy risk to individuals.

FAA Order 1370.121B, *FAA Information Security and Privacy Program & Policy*, implements the various privacy requirements of the Privacy Act of 1974 (the Privacy Act), the E-Government Act of 2002 (Public Law 107-347), DOT privacy regulations, (OMB) mandates, and other applicable DOT and FAA information and information technology management procedures and guidance.

In addition to these practices, the FAA implements additional policies and procedures as needed as they relate to the access, protection, retention, and destruction of PII. Federal employees and contractors who work with the National Sleep Study are given clear guidance about their duties as related to collecting, using, and processing privacy data. Guidance is provided in mandatory annual security and privacy awareness training, as well as FAA Order 1370.121B.



### **Responsible Official**

Susumu Shirayama  
System Owner  
Environmental Protection Specialist, AEE

Prepared by: Barbara Stance, FAA Privacy Officer

### **Approval and Signature**

Karyn Gorman  
Chief Privacy Officer  
Office of the Chief Information Officer

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