

Evangeline Haughney

Final Report – Home Security System HMK 4

Programming Usable Interfaces

March 23, 2004

Initial Design Rationale

When a user interacts with a Home Security System, the context is invariably stressful. They need to be accurate under limited time constraints while in the background there is the noise of a beeping alarm.

To help users deal with multiple processing, I decided to implement an interface with physical buttons that could be felt by location and confirmation that they were pressed. Since it is important for users to know that they entered the right set of numbers in the right sequence, I added redundant levels of feedback. Every time they press a button, they will hear a beep and see a display change based on the system response to user input.

Based on comparative analysis, most other systems had “panic” buttons that were activated by a single touch. I included these in the interface, but all three (Fire, Security Company, Police) could be similarly canceled with one press in case the buttons were accidentally depressed.

Also, on some devices, you entered the numbers first, then the function, or vice versa. My interface needed to support both mental models.

To test the configuration of a security device, most users would not do this alone, but to facilitate the process, I created a mock test area where clicking on a part of the home represented someone walking around.

Paper Prototype (Design 1)

The paper prototype had a column of text buttons on the left for Fire, Security, and Police. There were display indicators on top for Armed, Disarmed, and Ready. In the center there was the number keypad and the Away and Home buttons along the top. On the right hand side of the panel there were several labeled buttons for different administrative and maintenance functions.

Test Results (U1, U2)

- None of the users chose the Bypass button when the alarm was accidentally triggered. Instead, they all used Cancel.
- Users entered numbers first, totally missing the HOME and AWAY buttons. With the lack of feedback in the paper testing, they thought all they had to do was enter in the number.
- Both users had never used a security system before, and did not completely understand the tasks. On task 1, User 2 stated he would “wait outside for the police if all he had was the password but no other instructions.” In this situation, he wanted a button to just call the security company as well as a label that gave the phone number in case he had questions or needed help.

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- User1 was confused by the difference between Motion and Sensor, wondering if the system could sense the difference between her and foreign objects.

Lessons learned

Always pilot-test the tasks. U1 was self-admittedly skittish of technology and found the tasks intimidating.

Too many tasks can reduce the chances of active participation. I tested the paper prototype with a local merchant who I thought would use a security system, but once he saw the multiple tasks, he had little interest in donating more than a few minutes of his time and ran through the interface quickly.

Do a dry run with post-its and time how long it takes. With a paper prototype and limited feedback – I had created post-its for the LED display but the users were rushed for time so I decided to forgo the post-it note LED feedback – which turned out to be one of the most important areas in my redesign.

I knew I was going to have label issues, so I did a quick and dirty card sorting to try to find the least problematic words. Asking the users for their suggestions on what to label something that they had hesitation about was a good way to solicit both a possible solution and further feedback about their mental model.

VB Iteration v.1 (Design 2)

Design Changes

- Created red, green, and blue symbols to represent Fire, Security, and Police to reduce clutter.
- Grouped Setup buttons in a labeled group box.
- Made HOME and AWAY buttons bigger and lighter in background color.
- Combined Sensor and Motion into one button labeled Sensor.
- Removed Delay and Bypass (people clicked Cancel). Also, Delay was not a critical function, an entry timer could use a default value.

Note: Did not include Armed, Disarmed and Ready indicator lights due to lack of time for the first full implementation.

Test Results (Heuristic Evaluation)

1. Change Home security label from nondescript green cross.

DESIGN CHANGE: I decided to update several things from this suggestion.

First, I tried text labels for all three buttons like I had in the paper prototype, but the labels became unreadable. The purpose of the security button was

for users to get help with their alarm not going off (U2), or other configuration issues. Since I couldn't identify a "Security" icon that did not closely resemble the blue Police shield, I decided to place a brand label on the bottom of the panel, and re-label the green arrow with the company name. The fire graphic was OK, but having the middle button with a text label made the police shield look out of place - too bulky, so I changed the blue shield to a blue 911 text label.

2. OK button to confirm number entry. I did not implement this suggestion based on the fact 1) This heuristic seems to be geared more towards Windows standards versus a physical interface, 2) Users did not have a problem entering information without one and 3) because if I added a new OK button, it would add an extra step to the entry/exit process, which is already under time constraints.

I also asked User6 what their mental model was - he confirmed it was to just enter the buttons due to the nature of the task - timing issues, panic that they won't get the code entered in time.

3. Clear button/backspace for the keypad when creating new code. I originally considered having both a Clear for the number keypad and a Cancel for the rest of the interface, but the semantic meaning is too close to so I decided to combine the features into one label. I didn't feel a backspace button was worth the tradeoff of real-estate space to frequency of use. Users are either brand new or experienced. New users are more likely to be extra careful when entering the password and experienced users have the code memorized and know the key locations.
DESIGN CHANGE: Relabeled the Cancel button to Clear. U4 said she thought Cancel would disengage the entire alarm if she pressed it on a data entry mistake.

4. Remove Beep for every button click. I did not implement this change since part of my design rationale was that consistent, redundant feedback is necessary. With tactile buttons, did I really push it hard enough? The beep serves as an added confirmation. If only a few buttons beep, people might panic with an alarm system.
Slight DESIGN CHANGE: Removed beeps on the test buttons that are distinctively GUI buttons.

5. Need image swap for test zone areas. Better feedback if sensor is off when they click a zone. Right now, only shows label for sensor that is turned on.
DESIGN CHANGE: Added red X mark the spot that appears when the user clicks on a zone. They marks only appear if the sensor for that zone is turned

on! The user can click the Clear GUI button to remove them from the zones and start over. Possible enhancement would be to click them on and off.

6. New label - edit or create?

DESIGN CHANGE: now CREATE and DELETE instead of NEW and DELETE.

7. Also, have stronger status descriptions than just: Status: CODE.

DESIGN CHANGE: Added "SETUP" to both Code and Sensor Labels. Now, the string reads "STATUS: CODE SETUP" or "STATUS: SENSOR SETUP"

Additional Enhancements

Added Armed and Disarmed status displays from the original paper prototype. The indicator light goes on when either Armed or Disarmed and this maps to selecting the Home and Away functions.

The LCD display backlights on the first press for when users come home at night. Based on comparative studies, this seemed like a desirable feature that would help with visibility in a dark room. In later rounds of testing, U6 commented "Oh Cool! Backlighting!"

Lessons Learned

There can never be enough visibility. Adding additional visibility to the test graphic was a great idea, especially since the user's fovea was focused on the zone they had just clicked on, not the LCD display to the left. This prompted me to add the additional enhancement of the Armed/Disarmed display indicators, which really helped users in later rounds of testing to confirm what they had just done.

VB Iteration v.2 (Design 3)

Design Changes

In addition to the suggestions from the Heuristic Evaluation, the biggest change I made was to re-write the tasks. First, I had the word "code" in the task, which I needed to remove to not lead the user. I also changed the tone to make the tasks more like a storyboard and placed them in sequential order that started out with easy tasks like leaving the house and then coming back home. Once they were comfortable with the first two tasks, then I asked them to perform the more intricate ones like setting the motion detectors and testing the configuration.

Test Results (U3, U4)

At this point, the Good UARs start to match up the Problem ones. The issues that one user in particular noted were 1) Add labels to the sensor selector buttons, 2) Separate out the Setup buttons, and 3) Change the Zone labels to something less ambiguous.

Lessons Learned

Break up complex tasks into a more natural order of events that map to the user's mental model.

VB Iteration v.3 (Design 4)

Design Changes

- Added small text labels for the three selector buttons.
- Re-aligned the Setup buttons to be bottom aligned

Test Results (U5, U6)

- U5 liked the backlit display
- U6 wanted more contrast in the display indicators – she thought the Off state was too red and too similar to the On state.
- Continued to have hesitation with the “Zone” label.

Lessons Learned

Don't change things just for one user. I made the changes, and they started to violate the minimalist heuristic. That, combined with the fact that no other user had problems led me to remove some of these changes.

VB Iteration v.4 (Design 5)

Design Changes

- Removed the “Select” labels from beneath the selector buttons. They added to the clutter and were small enough to not be noticed by the user.
- Made the display indicator lights more distinct when On or Off.
- Made the timers longer before reverting back to the “STATUS: READY” display.

Test Script

Introduce myself

"Hello. My name is <insert name>, and I am conducting a usability test to evaluate a prototype of a Home Security System. Do you mind if I talk with you for a few minutes?"

