

# spaces

aron chavez   elizabeth abrahanson   kristen bales   mike johnson   sean ren   tim damon

home  
of the  
future

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Originally, walls were developed as a defense mechanism with the function of providing safety and security from outsiders, as well as creating shelter and providing an infrastructure.

Walls serve the purpose of upholding the structure of a home and acting as the framework. These structures facilitate activities and define the context of rooms.

The history of walls also references a constant incorporation of art. From more permanent installations--like mosaics and murals to more temporary arrangements like hanging paintings and prints history shows that people like to have control over their walls to create ambiance.

# 01 background



Walls limit the activities of a room. The typical layout of the walls within a home has not changed much despite the efforts of some Modern architects. Primarily homes are filled with a series of four-sided rooms arranged in the most efficient manner.

The most interesting development in the organization of the standard home has been the merging of the kitchen and the living room. By knocking out a wall—usually over the counter—a larger sense of space was created. Much more can be done to create more space, especially by utilizing new technology.

The goal that interior designers are usually given is to create a larger sense of space in a room. Walls hinder the ability to do this and are often worked around by bringing in mirrors and paint. Natural lighting is often scarce in standard designs and new ways of incorporating lighting design through integration with walls would also provide the ability to expand the perception of space.



see  
beyond

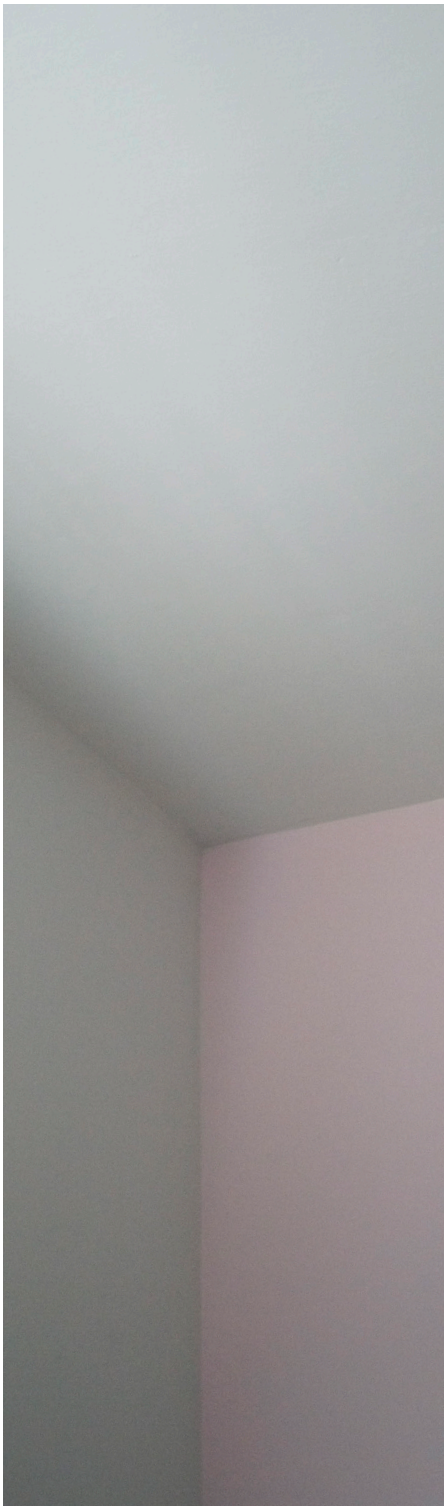
walls





Stepping out from the wide-open category of walls and spaces made it extremely easy to fall into exciting talks involving the limitless power of a system of projections on walls. This gave us way too many features to choose from, many of which were merely shallow extensions of existing systems. For instance, there was talk in the beginning of essentially making this into something that really was just a big screen for your video games and PC functions. To avoid this, we had to keep pushing ourselves back to considering the role of walls as they exist now and throughout history. From this point, we were able not only to think of how to further their function by combining existing roles, but we were also able to add to that list in order to make our system something purely focused on extending and adding exponentially dynamic characteristics to the home environment.





