AIRSPECT

HCDE CAPSTONE
SPRING 2015

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ACKNOWLEDGEMENTS

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Our mentors
Jared Bauer
Michael Grazewski
John Porter

SeaTac Airport
David Wilson

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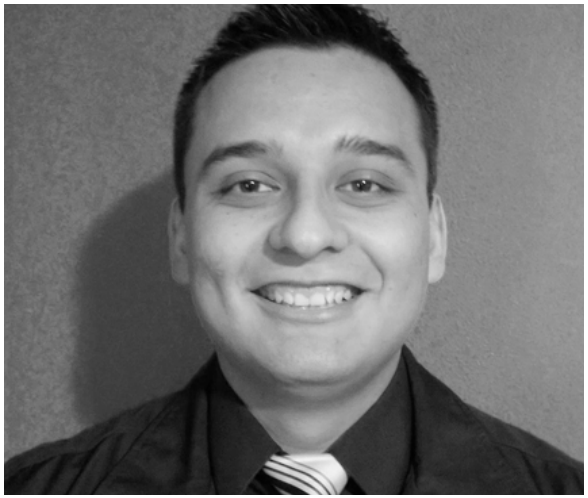
THE TEAM

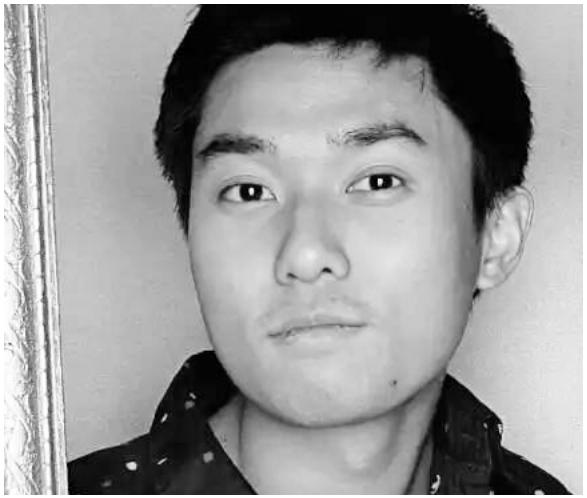


ANTONIO DIAZ

Antonio enjoys using research and usability principles to create amazing designs. He enjoys the challenge of design constraints and the user-centered process to focus a design.

JENNIFER WONG

Jennifer is an aspiring user experience designer and researcher. She loves working on new and challenging projects to create simple, effective, and elegant solutions.



ETHAN ZHANG

Ethan loves solving complex UX problems in simple ways. He focuses on creating intuitive and efficient solutions to help users achieve their goals.

SAM ZHAO

Sam has a background in computer science and he enjoys building things that solve everyday problems. He is passionate about creating elegant design and experience with a user-centered process.

GARY ZHOU

Gary is a creative designer who specialize in prototyping. He is always passionate about integrating cutting edge technologies with UX design principles to build something more useful.

01 EXECUTIVE SUMMARY

For our Human Centered Design and Engineering undergraduate senior capstone at the University of Washington, our team focused on improving the airport experience.

OPPORTUNITY

Through our preliminary research including surveys, and interviews, we found that common feelings people attribute to the airport are anxiety, stress, and boredom. We also found that travelers always focus on getting to their gates first after passing security. Travelers do not have much interest in exploring the airport and instead, like to wait at their boarding gate. They don't like to leave their gate for too long because they are afraid they will miss important flight notices, they are not sure they can get back to their gate on time, or they just don't see the airport as a place for exploring.

SeaTac airport had 37 million people coming in and out in 2014 and with the increase of mobile devices, there is a huge opportunity to implement an application for SeaTac airport. We had the opportunity to work with David Wilson, SeaTac Airport's Chief Technologist, who gave us insight on the use of technology at the airport and how travelers spend their time at the airport, which further supported our research that travelers do not like to leave their gate and explore the airport.