Study instructions

"The point of today's test is to discover whether people have problems using this prototype Home Security System. I'm going to ask you to perform a task with this piece of paper. I'm testing the prototype, I'm not testing you. I'm looking for places where the prototype might be difficult to use, so if you can't do some things please don't feel bad. That is exactly what we are looking for. Remember, this is completely voluntary. Although I don't know why this would happen, if you become uncomfortable in any way feel free to stop. In this observation, I am interested in what you think about as you perform the task I will be asking you to do. I'm going to ask that you 'think aloud' while you are using the prototype. What I mean by 'think aloud' is that I want you to tell me EVERYTHING that you are thinking from the first time that you see the statement of the task until you finish the task. I would like you to talk aloud CONSTANTLY from the time I give you the task until you have completed it. I don't want you to try to plan out what you say or try to explain to me what you are saying. Just act as if you are alone, speaking to yourself – just a little louder.

Instruct them on how to think aloud: non-computer task

Let me demonstrate thinking-aloud for you as I review the directions from Pittsburgh to DC in my head.

<Illustrate thinking aloud>.

Now, you try thinking aloud. Here's a problem: please think aloud while you answer the question, 'How many windows are there in your mother's house?' Good!

Final instructions

As you're doing the task, I won't be able to answer any questions. But if you do have questions, go ahead and ask them anyway so that I can learn more about what kinds of questions the prototype brings up. I'll answer your questions after the session. Also, if you forget to think aloud, I'll say, "Please keep talking." Do you have any questions about thinking aloud? Now, I have a task printed out for you.

Hand them the task and ask if they have any questions

"Here is the task you will be working on. Why don't you read it aloud, just so you can get comfortable with speaking your thoughts. Do you have any questions about the task?"

Tell them they may begin
"You may begin."

Task version 1

You are house-sitting for a friend over the weekend. They have a home security system for their house. You have been given the entry code (6789).

Task 1

1. It is your first day of house-sitting. Open the door and turn the alarm off.
2. Oh No! You took too long! Now the alarm is shrieking. What do you do?

Task 2

You've finished watering the plants and gathering the mail. Set the alarm before leaving the house.

Task 3

You are a homeowner with a home security system. You are going away for the weekend and need to have a friend house-sit. Create a new entry code for this person.

Alternative Task 4

You just bought a new home security system. Configure your new system and test it out.

Task version 2

You just bought a home security system for your house. The pre-installed master password is 1234.

1. You need to go run a few errands. Set the alarm before you leave the house.
2. You have finished your errands and you've just come back to your house. Turn off the alarm when you come back inside.
3. Turn on the motion detectors for your house and test them out.
4. You are having some work done on your house. Create a new password for the workers.

PUI Template for Usability Aspect Report

Study Name: Home Security Console – Design 1
Date of Study: March 11, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U1

No. TA-01	Problem/Good Aspect Good
Name: Visibility of function buttons	
Reference: Interview notes	
Evidence: User complimented the paper prototype: “This is very thorough.”	
Explanation: The “one-touch” function keys for Security, Fire, and Police, combined with the standard keyboard, and the number of function keys (Code, Sensor, Motion, Delay, Test, Bypass) gives a sense of feature-rich functionality.	
Severity or Benefit: Severity Level: N/A One-touch action Ability to customize and program – feature-rich interface.	
Possible solution and/or trade-offs: Tradeoffs: While visible, number of features adds to the clutter.	
Relationships: None at this time.	

PUI Template for Usability Aspect Report

Study Name: Home Security Console – Design 1
Date of Study: March 11, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U1

No. TA-02	Problem/Good Aspect Problem
Name: Beeping signifies the alarm state	
Reference: Interview notes	
Evidence: In Task #1 – “upon entering the door and hearing a beeping noise”, user said they would “press the Security button and wait to hear from the Security company.” Or, go outside and wait for the police.	
Explanation: User assumed that if the alarm was beeping, it had been triggered.	
Severity or Benefit: Severity Level: 4 Major Problem Persistence: Occurs during entry Frequency: This will occur each time the door is opened while the alarm has been armed.	
Possible solution and/or trade-offs: Tradeoffs: One possible solution would be to create a beep tone that isn't as alarming, more like a kitchen timer. Or eliminate the beep and replace it with a flashing light. Tradeoffs: A flashing light would be distracting and might make users think they had tripped the alarm.	
Relationships: None at this time.	

PUI Template for Usability Aspect Report

Study Name: Home Security Console – Design 1
Date of Study: March 11, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U1

No. TA-03	Problem/Good Aspect Problem
Name: Numbers entered before function keys	
Reference: Interview notes	
Evidence: U1: In Task #3 – user said they would “just punch in the numbers” to generate a new user entry passcode.	
Explanation: User’s mental model was to enter the passcode in first, then signify an action.	
Severity or Benefit: Severity Level: 0 Not a Problem	
Possible solution and/or trade-offs: A solution would be to allow users flexibility in how they enter their password - to either select a function key first , then enter the numbers (action, then validation, then confirmation). The alternative input would be for them to enter their passcode, and then select an action and see confirmation. Tradeoffs: I can’t think of any.	
Relationships: None at this time.	

PUI Template for Usability Aspect Report

Study Name: Home Security Console – Design 1
Date of Study: March 11, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U1

No. TA-04	Problem/Good Aspect Problem
Name: No way to identify the security agency contact information	
Reference: Interview notes	
Evidence: User offered a suggestion: "It's missing the emergency phone number of the company and the name of the company."	
Explanation: User wanted to see the phone number to call the security agency in case there was a problem.	
Severity or Benefit: Severity Level: 1 Cosmetic	
Possible solution and/or trade-offs: Combine the Security and a Help button. Re-name the Security button to the name of the company – users can use it to call for emergency assistance or customer support, like OnStar. Tradeoffs: Unlikely, but In a home invasion, the thieves could force the homeowners to give away the passcode and turn off the alarm.	
Relationships: None at this time.	

PUI Template for Usability Aspect Report

Study Name: Home Security Console – Design 1
Date of Study: March 11, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U1

No. TA-05	Problem/Good Aspect Problem
Name: Home and Away buttons not visible	
Reference: Interview notes	
Evidence: User chose the “Security” button to disengage the alarm upon entry instead of noticing the “Home” button.	
Explanation: No contrast to the Away and Home buttons, they are lost in the clutter and heightened stress of the beeping.	
Severity or Benefit: Severity Level: 4 Major Problem Persistence: This will occur with new users and casual users, the ones most likely to accidentally set off the alarm system. Frequency: This will occur every time the user exits or enters the house.	
Possible solution and/or trade-offs: Change the background color of the Away and Home buttons, make them larger. Use a different font color for Away and Home to bring distinction and provide contrast. Set them apart from the keypad. Make the Selection buttons smaller. Tradeoffs: Lack of space on the console, alignment with the other buttons for the overall aesthetic.	
Relationships: None at this time.	

PUI Template for Usability Aspect Report

Study Name: Home Security Console – Design 1
Date of Study: March 11, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U2

No. TA-06	Problem/Good Aspect Problem
Name: Cancel button overrides other function buttons.	
Reference: Interview notes	
Evidence: In Task #1, the user chose the “Cancel” button to turn off the alarm.	
Explanation: The size of the Cancel button drew the user and the label “Cancel” matched their goal of turning off the alarm.	
Severity or Benefit: Severity Level: 4 Major Problem Persistence: This will occur with new users and casual users, the ones most likely to accidentally set off the alarm system. Frequency: This will occur every time the user enters the house.	
Possible solution and/or trade-offs: Change the background color of the Away and Home buttons, make them larger. Use a different font color for Away and Home to bring distinction and provide contrast. Set them apart from the keypad. Make the Selection buttons smaller. Tradeoffs: Lack of space on the console, alignment with the other buttons for the overall aesthetic.	
Relationships: TA-05	

PUI Template for Usability Aspect Report

Study Name: Home Security Console – Design 1
Date of Study: March 11, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U2

No. TA-07	Problem/Good Aspect Problem
Name: Cancel button overrides other function buttons.	
Reference: Interview notes	
Evidence: In Task #1, the user chose the “Cancel” button to turn off the alarm. User commented “See how long it took me?”	
Explanation: The size of the Cancel button drew the user and the label “Cancel” matched their goal of turning off the alarm.	
Severity or Benefit: Severity Level: 4 Major Problem Persistence: This will occur with new users and casual users, the ones most likely to accidentally set off the alarm system. Frequency: This will occur every time the user enters the house.	
Possible solution and/or trade-offs: Change the size of the Cancel button to minimize its importance. Change the label from “Cancel” to “Clear”, set the keypad away from the other buttons to make the Clear/Cancel button grouped only with the number keypad. Tradeoffs: Lack of space on the console, alignment with the other buttons for the overall aesthetic. Need a Cancel button for the other functions, otherwise the user would have to drill down through the selection options to say No at confirmation.	
Relationships: TA-05	