Once we had this in mind, brainstorming and feature building became a much easier process and we were able to step past the point of furious list making and debate over how to make this a useful piece of work. From there, mock-ups for the first presentation in photoshop gave us a glimpse of what we all had been envisioning in our heads. In between presentations, the focus of ideation became further definition of “the features of features, and deciding what a visual interface would look like, and of course how it would work. The interface came from a similar process of trying to flesh out categories of function on paper/white-board, thinning this out as much as possible to what was really essential, sketching visuals, and finally placing them into final slides.



awaken  
your

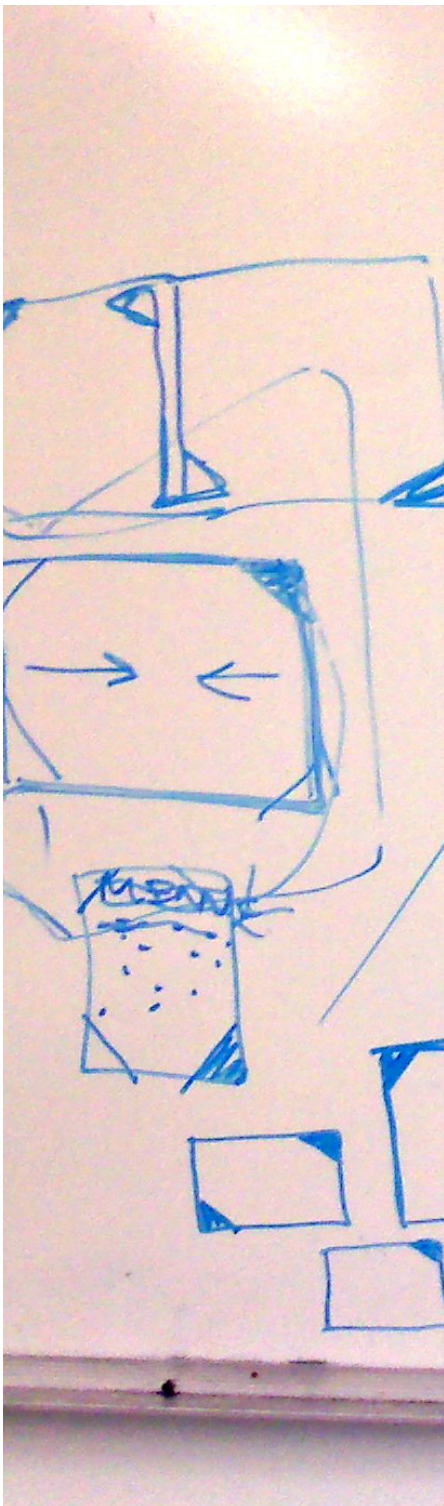
walls





When the Spaces team first formed, we were intrigued by visual ideas - especially the potential to make the walls of a home transparent. We envisioned a multistory house party at which you could see everyone in the house, because the walls were transparent. Or, we could allow users to watch their children play outside or see who is at the door by looking through walls. We also were interested in applications of movement-tracking sensors, such as "drawing" on the walls or having a projected movie follow you throughout the home. However, because of the need to create a powerful product with functions that cohesively address the potential needs of future users, several of these original ideas did not make it into the final presentation. Because our product became themed around the idea of transforming the spaces of a home to allow for an instantaneous change of environment, it was important for us to rely on narrative to show how a typical space could change during the course of a day. For some time we also toyed with the idea of having walls in the home be able to move physically as well. While this supported the notion of transformable space, we realized that ultimately this was not a focused application of Intel's projection technology, and it would create too great a disruption in the user's general behavior pattern.