DESIGN QUESTION

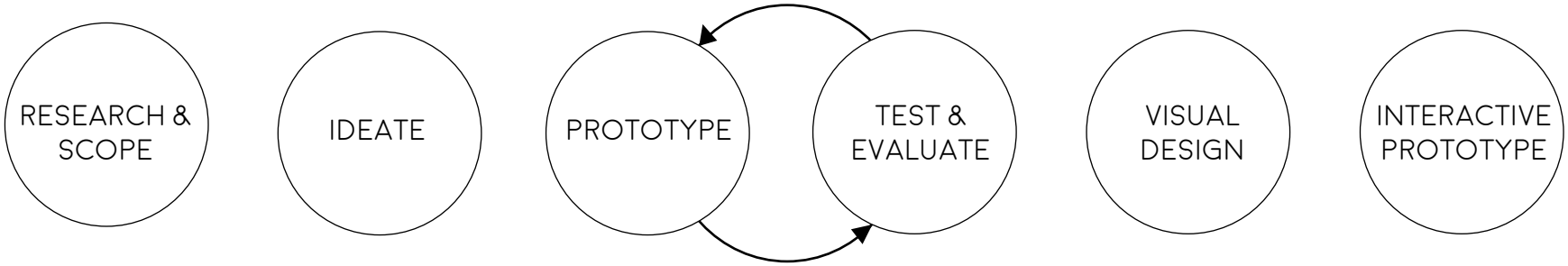
How can we encourage travelers to explore the airport and always make it back to their gate on time?

AIRSPECT

Our solution is Airspect. Airspect makes use of Bluetooth-enabled Beacons to track travelers' locations in

the airport to help them find nearby attractions. Knowing the location and flight number, Airspect allows travelers to feel relaxed by tracking time for them and providing notifications. With assurance that they have time to spare before boarding and that they are posted on the flight status, they can take their time and stop by shops/restaurants on their way to their gates or explore the airport. Our application allows travelers to control their airport experience.

PROCESS



Surveys Interviews Web S.M.E.	Persona Storyboard Sitemap Wireframe	Paper & Low-Fidelity Prototype	Guriella Testing	Moodboard Illustrator Mockup	Proto.io Prototype

HUMAN-CENTERED

Throughout our project we focused on following a human-centered design approach. Whenever possible, we gathered feedback from potential users to ensure that the design of application is usable, desireable, and feasible for users.