PUI Template for Usability Aspect Report

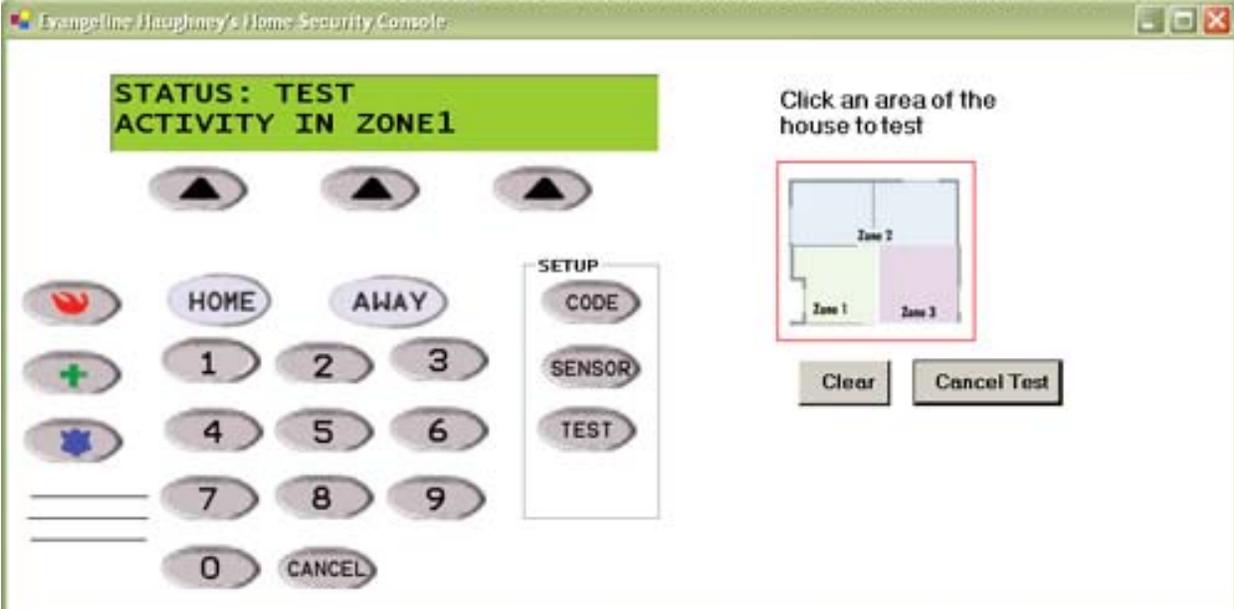
Study Name: Home Security Console – Design 2
Date of Study: March 11, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U2

No. TA-08	Problem/Good Aspect Problem
Name: Motion and Sensor labels ineffective	
Reference: Interview notes	
Evidence: User expressed confusion: “I guess “Motion” senses motion in the house, if somebody was walking around, but how does it distinguish legitimate versus illegitimate movement?” “I don’t understand the difference between Sensor or Motion. “Sensor” is too technical for me. I think of it as some overarching thing that monitors if a light is on or something.”	
Explanation: The user could not distinguish the difference between the functionality of the Motion or the Sensor button for Task 4.	
Severity or Benefit: Severity Level: 4 Major Problem Persistence: This will occur with all types of users. Frequency: Changing the settings will occur infrequently.	
Possible solution and/or trade-offs: Combine the Sensor and Motion buttons into one button, labeled “Perimeter” or Window/Door and Motion Det. Tradeoffs: Technical jargon, lack to space and small font on the buttons will be hard to read.	
Relationships: None at this time	

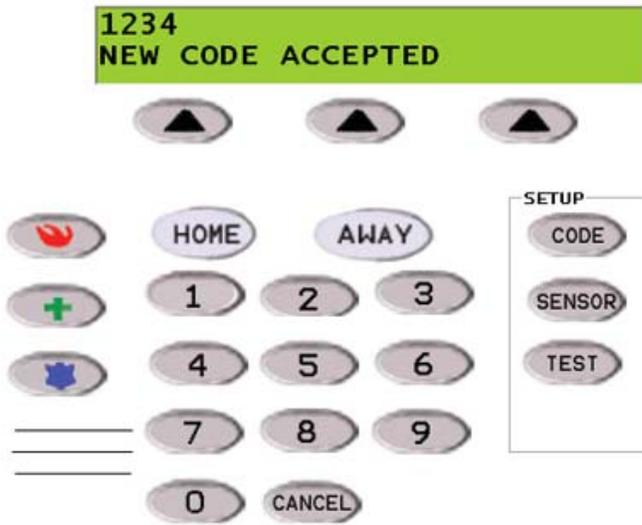
**PUI Template for
Usability Aspect Report
Heuristic Evaluation**

Study Name: Home security system (Evangeline Haughney's)
Date of Study: March 19 th
Evaluator's Name: Jina Huh

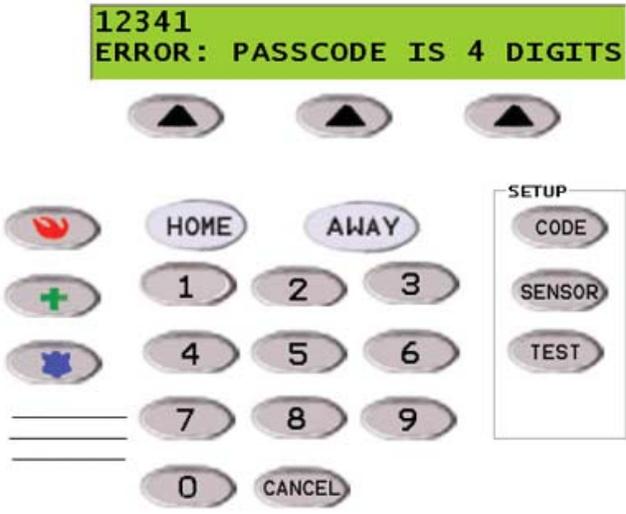
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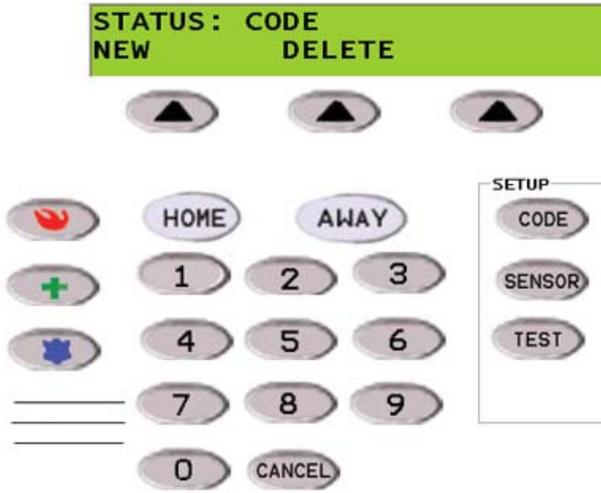
No. HE1-JH	Problem
Name: No feedback on which zone is selected.	
Reference:	
 <p>The screenshot shows a software interface for a home security console. At the top left, a green status bar displays 'STATUS: TEST ACTIVITY IN ZONE 1'. Below this is a keypad with three arrow keys, 'HOME', 'AWAY', and numeric keys 0-9, along with a 'CANCEL' key. To the right of the keypad is a 'SETUP' menu with 'CODE', 'SENSOR', and 'TEST' options. On the right side of the interface, there is a house diagram with three zones: Zone 1 (green), Zone 2 (blue), and Zone 3 (purple). A red rectangle highlights the house diagram, and the text 'Click an area of the house to test' is positioned above it. Below the house diagram are 'Clear' and 'Cancel Test' buttons.</p>	
Evidence:	
Heuristic: Visibility of system status	
Interface aspect: As you can see in the reference above, even if it's labeled as 'click an area of the house to test' above the red rectangle, only 'zone 1' seems to have feedback on the green display. When you click on other zones, you don't see any feedbacks on the click area nor the display.	
Explanation:	
You are unable to know whether zone 2 or zone 3 is being tested or not, or even whether you can test zone 2 or zone 3 or not since nothing changes while clicking on the surface of the zone 2 and zone 3. User will keep clicking on it since it says to click an area, but the result doesn't happen appropriately.	
Severity or Benefit:	
Severity: 4	
This will occur every time user tries to test the device. The impact could be pretty big in terms of not being able to test zone 2 and 3. This is not something that could be solved by learning.	
Possible solution and/or Trade-offs:	
Solution: When the area is clicked, show some feedback on the area that it's clickable and is being clicked as well as whether the area is being activated or not on the display screen.	
Trade-offs: I don't see any trade-offs for this solution at this moment.	
Relationships: Not at this moment.	