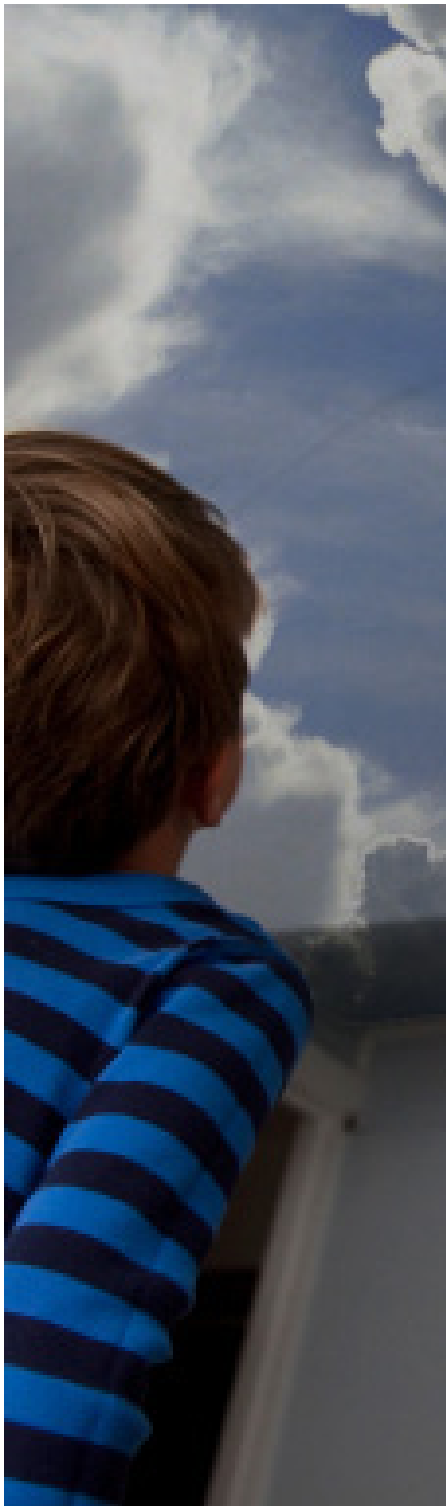


For the first presentation, we presented some background information on the overlooked potential of walls, then showed several visualizations of possible applications of the technology. This was a success, but for the final presentation we invested a significant portion of our focus on creating a compelling narrative to showcase our product. We came very close to creating a video which featured a successful businessman enjoying the view from his 23rd-story apartment, and an unsuccessful fellow who lived in a basement but enjoyed the exact same view thanks to projection technology. Unfortunately we were unable to follow through with this idea because of time constraints (and the lack of a 23rd story apartment with a view). The idea we settled on involved a young boy and his grandmother interacting with the system, highlighting the ease-of-use and variety of potential users. After writing and revising the narrative, we began to work on the interface. Throughout the process we had repeatedly considered gestural, voice, automated, and menu-based controls. We also wanted an unobtrusive yet easily accessible interface. The end result was a system in which you can drag your fingers across an item to interact with it, or use a simple gesture to bring up a menu on any surface. According to your specifications, a variety of automated functions could also be implemented.

these  
walls can

talk





We spent a great deal of time analyzing exactly what features would be most essential to our design. Since we wanted to create something simple to understand we made many of the features automated that could be edited through a simple menu. We also wanted to ensure that our design wasn't just a cool gimmick. As a team we strived to discover practical implementations of our design. One example reduces your energy consumption by having lights that dim as you leave rooms and follow you through the house. Another was to utilize the alarm clock to not only brighten your walls but utilize it as morning light therapy for people with seasonal affective disorder. This same lightening of the walls could also awaken you and light your way in the event of fire or emergency. These same walls could also increase security by allowing you to see who is outside without placing you in harm's way. The following pages include more of the features we developed during the project.

# 05 features



Invisible Walls: This feature allows a user to remove the walls from around them at will, to let the user feel as if they were simply standing on the ground where their house “should be.” This takes the idea of the window to an entirely new level, and when coupled with the sensors in the system, is a great resource for security purposes, from watching your children as they play, to noticing suspicious movement outside the house late at night.



Room-Merge: Users can paste a room from each of their respective houses together, share a conversation and exchange media such as created environments or artwork, etc.





Ambience Autopilot: The system is able to, with minimal input from the user, track their movement and automatically adjust settings such as color, texture, implied size of rooms, and lighting to provide the most utility for a task, whether it be waking, working at a desk, hosting a party, etc.



Sample/Creation Mode: The most intuitive way for creating environments is to throw things that inspire you up onto the wall with the interface; this sampling process allows you to build an immersive environment by giving the walls information to work off of in order to either let you surround yourself with the images you scan, or suggest a similar downloadable environment. Users are allowed free reign in active creation as well, as there is a gesture-based drawing setting.



Audio Immersion: Basic audio applications like the alarm clock, merging environments, media, etc would create an enriched experience. The walls would also be able to create an enhanced experience through utilizing audio spatial technology that would create sound in the environment that would produce audio similar to the actual experience, as well as respond to the changing location of those in the room.



Connection to Objects: Items in the home would act as catalysts for changes in the environment. Combining the Bonfire technology with scanning capabilities, the walls respond to objects. This provides a more physical interaction with the wall as well as allowing for a relationship to further develop between the walls and the home. Educational experiences are one area that would be enriched by this application learning could leap from the pages of the book to fully engage the user.