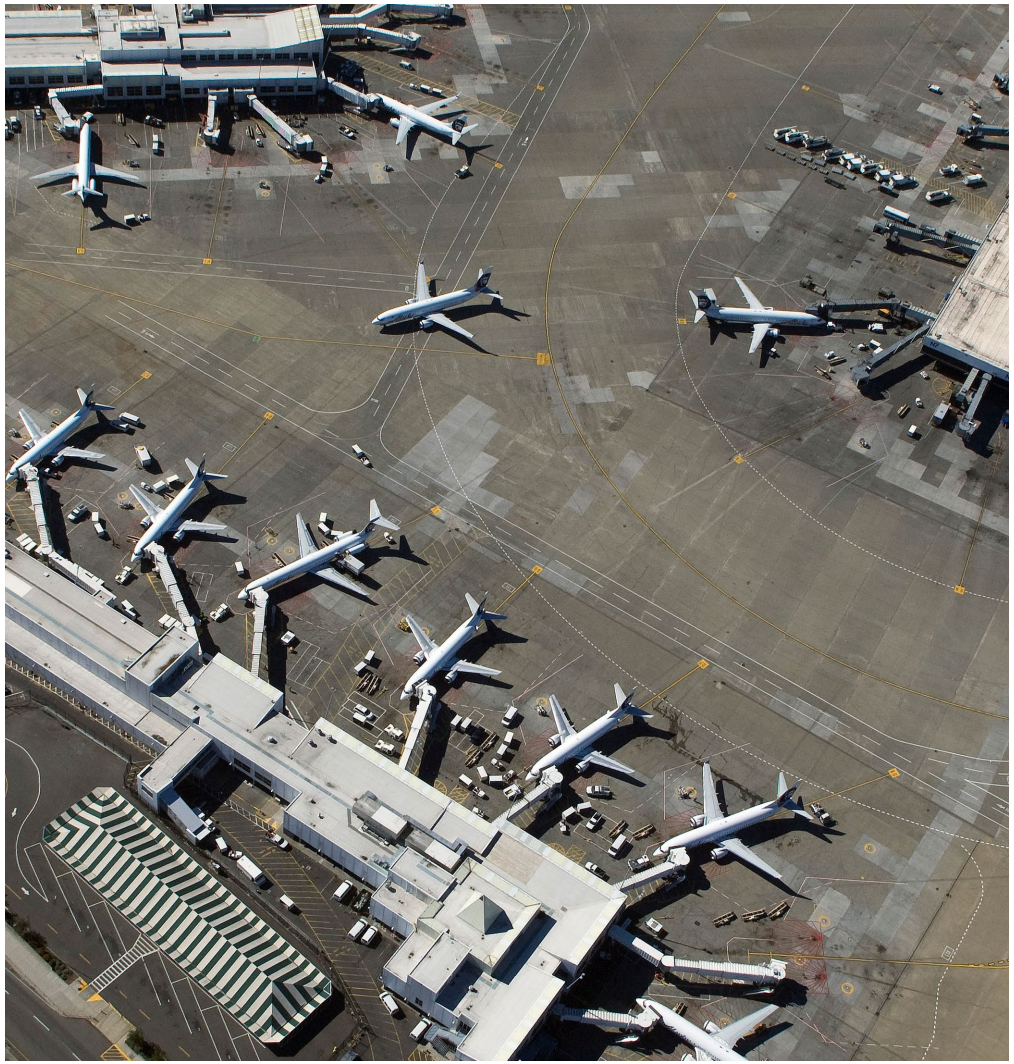
We researched related background material, surveyed and interviewed target users, created initial designs, evaluated and iterated on the designs based on users' feedback, and finally produced a high fidelity prototype.

Ideally, this process would be a cycle. After reaching our final prototype, we would do more usability testing and refinement, then go back to doing research to see how we can further improve our design.

02 RESEARCH

During our user research phase of our project, we sent out a survey to Facebook on various group pages as well as our personal page, carried out semi-structured in-person interviews, and met with Sea-Tac Airport's Chief Technologist, David Wilson. In addition, during our Spring break prior to the start of our class, we had three group members who visited the airport for vocational purposes. During this, we kept observant and noted anything that stood out to us about the airport space. We also took pictures at the various airports we visited. Our observational research was used in group discussions to identify problems and spark conversation.

After doing all of our user research, we created two personas based off of our research. These will be used in our next step to narrow down on our design idea.



SURVEYS

We designed a survey using Google Forms to better understand people's experience at the airport and sent it out through social media. We received 89 responses, varying from ages 18 to 64.

In the survey, we were mainly interested in:

What bothers travelers in airports?
What do travelers like about airports?
What could improve travelers' experience in airports?
How long do travelers wait for boarding and what do they do while waiting?
What are travelers' purchasing habits in airports?

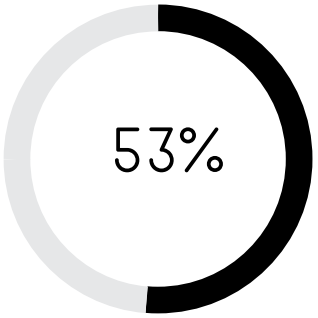
Next, we give an overview of our main findings from our survey.

MAIN FINDINGS

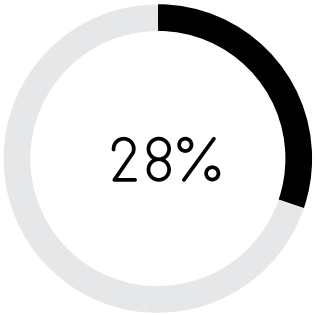
The top things that bother people at airports are:
1) Waiting in line at security, 2) Finding electric outlets, 3) Flight changes/delays, 4) Waiting for boarding, 5) Claiming baggage, and 6) Finding food to eat

We also found that travelers wait longer at boarding gate than they would actually like to. Travelers generally think they will need around 30 minutes to explore or go somewhere in the airport, but 53% of travelers will just sit at their gate for 30 minutes to an hour and an additional 28% will wait at their boarding gate for over an hour.