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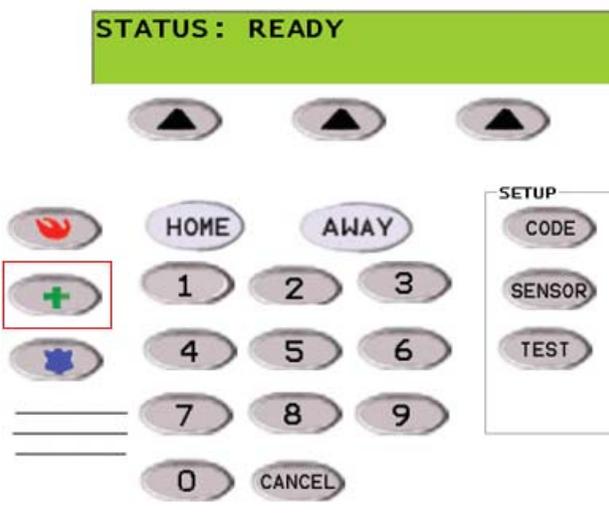
No. HE2-JH	Problem
Name: No 'OK' button.	
<p>Reference:</p> 	
<p>Evidence:</p> <p>Heuristic: Consistency and standards</p> <p>Interface aspect: As you can see in the reference above, even after you enter a new code, you don't see any button that would confirm the new entry.</p>	
<p>Explanation:</p> <p>After you enter a 4 digit number, it says 'new code accepted'. It happens without any confirmation by the user. And there is no way that user can go back to the home screen after this message, so user would feel like they haven't finished entering a new code, and it really haven't finished since after the message click 'away' and click 'home' again, it doesn't remember the code that I just entered.</p>	
<p>Severity or Benefit:</p> <p>Severity: 4</p> <p>This will occur every time user tries to enter the code. The impact could be pretty big in terms of not being able to enter a new code of user's own. This is not something that could be solved by learning.</p>	
<p>Possible solution and/or Trade-offs:</p> <p>Solution: Put an 'OK' button that could confirm the user after the message saying the new code is being entered and go back to the main menu again.</p> <p>Trade-offs: It might not necessarily be a quick way to interact with the interface.</p>	
<p>Relationships: Not at this moment.</p>	

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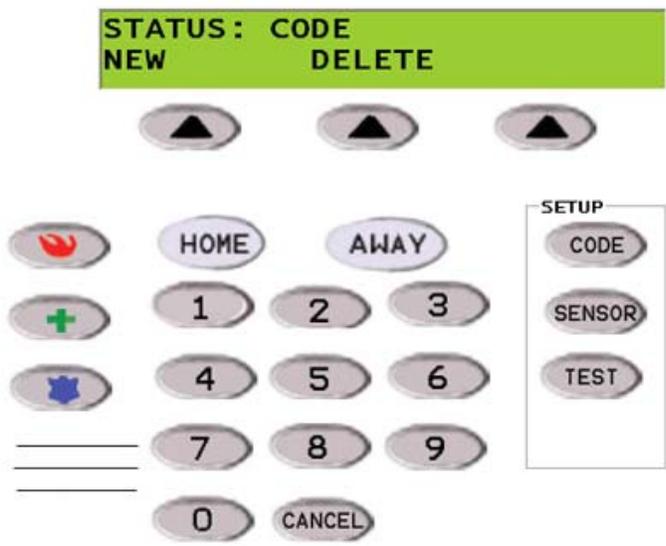
No. HE3-JH	Problem
Name: No 'clear' button for the wrong number user accidentally entered.	
<p>Reference:</p>  <p>The screenshot shows a keypad interface. At the top, a green bar displays '12341' and 'ERROR: PASSCODE IS 4 DIGITS'. Below this are three arrow buttons. The keypad includes a red fire button, a green plus button, a blue star button, and a numeric keypad (0-9). There are also 'HOME', 'AWAY', and 'CANCEL' buttons. A 'SETUP' menu is open, showing 'CODE', 'SENSOR', and 'TEST' options.</p>	
<p>Evidence:</p> <p>Heuristic: User control and freedom</p> <p>Interface aspect: As you can see in the reference above, when user accidentally enters wrong numbers, there is no way that user could clear the numbers and put in new numbers.</p>	
<p>Explanation:</p> <p>When user would like to set up a new code, and enters numbers, user could accidentally push wrong number. Say if user wanted to enter '1234', but accidentally pushed '12341', if there was a back space button, user could easily make it 1234 instead of pushing cancel button and start all over from the start, but since there is no back space button or even 'clear' button, user cannot stay within the setup menu and change the number that he wishes to enter.</p>	
<p>Severity or Benefit:</p> <p>Severity: 3</p> <p>This will occur every time user tries to enter numbers. The impact could be not too serious, but it could be annoying to the user, since he has to repeat a redundant process to enter the right number that he wanted to enter. This is not something that could be solved by learning, since people make mistakes.</p>	
<p>Possible solution and/or Trade-offs:</p> <p>Solution: Put 'back space' button on the menu to enable user to erase the last number that he entered.</p> <p>Trade-offs: It might cause a clutter on the interface since one more button is being added.</p>	
<p>Relationships: Not at this moment.</p>	

No. HE4-JH	Problem
Name: The label 'new' is not appropriate.	
Reference:	
 <p>The screenshot shows a security system interface. At the top, there is a green status bar with the text 'STATUS: CODE' and two options: 'NEW' and 'DELETE'. Below this are three arrow buttons. The main interface features a keypad with buttons for 'HOME', 'AWAY', and 'SETUP'. The 'SETUP' button is highlighted, and a sub-menu is visible with options 'CODE', 'SENSOR', and 'TEST'. The keypad also includes numeric buttons 1-9, 0, and a 'CANCEL' button. On the left side of the keypad, there are three icons: a red flame, a green plus sign, and a blue star.</p>	
Evidence:	
Heuristic: Match between system and the real world.	
Interface aspect: When user wants to change the code and goes to a setup mode for the code, it shows 'new' and 'delete'.	
Explanation:	
When there is already a code saved, and user wants to change the code, user would expect a label called 'edit' or 'change' rather than 'new'. The label 'new' seems more like if user didn't have a code already saved, and when user already has an existing code saved in the device, user could think that 'new' will add a new code on top of the existing code not necessarily changing the existing code.	
Severity or Benefit:	
Severity: 3	
This will occur every time user tries to set the code. The impact could be not too serious, since still user can change the code whether or not he thinks he is changing the code or not. This problem could diminish when user notices that even 'new' will 'change' the code after he checks it.	
Possible solution and/or Trade-offs:	
Solution: Instead of labeling as 'new', label as 'edit'.	
Trade-offs: The label 'edit' or 'change' might not also be the best solution, since to be strict, 'edit' is editing the part of something not the whole thing.	
Relationships: Not at this moment.	

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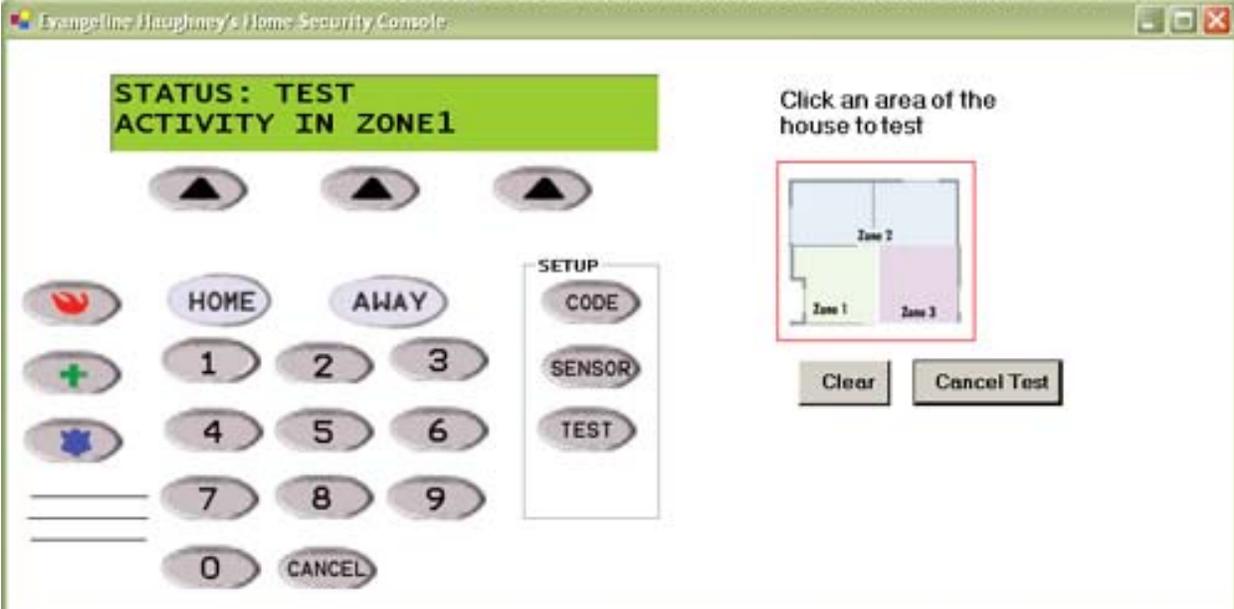
No. HE5-JH	Problem
Name: The icon is not obvious of what it means.	
<p>Reference:</p> 	
<p>Evidence:</p> <p>Heuristic: Match between system and the real world.</p> <p>Interface aspect: It has green plus icon on the button on the left side of the interface, with out the description of what it is, and the icon is not familiar.</p>	
<p>Explanation:</p> <p>The green plus is not obvious of what it means, since there's no description of what it is, and the icon itself is not familiar. You will not be able to know what it means until you actually push the button. But when you push the button, you don't know what is going to happen, so you won't push it, and thus you won't be able to know what it means until you get to the point where an emergency occurs and you get freaked out and start to push everything.</p>	
<p>Severity or Benefit:</p> <p>Severity: 4</p> <p>This will occur every time user uses the interface. The impact could be serious since the button is for calling the security company, but user doesn't know that it is for calling the security company, and if any emergency situation occurs, and has to call the security company, user won't be able to call the company. It could be learned after the user calls up the security company out of curiosity.</p>	
<p>Possible solution and/or Trade-offs:</p> <p>Solution: Put each icons at the blank space at the bottom of the buttons with the explanation of what it is for.</p> <p>Trade-offs: It might cause a clutter on the interface.</p>	
<p>Relationships: Not at this moment.</p>	