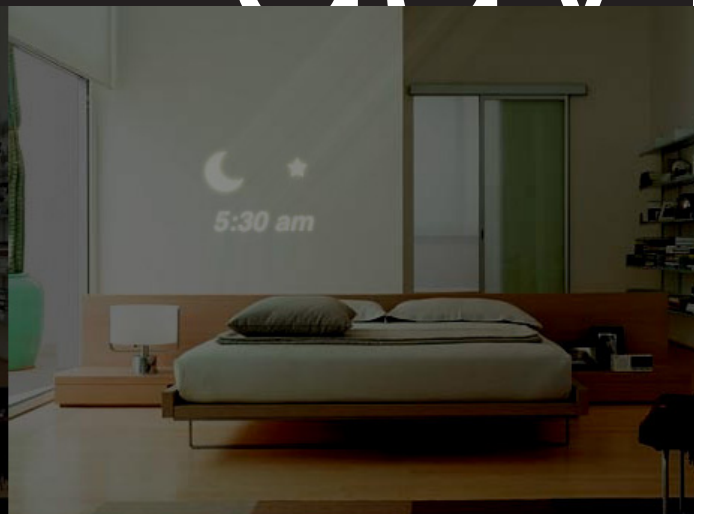
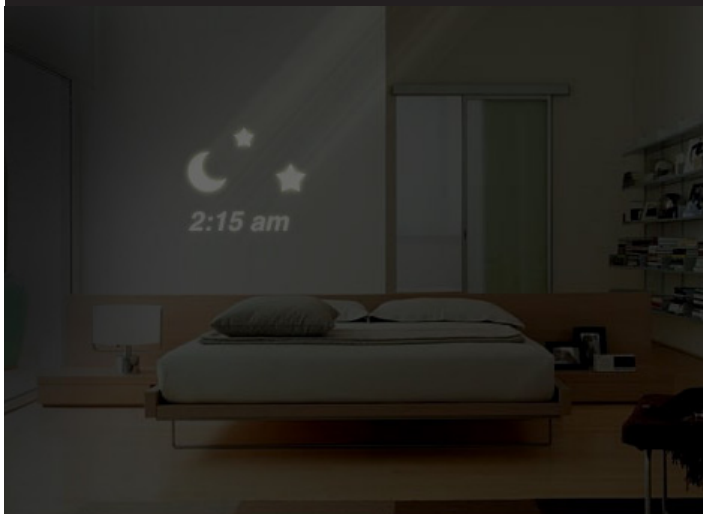
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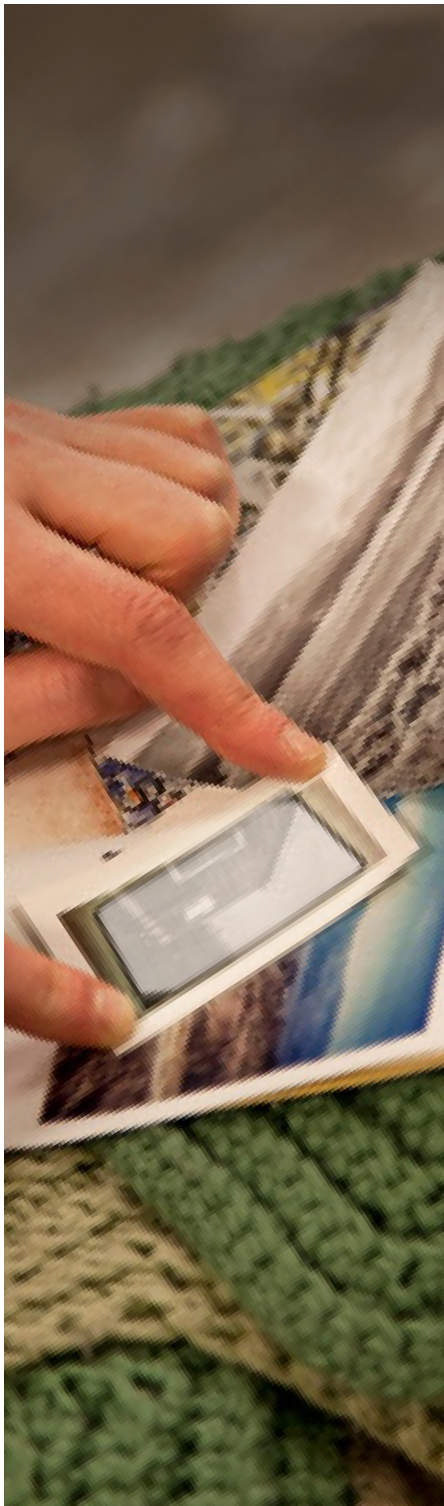
world



# structure your

# day





The goal of the interface was to keep it as minimal as possible. We felt that if it got too large or involved, it would disrupt the environment created by the walls — make the projections seem false. That being said, the interface is an integral piece of the system.

