*NIST Survey Questionnaires for:* **Questions for members of households with Internet of Things (IoT) about their experiences with smart home devices.**

## Phase 2 – Information Collection

1. **Explain who will be surveyed and why the group is appropriate to survey.**

   The Visualization Access Division (VAD), of the Information Technology Laboratory (ITL), at the National Institute of Standards and Technology (NIST) is leading this information collection.  The purpose of this in-depth, interview study is to understand users' beliefs, perceptions, expectations, and behaviors regarding Internet of Things (IoT) smart home devices (e.g., internet-connected appliances, lighting, sensors, security devices, media), and to identify factors that impact IoT usage.  The findings will contribute to the development of a usability framework that can guide the design of future smart home devices.  Therefore, it is necessary and appropriate to interview people who use smart home devices to learn about their experiences with the devices.

   Phase One (1) of this collection was the Screening Collection to determine potential eligible participants for Phase 2 of the collection.  NIST will move forward with a sample group of 40 adults (18 years of age and older) from households with smart home devices.  To ensure a diverse sample with respect to smart home device usage, the goal is to have roughly half of the subjects be smart home device installers or administrators, with the rest primarily being just users of the devices.  The information being requested is not available from public sources.  A copy of the recruitment email and flyer to be used has been uploaded into ROCIS for review.

2. **Explain how the survey was developed including consultation with interested parties, pretesting, and responses to suggestions for improvement.**

   The survey questions were developed and refined based on: 1) survey questions and gaps identified in prior research on Internet of Things and smart home devices and 2) discussions with smart device subject matter experts (SMEs).

   The interview questions were reviewed by a survey expert and an SME to ensure the language and questions were technically accurate and appropriately tailored for the study population.  Questions were further refined based on feedback from four pilot interviews with individuals who were representative of the target study population.

3. **Explain how the survey will be conducted, how customers will be sampled if fewer than all customers will be surveyed, expected response rate, and actions your agency plans to take to improve the response rate.**

   Participants will be notified of the potential information collection via email or ad/flyer.  Once an individual has agreed to participate and been determined qualified to participate in the information collection, an in-person interview appointment will be scheduled.

   The interview appointment will begin with a review of the Information Sheet that describes the study and human subject protections.  A copy of the Information Sheet has been uploaded into ROCIS for review.  NIST researchers will collect data through semi-structured interviews.  Each interview will include a minimum of 37 questions and up to 6 additional interview questions for potential participants who are determined to be smart home device installers or administrators.  The interview appointments will be at most 60 minutes in length.  The audio of the interview will be recorded and then transcribed.  Qualified participants will be offered compensation in the form of a prepaid Visa Card for

their participation.

**4. Describe how the results of the survey will be analyzed and used to generalize the results to the entire customer population.**

Data analysis will be conducted by NIST researchers.  The qualitative data analysis technique of Grounded Theory will be used to create a list of participants' perceptions, behaviors, experiences, and challenges regarding smart home devices and how those are affected by the usability (or lack of usability) of the devices.  Comparisons of interview data based on sub-groups of the different smart home device user roles (e.g., administrators, users) or sub-groups of those with different types of smart home devices (e.g., appliances, security, home automation) will also be made.  From these results, we will plan any subsequent phases of our research efforts.

As stated in the provided Information Sheet, to maintain participant confidentiality participants will be assigned a participant reference code that will be associated with their responses.  Data will not be linked back to a respondent or their personally identifiable information.  NIST will not create or keep a list that links the participant reference code to a participant.