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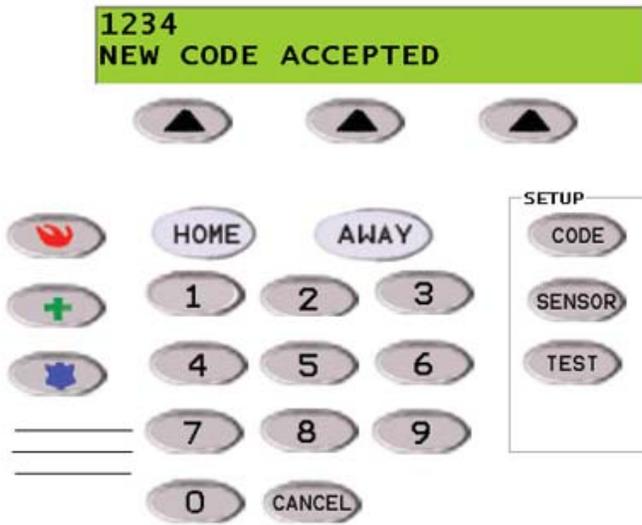
No. HE6-JH	Problem
Name: Current status is confusing.	
<p>Reference:</p> 	
<p>Evidence:</p> <p>Heuristic: Match between system and the real world.</p> <p>Interface aspect: In the screen for setting up the code, it says ‘status: code’.</p>	
<p>Explanation:</p> <p>In the screen for setting up the code, it says ‘status: code’, and it is not clear whether the current status is for ‘showing the code’ or ‘deleting the code’ or ‘changing the code’, or ‘creating a new code’. It might be confusing for the users to know if the current status is editing the code, or it’s showing the current code, but accidentally it is showing ‘new delete’ with some errors inside the device.</p>	
<p>Severity or Benefit:</p> <p>Severity: 2</p> <p>This will occur every time user tries to set the code. The impact is not serious since by the labels written below the status label saying ‘new delete’ gives user an idea that she can create a new code of delete the code. User would learn after using this that it IS a status for setting the code, since it set the code.</p>	
<p>Possible solution and/or Trade-offs:</p> <p>Solution: Change label to ‘set up code’.</p> <p>Trade-offs: I don’t see any trade off for the solution at this moment.</p>	
<p>Relationships: Not at this moment.</p>	

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No. HE7-JH	Problem
Name: Beep sounds are always the same.	
Reference: Running prototype.	
Evidence: Heuristic: Consistency and standards. Interface aspect: When user pushes a wrong button, it beeps, when user pushes a button that's correct, it beeps with the same beep that happened when user pushed the wrong button.	
Explanation: When user first pushes a button that does not work at that stage, it beeps, and user would think that it beeped because he pushed a wrong button. But when the user pushed a button that was actually working, it beeps with the same sound that beeped when he pushed a wrong button. So he will start to get confused on which button is wrong to push or right to push.	
Severity or Benefit: Severity: 3 This will occur every time user pushes any buttons on the interface. The impact is not serious since after a lot of usage by the user, user will learn that the beep sound doesn't mean anything in terms of the right and wrong.	
Possible solution and/or Trade-offs: Solution: Beep only when the wrong button is pushed. Trade-offs: There should be some kind of a feed back that the button is pushed even when the user pushes the right button.	
Relationships: Not at this moment.	

No. HE8-JH	Good aspect
Name: Testing window being flexible is neat.	
Reference:	
	
Evidence:	
Heuristic: Aesthetic and minimalist design.	
Interface aspect: When user selects 'test' button, the window opens and shows a separate interface that user can interact to test the device. When the testing is done, user can cancel the test, and the window will close to the normal size and the testing interface will no more be seen.	
Explanation:	
The test interface not necessarily is needed during the normal operation. So the interface being hidden and shown only when it's needed saves up the space during the normal operation.	
Severity or Benefit:	
Benefit.	
This is a benefit in terms of saving up the space and reducing the clutter. It doesn't show what's not important at the moment, so that the user can concentrate on only what is important at the moment.	
Possible solution and/or Trade-offs:	
Trade-offs: If the interface were to be embedded on a physical device, it would be hard to implement the dynamic space on a constrained area.	
Relationships: Not at this moment.	

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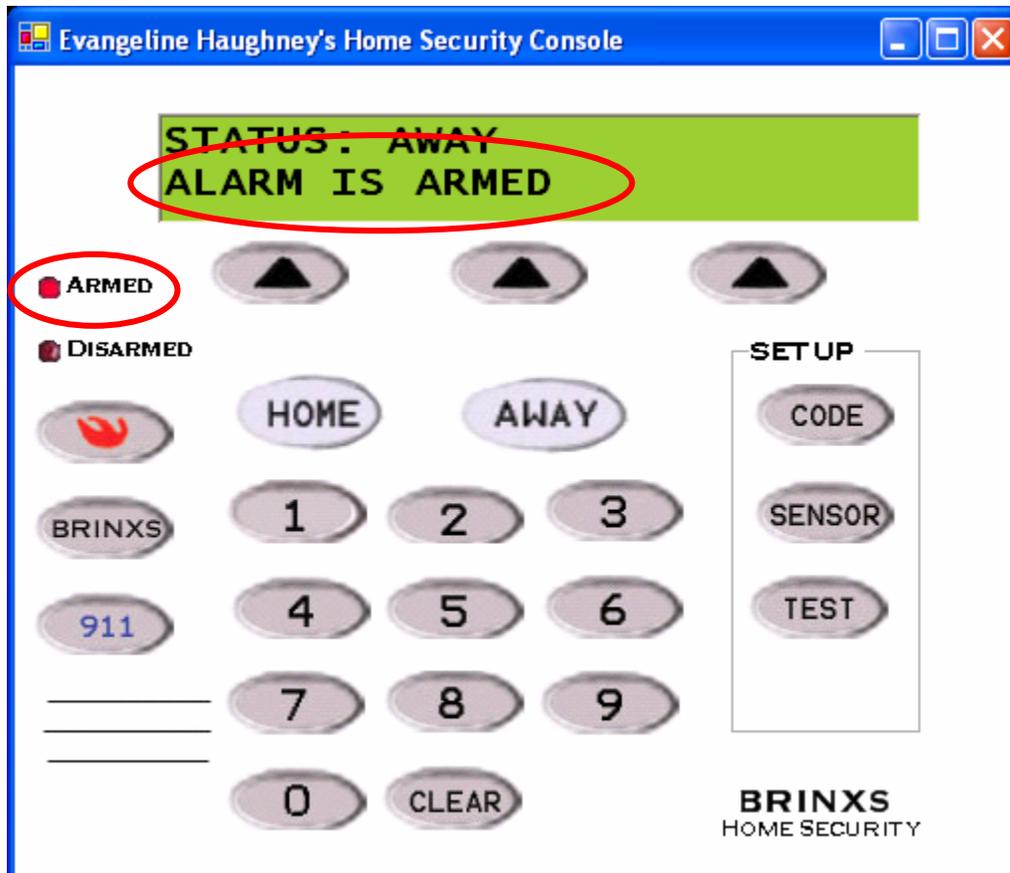
No. HE9-JH	Problem
Name: You are able to enter a new code and set up even when you're away.	
<p>Reference:</p> 	
<p>Evidence:</p> <p>Heuristic: Error prevention</p> <p>Interface aspect: Even when user sets the interface to 'away', all the other buttons work without putting in the code. When user enters 4 digit numbers even during the away mode, it sets up a new code with the number that's just been entered.</p>	
<p>Explanation:</p> <p>If the user is away, people shouldn't be able to set up or change anything with the interface without entering the code. But in this interface, even you are on the 'away' mode, you can setup the code, sensor and even test the device without entering any code. Basically there is no difference between 'home' and 'away' mode except you need to enter a code after you click 'home' button.</p>	
<p>Severity or Benefit:</p> <p>Severity: 4</p> <p>This will happen every time the user is away, and the impact would be big since any intruder can change the code and get into the house and steal everything from the house without getting caught.</p>	
<p>Possible solution and/or Trade-offs:</p> <p>Solution: Disable all other buttons when it's in 'away' mode.</p> <p>Trade-offs: There might have to have some feedback why the buttons are not working.</p>	
<p>Relationships: Not at this moment.</p>	