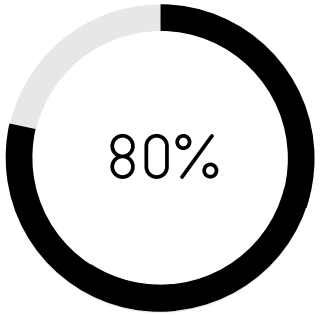
These survey results gave us great insights about what problems people have in airports. We analyzed these problems and acknowledged the ones that we had the power to solve. From Figure 1, we found that waiting in line at security was recognized as the main frustration travelers had at the airport. However, our research proved that it is not possible to provide information about how long security lines will take because. It is too variable and unreliable. Looking past this, we can see themes in people's interests in finding food, the importance of use of technology, and their worry about getting to their boarding gates on time. Therefore, we decided to focus on the problem space after passing security until boarding.



Wait at their boarding gate for 30 minutes to an hour

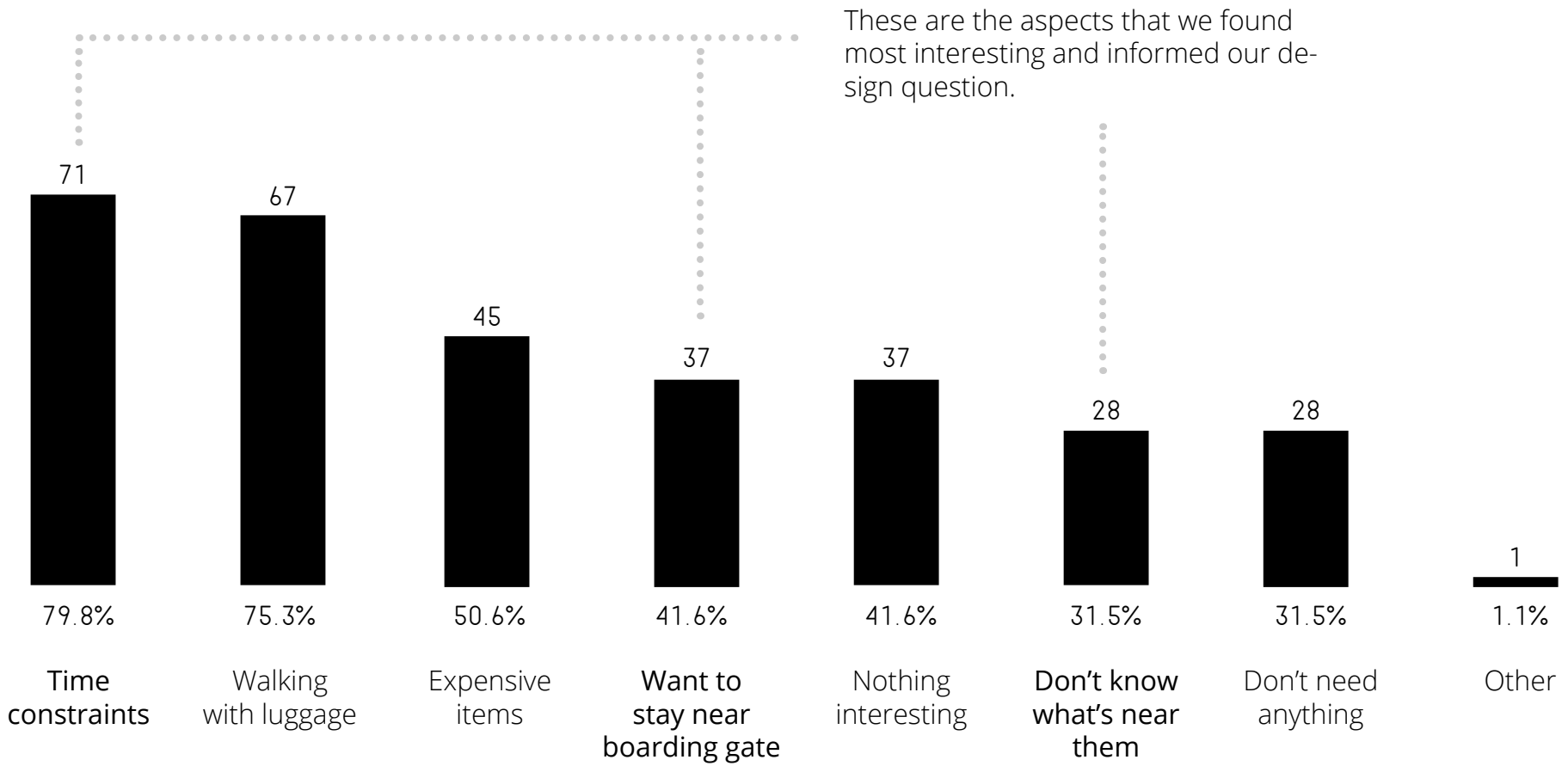


Wait at their boarding gate for over an hour



Don't explore the airport because issues related to time and awareness

FIGURE 1: WHAT PREVENTS TRAVELERS FROM EXPLORING THE AIRPORT



INTERVIEWS

We interviewed a total of eight people – 5 males and 3 females, ranging from ages 19 to 55 – about their experience in airports. The interview was semi-structured: we had a list of questions regarding to what they do in airports, what they like and dislike in there, and their opinions on airports, but we also encouraged our interviewees to talk about anything in their minds about their experience in airports. Our main findings are summarized by including findings that affected most participants. We broke our findings into three major categories: boarding gate, navigation, and shopping.

“”

After I pass the security gate, I go and look for my boarding gate. I always do this immediately before doing anything else.

- FEMALE, 47

I look up my gate number on my ticket and follow the signs to the gate. This is not hard.

- MALE, 30

I usually just sit down at the gate. But if it’s not in the United States I will walk around.

- MALE, 30

MAIN FINDINGS

Finding #1: Travelers head straight to their boarding gate after security