We ultimately decided upon a small square that would appear when you dragged your fingers apart from one another diagonally. Bonfire technology would follow the user around the house and recognize this movement. You could then adjust the size of the square on the corners or drag it to another object. The user could then scan the image and move to it to the wall or recognize it and create context in the environment that responds to it.

We designed the interface with two triangles on the corners of the square — a black one in the upper left, and a white one in the lower right corner. When the user twists the interface to the left, it appears on the wall in front of them with the menu screen. A twist to the right and the interface appears on the user's lap.

Keeping with the idea of a simple interface, we made five options for the main menu screen: saved environments, downloadable environment, settings, entertainment and media, and contacts. The environments are displayed in thumbnails on the wall, with the user flipping through them. Settings and tools would provide the controls for ambiance, colors, lighting, alarm clock, cycle features, calendar, etc. Through entertainment and media the user can access interactive features such as drawing on the walls, gaming, etc. The contacts feature allows for immediate connection and merging with other environments.

# 06 interface



twist  
for

# menus

Saved Environments

Downloadable Environments

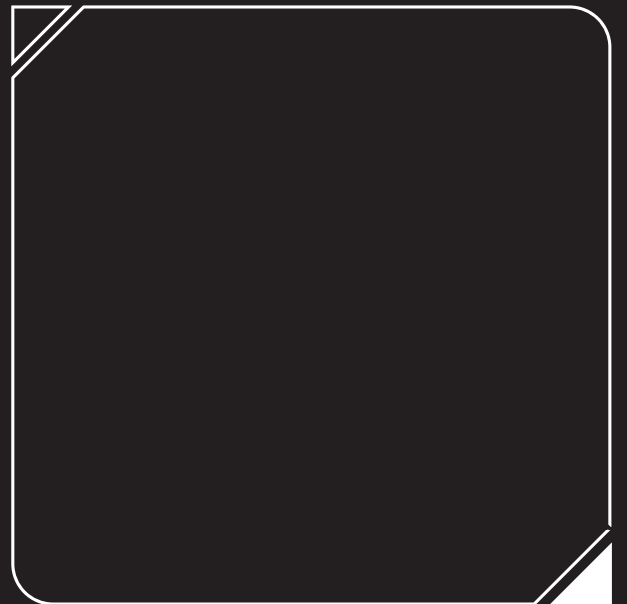
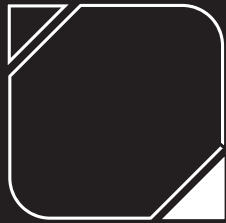
Entertainment and Media

Settings

Contacts

corners  
re size

interface



every  
surface

interface





Our utilization of the bonfire system and projections could revolutionize the way we use our homes. In the future home may simply become empty canvases that adapt to a user's desire to change their space instantly. Homes could alter in their basic structure and evolve to have larger gathering spaces to accommodate new immersive environments. Since we can swipe and erase walls away, there is even the potential for a home to become a windowless dwelling with improved ventilation systems. Users will be able to save and share the spaces around them opening up a network of environments and opportunity to "travel" without monetary constraints. There is even the possibility of creating educational partnerships with art museums, scientific institutions, and musical and theatrical venues to allow people in rural areas the chance to explore the world around them that they may not have experienced prior. The home can become an even more life changing experience because in addition to building relationships with the people you live with you can break down the barriers houses create.





There are two aspects of our product that we struggled with, and perhaps could have resolved differently.

The limitless possibilities for projection create a tension with the need for a focused product. After realizing the infinite ways in which a space can be transformed with this technology, we rarely considered limiting the types of features available, or at least the types of features that appeared in our final presentation. Because we only had a few minutes to present the entire scope of our project, our presentation may have had a "this product can do anything and we are not sure how" effect.

There is also a tension between the logical necessity of making an interface technologically and practically realistic, and the desire to focus on the possibilities afforded by the team's vision, letting the professionals worry about the technology. This led to occasional disagreements, and ultimately an interface that used a strange combination of gestural, automated, and menu-based interactions. While this might actually be practical and possible, we were unable to do the interface justice in our short presentation, feeding the "our product can do anything" effect.

However, our visualizations were high quality and powerful, certainly showcasing the visual appeal of our applications. While asking friends and family for input, we found that the idea of large-scale ambient projection is appealing and provocative.

08 reflection

live  
in

spaces