PUI Template for Usability Aspect Report

Study Name: Home Security Console – Design 3
Date of Study: March 28, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U3

No. TA-09	Problem/Good Aspect Good
Name: Combination of LED display and indicator light display feedback is helpful	

Reference:



On the second line of the LED display, the system action displays. The left side of the display panel has two indicator lights which light up to map with the LED message text.

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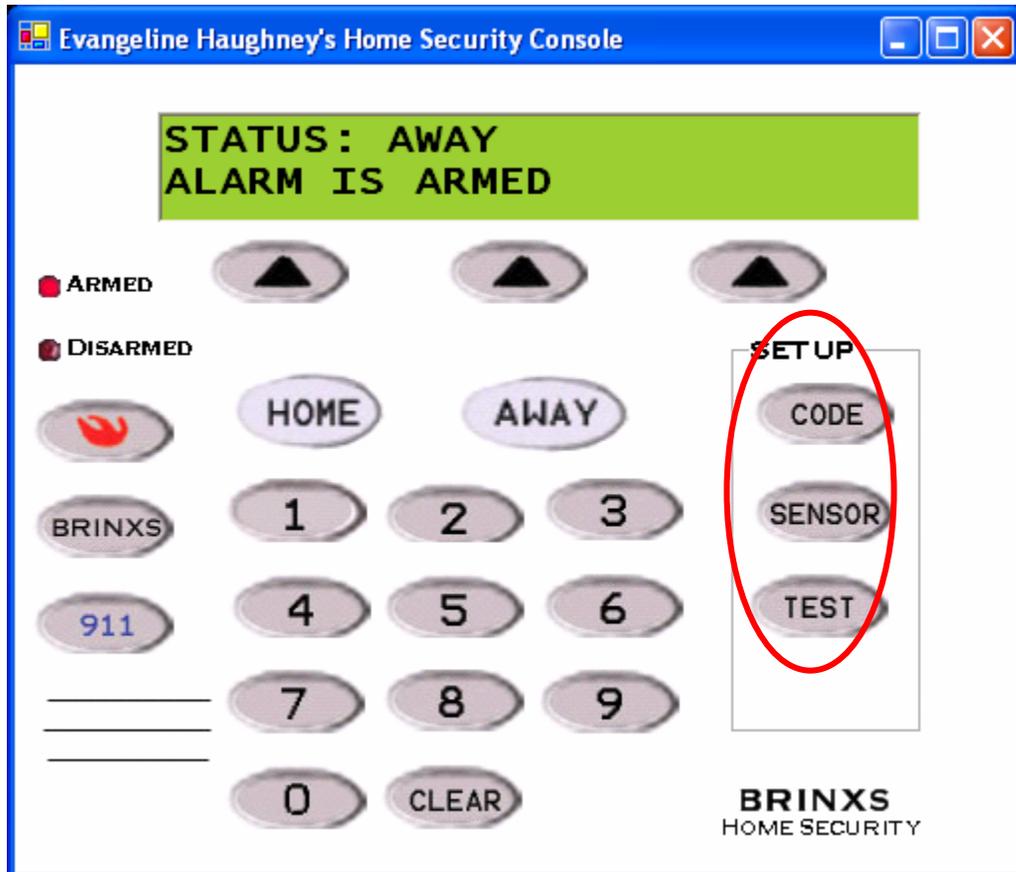
<p>Evidence: At the start of the tasks, the user asked, “Will this light up if I do this correctly?” – referring to the Armed and Disarmed indicators. After they performed the first task (to leave the house and set the alarm), the user expressed pleasure at the feedback, “That’s wonderful to have feedback.”</p>
<p>Explanation: The user received redundant visual feedback in response to their action of setting the alarm. The text label alone may not have been visible to the user. The red indicator light draws the fovea.</p>
<p>Severity or Benefit: Severity Level: N/A Persistence: This will occur for all functions Frequency: This supports all levels of users.</p>
<p>Possible solution and/or trade-offs: Tradeoffs: Two lines provide clutter, users need to read both?</p>
<p>Relationships: None at this time</p>

**PUI Template for
Usability Aspect Report**

<p>Study Name: Home Security Console – Design 3</p>
<p>Date of Study: March 28, 2004</p>
<p>Experimenters’ Names: Evangeline Haughney</p>
<p>Subject ID: U3</p>

No. TA-10	Problem/Good Aspect
Name: Grouping of buttons under SetUp section confusing	Problem

Reference:



The right side of the display panel has a SETUP section that contains three buttons: CODE, SENSOR, and TEST. They are aligned horizontally with the other buttons on the panel.

Evidence:

During the task to set the motion sensors, the user pressed CODE and then realized their mistake "Oh no, this is not what I wanted to do". The user explained that they "thought CODE meant to enter the password and then TEST would allow you to test", that all three buttons were related since they were under the SETUP section.

Explanation:

The user may have been conditioned by the previous tasks to always associate a label button with entering the password.

Severity or Benefit:

Severity Level: 3 Minor Problem

Persistence: This will occur only when the user needs to perform setup operations – infrequently.

Frequency: This will occur for all users.

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Possible solution and/or trade-offs:
Spread out the buttons under SETUP so they don't seem so proximally grouped. Tradeoffs: Works against the aesthetic design if one set of buttons are misaligned from the rest of the display.
Relationships:
None at this time

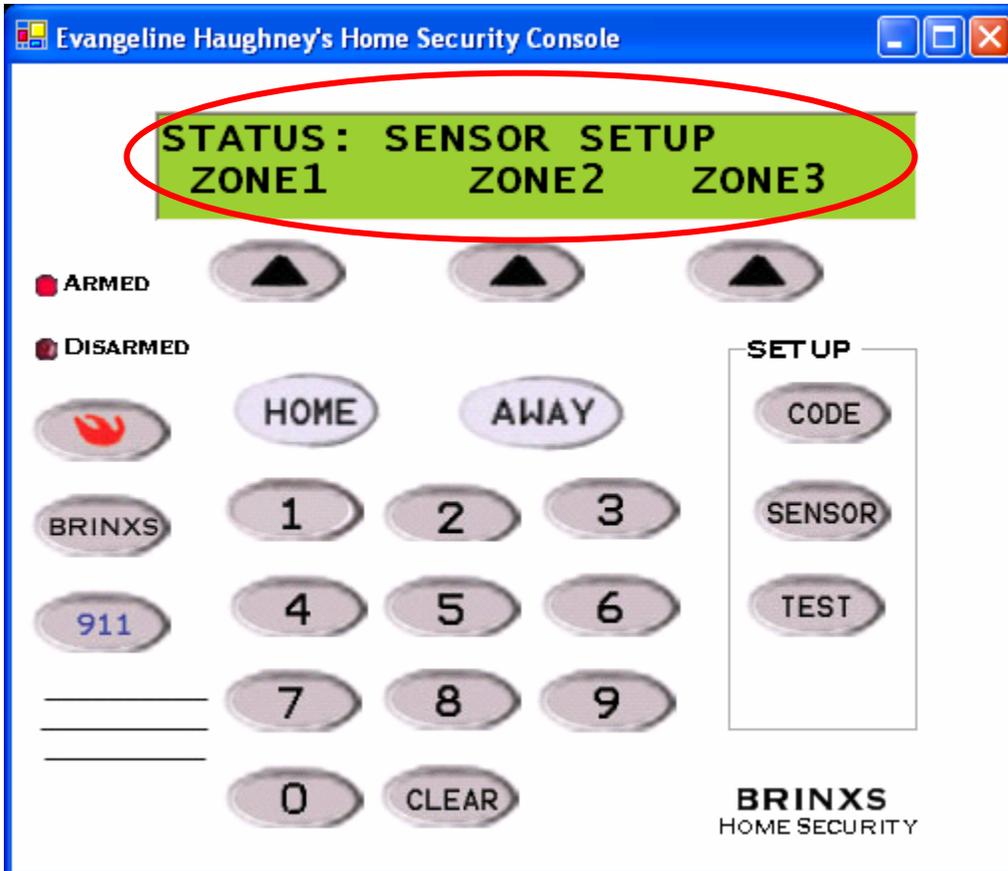
PUI Template for Usability Aspect Report

Study Name: Home Security Console – Design 3
Date of Study: March 28, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U3, U4

No. TA-11	Problem/Good Aspect Problem
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Name: Zone labels ambiguous

Reference:



The second line of the LED display informs the user of three sensor zones.