Notable is the first finding that seven out of the eight people we interviewed said that they go straight to their boarding gate after passing security, no matter how much time they had before their boarding times. In general, they do this in order to know their gate location and to check on any status of the fights, or just because they have no interest in exploring the airport and just want to sit down and relax.

Finding #2: Travelers have no trouble navigating through the airport

All interviewees found that it was easy to navigate to their boarding gates. They all said that they just follow the signs. When asked if navigation in the airport is easy, only Interviewee 3, a 21 year old male, said it was not. He pointed out that one confusing aspect of SeaTac airport is that you have to take an underground train to get to the S Gates. He says that "It is a little confusing that you have to take it because it doesn't say [on the map] or no one tells you to take it."

Finding #3: Travelers are not enthusiastic about shopping at the airport

When we asked if people shopped in the airport, most people said that they did not. Interviewee 5, a 55 year old male, said that "I take it as more expensive than outside," so he does not want to purchase anything. All of our participants did not see the airport as a place to shop, therefore they were more likely to do other activities. Interviewee 6, a 50 year old female, said she "...just sit down at the gate. But if it's not in the United States I will walk around. Most airports in the US are the same.

MEETING WITH DAVID

We also had the opportunity to meet with David Wilson, Chief Technologist at Sea-Tac Airport. He gave us great insight into Sea-Tac's current projects and what they look forward to in the future. One of the most prominent pieces of information is that Sea-Tac airport has already placed 140 beacons in their airport.

We were also able to receive user research reports that they have already conducted. A couple of the most interesting findings are described next.

FIGURE 2: WHEN VISITING SHOPS/RESTAURANTS

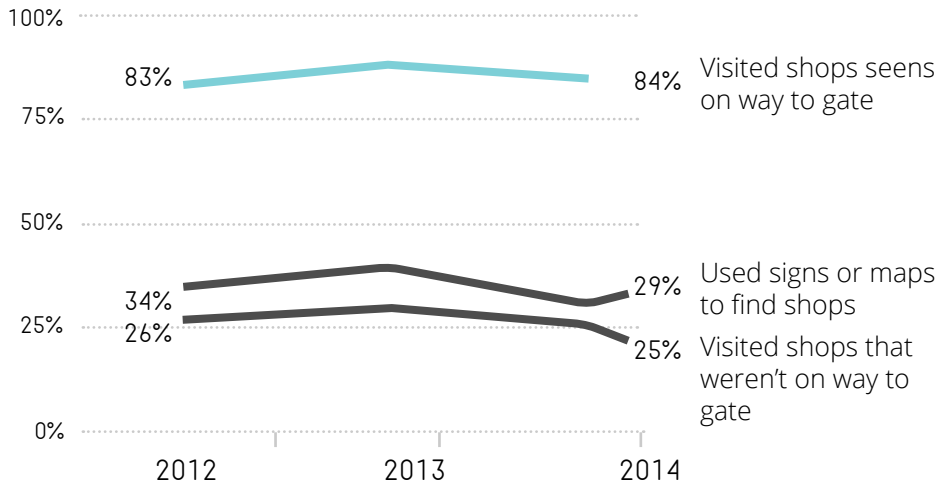
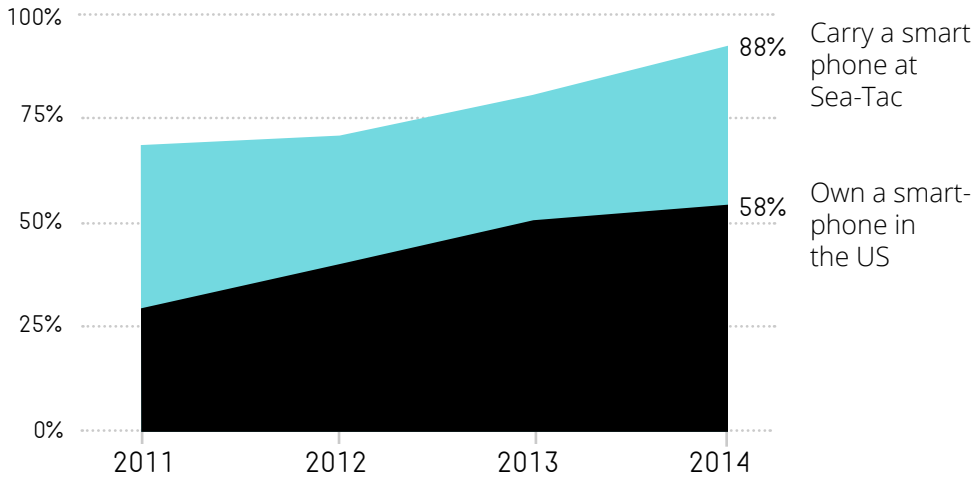


FIGURE 3: POSSESION OF SMART PHONES



From Figure 2, we can see that 84% of people traveling through Sea-Tac visit shops seen on the way to their gate. It is easy for people to make a short stop along their path to their boarding gate to go shopping, but how can we encourage people to make a detour off their path and explore other areas of the airport?

From Figure 3, we can see that 88% of people at Sea-Tac airport carry a smartphone, which is noticeably higher than the national percentage of 53%. Because mobile platforms are what most travelers have, we decided to design our solution with a mobile application.