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<p>Evidence: U3 expressed hesitation: “I don’t know what...I assume that Zone1 means first floor.” U4 expressed hesitation: “I guess I’ll go with Zone1.”</p>
<p>Explanation: Users were unsure of what “zone” meant in the context of setting up a sensor. They might have had an idea that it had something to do geographically, but there wasn’t a strong link between the action and the label.</p>
<p>Severity or Benefit: Severity Level: 3 Minor Problem Persistence: This will occur only when the user needs to turn motion sensors on or off – an infrequent task. Frequency: This will occur for all users.</p>
<p>Possible solution and/or trade-offs: Re-label “Zone” to “Area”. Users set these sensors up depending on the layout of their home – it would make more sense to map the label to the room like “master bedroom” but this is specific to each home and would need to be customized in the programming. A generic, “zone” resolves the issue. Tradeoffs: Label still may not be semantically clear.</p>
<p>Relationships: None at this time</p>

**PUI Template for
Usability Aspect Report**

Study Name: Home Security Console – Design 3
Date of Study: March 28, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U3

No. TA-12	Problem/Good Aspect Problem
Name: Selector button function unclear	

Reference:



There is a row of three selector buttons immediately below the LED screen. The first row of the LED always contains a status text display. The second row of the LED sometimes contains system responses and options for selection.

Evidence:

U3 expressed hesitation: “I guess those lines mean...I wondered what they did because there is no immediate association label...Only when you hit CODE or SENSOR that the labels come up. Until that point, you don't know anything about...you don't know what they're doing there.”

Explanation:

When the user first approaches the interface, the buttons float without a label or association to a set of functions. Only when they choose CODE or SENSOR, two infrequently used setup functions, will they see a correlation between the selector buttons and a selection option.

Severity or Benefit:

Severity Level: 3 Minor Problem

Persistence: This will occur only when the user needs to turn motion sensors on or off – an infrequent task.

Frequency: This will occur for all users.

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Possible solution and/or trade-offs:

Include a Selector label next to the row of buttons. Or, label the buttons individually as “Select” in white font on the black triangle.

Tradeoffs: Increased clutter, minimal real-estate.

Relationships:

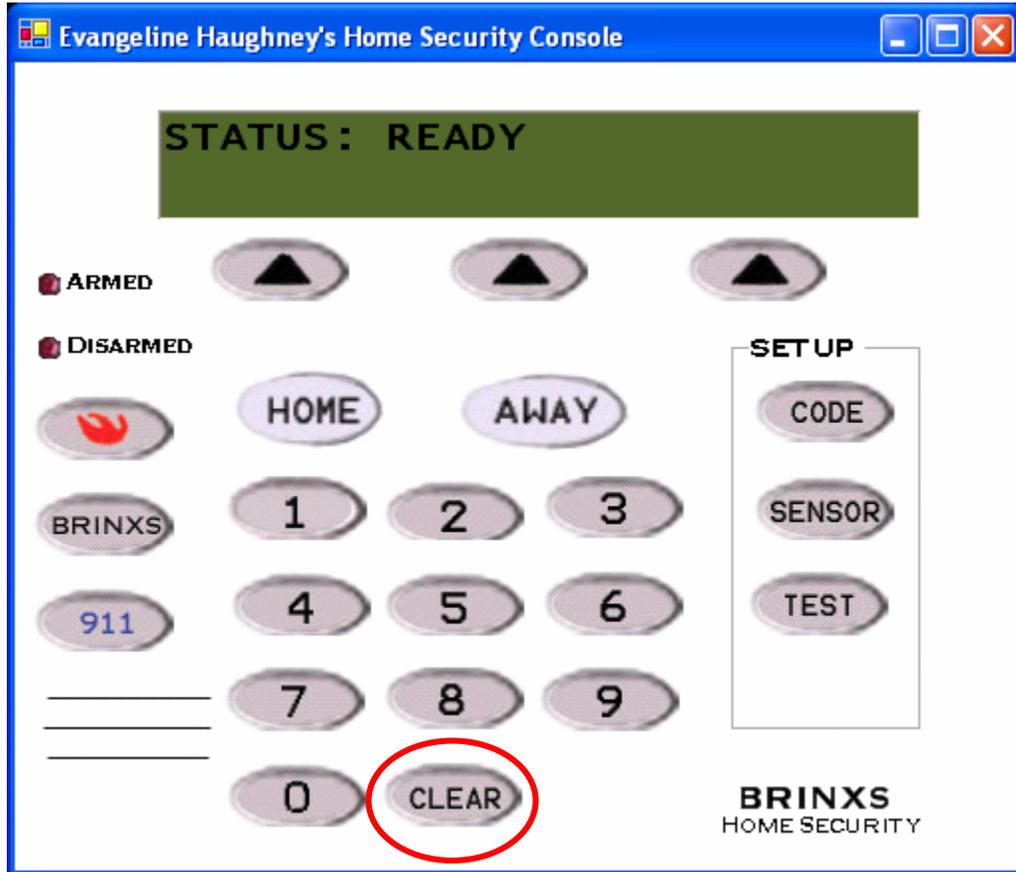
None at this time

**PUI Template for
Usability Aspect Report**

Study Name: Home Security Console – Design 3
Date of Study: March 28, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U3

No. TA-13	Problem/Good Aspect Good
Name: Clear button appropriate label	

Reference:



There is a Clear button at the bottom of the number keypad.

Evidence:

U3 expressed happy surprise: “Oh, Clear!”

Explanation:

The user had accidentally chosen CODE instead of SENSOR and wanted to go back. When they found clear, they stated that they thought it was what they should click because “No, that would mean...would it do something with the alarm, but that’s too easy, you’d have to do something more to program.” – referring to Clear canceling the alarm status.

Severity or Benefit:

Severity Level: N/A

Persistence: This button could possibly be used every time the user interacts with the screen.

Frequency: This will occur for all users.

Possible solution and/or trade-offs:

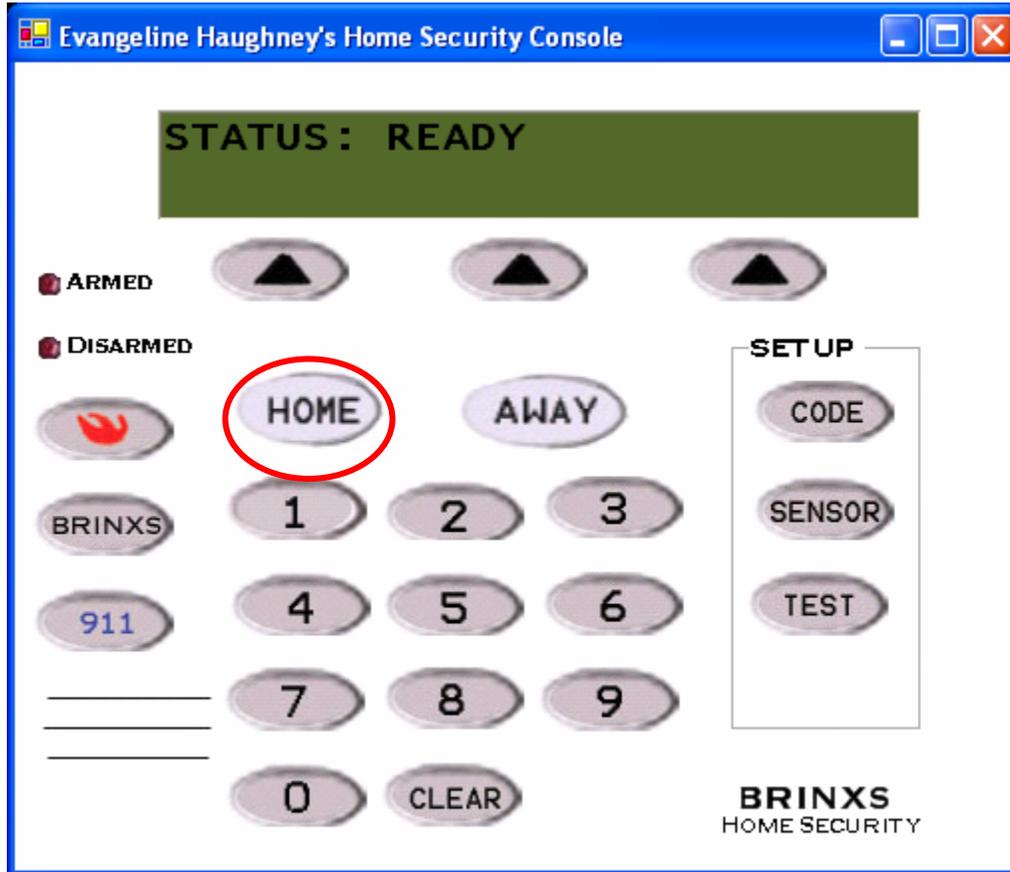
Tradeoffs: Cancel/Clear could imply that the alarm was being cancelled.