MARK VANDE KAMP, REACHING SATURATION: THE 2014 PERSONAL ELECTRONICS SURVEY, 2014

03 OPPORTUNITY

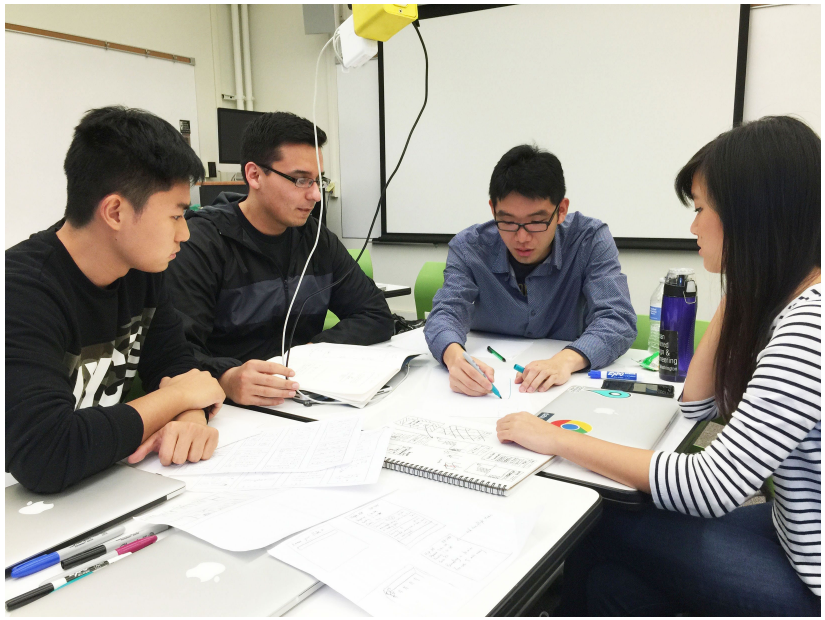
Our research revealed that most casual travelers spend half an hour to an hour waiting at their boarding gates. Many of them are hesitant to walk away from their gates because of time pressure or unfamiliarity with the airport. We can leverage the new airport beacon infrastructure and users' smartphones to help travelers stay on top of their flight status and guide them to their points of interest in a timely fashion. With the assurance of making their flights on time from the application, travelers are able to manage their time and control their experience while waiting for flights. This has the opportunity to benefit travelers as well as the airport by increasing revenue.

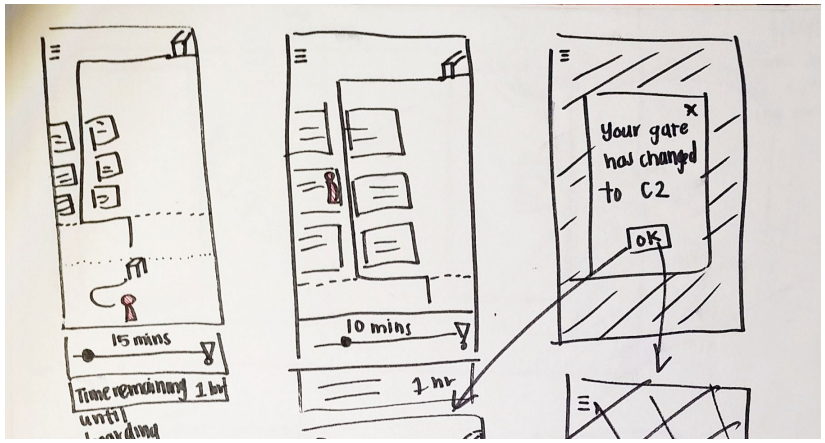
DESIGN QUESTION

How can we encourage travelers to explore the airport and always make it back to their gate on time?

04 IDEATION

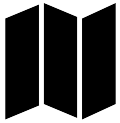
After we concluded the research phrase and understood our users and design requirements, we began the ideation and preliminary design in our project. Based on the user research, we decided to design a mobile application. We first had brainstorming sessions to form our initial concept for the design of our app using post-it notes and affinity diagrams. We iterated through this process multiple times until we could narrow in on our scope. Then, we created sketches, a sitemap, and information architecture of our product to help define the flow and general interface of our design. After this, we created user scenarios for each persona, storyboards, and a low-fidelity prototype to get quick feedback from potential users.