**PUI Template for
Usability Aspect Report**

Study Name: Home Security Console – Design 3
Date of Study: March 28, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U4

No. TA-14	Problem/Good Aspect
Name: Home button appropriate label	Good

Reference:



There are two larger white buttons for Home and Away in the middle of the panel.

Evidence:

User commented "OK, well I'm Home"

Explanation:

In the second task, the user needed to turn off the alarm after finishing their errands.

Severity or Benefit:

Severity Level: N/A

Persistence: This button is always visible on the panel.

Frequency: This will be used each time the user interacts with the system.

Possible solution and/or trade-offs:

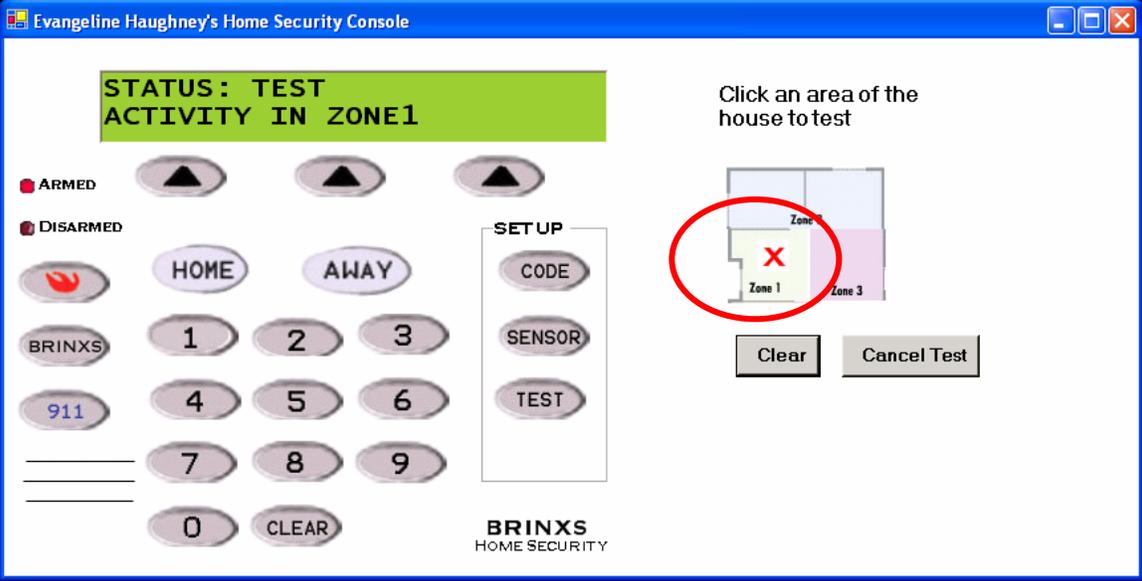
Tradeoffs: Home implies disarmed. Can't the alarm be set while still at home, especially if you are home alone? Problem with using technical labels like Arm or Disarm - they can be used for different scenarios but the most common mental model is leaving and entering the house.

Relationships:

None at this time

PUI Template for Usability Aspect Report

Study Name: Home Security Console – Design 3
Date of Study: March 28, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U4

No. TA-15	Problem/Good Aspect Good
Name: Test graphic “cool”	
Reference:	
	
<p>When the use sets sensors and clicks TEST, the display expands to show a simulation of the user walking through their house. They click on a zone to imply movement in that area. If the alarm is armed, the alarm will go off when they click on a zone.</p>	
Evidence:	
<p>User expressed happy surprise: “Oh, cool.” User commented “There’s activity in zone1. I think that’s good.”</p>	

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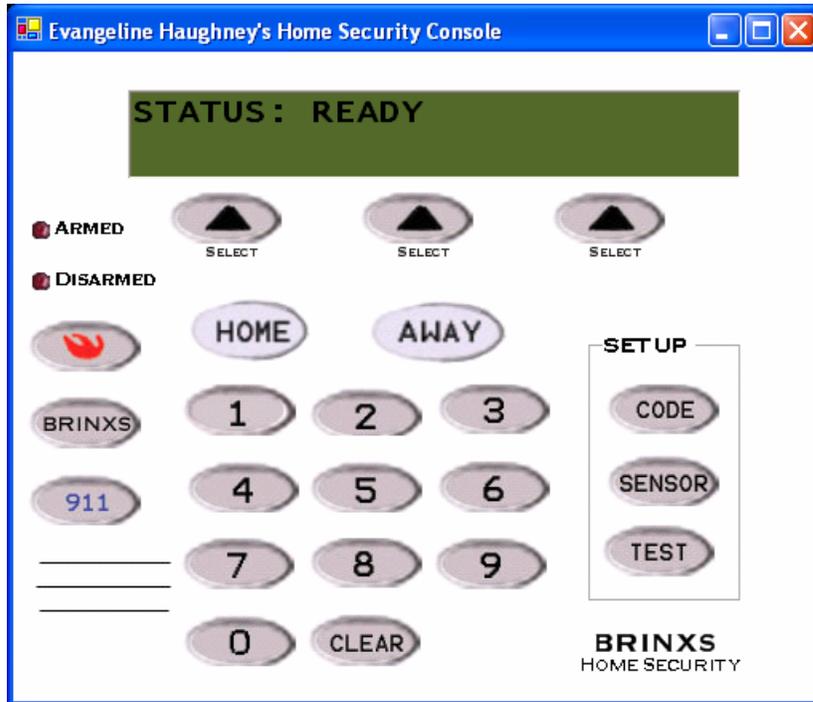
Explanation: User was able to associate the red X in the zone with the LED status label. Previously, the LED label alone was not sufficiently visible to indicate feedback to the user.
Severity or Benefit: Severity Level: N/A Persistence: This simulation is only available when the user chooses to test the sensors. Frequency: Infrequently used.
Possible solution and/or trade-offs: Tradeoffs: User needs to look all the way to the LED display to see text feedback. However, if text feedback was added to the test area, it may clutter the area. What is the mental model for this? To have 2 people test the system?
Relationships: Refer to Jina's HE

PUI Template for Usability Aspect Report

Study Name: Home Security Console – Design 4
Date of Study: March 28, 2004
Experimenters' Names: Evangeline Haughney
Subject ID: U5

No. TA-16	Problem/Good Aspect Good
Name: Backlit LED display useful	

Reference:



Before the user clicks anything...



After the user clicks "AWAY", the background color of the LED display changes to a lighter green.

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<p>Evidence: User expressed happy surprise: “Oh, I like the backlighting.”</p>
<p>Explanation: The background of the LED display lights up when the user presses any button to help provide more visual contrast, especially at night.</p>
<p>Severity or Benefit: Severity Level: N/A Persistence: The backlighting appears each time the interface is used. Frequency: This is a benefit for all users.</p>
<p>Possible solution and/or trade-offs: Tradeoffs: None that I can think of.</p>
<p>Relationships: None at this time.</p>

**PUI Template for
Usability Aspect Report**

<p>Study Name: Home Security Console – Design 4</p>
<p>Date of Study: March 28, 2004</p>
<p>Experimenters’ Names: Evangeline Haughney</p>
<p>Subject ID: U6</p>

No. TA-17	Problem/Good Aspect
	Problem
Name: Low contrast between ON and OFF states of Armed/Disarmed display indicators.	

Reference:



When the user sets the alarm or turns off the alarm, the display indicator lights on the left side of the panel light up.

Evidence:

User provided a design suggestion: “Make Disarmed more black.”

Explanation:

Currently, there is little color difference between the ON and OFF states which makes it hard to tell the difference between Armed and Disarmed.

Severity or Benefit:

Severity Level: 2 Minor Problem

Persistence: The indicator lights will light up each time the system is armed or disarmed.

Frequency: This impacts all users.

Possible solution and/or trade-offs:

Do as the user suggested and darken the Off indicator light to provide more visible contrast.

Tradeoffs: None that I can think of.

Relationships:

None at this time.