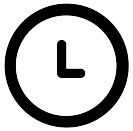
SKETCHES

We started to think about the ways that we can design technology to meet the needs of our users by drawing sketches. Each team member brought two sketches representing two different ideas to the discussion, and as a team we evaluated the strengths and weaknesses of each one and brainstormed new ideas based on these. At the end of discussion, we all agreed that the app should focus on three major functions:



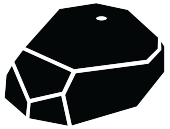
DISCOVERY

The app will help travelers find places in airports or explore what the airport has to offer. It will provide at least a list and map view of all venues and services in the airport.



TIME AWARENESS

The app will ensure travelers never miss their flights even when they choose to leave their boarding gates. It will send out alert to travelers when it's time for them to head back to their gates.



NAVIGATION

The app will provide a simple navigation to boarding gate, restaurants, shops, etc. It will tell travelers how long it will take to get to where they want to go.

USER PERSONAS

Each persona is synthesized from our research findings and it is representing some of our typical users. They enable us to focus on a set of characters that we are designing for, rather than all individuals. We made sure to refer to these personas later in our process and ensure that our product would be usable and desirable by these personas.

Eric is a 40 year old father who travels with his wife and two kids, ages 5 and 8.

He likes to find family-friendly things to do close to his gate and make sure that his family stays together.

Joanne is a 25 year old student who usually travels during breaks.

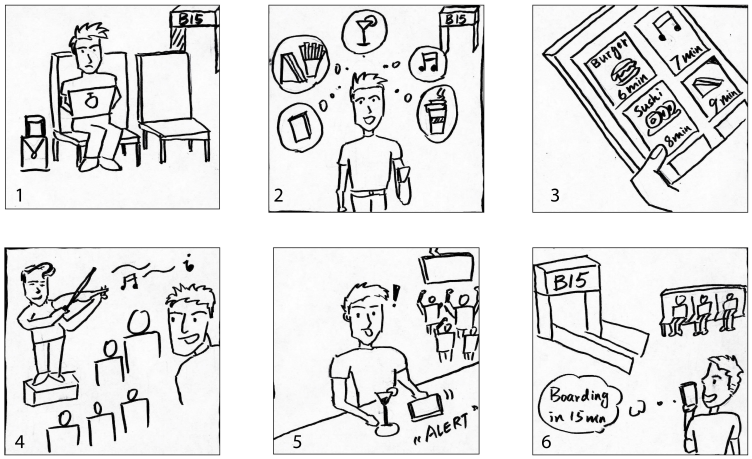
She likes to explore airports and wants to find interesting things to do and see while always being aware of the flight status.

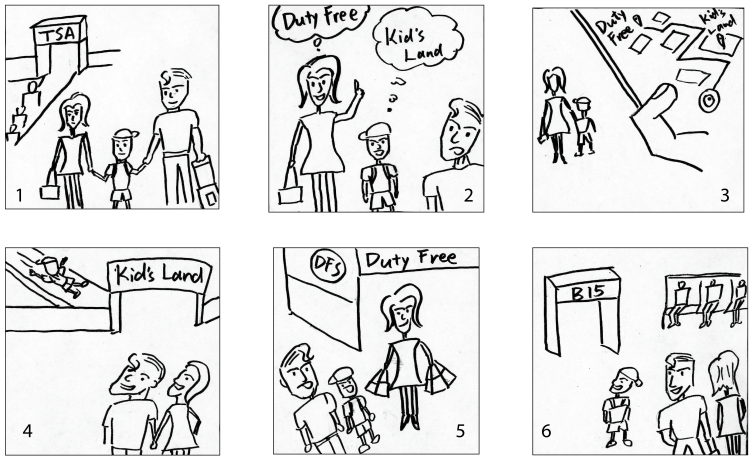
STORYBOARD

To better convey our design concept in context, we brainstormed and created two storyboards to show two typical use cases with Airspect. Both storyboards showed our vision of the in-airport user experience we want our users to have, and visually conveyed the scenarios in which our app is being used.

In the first storyboard, Jason uses the app to find a nearby musical performance and a bar to spend some time as he is in the airport. When it's about time to board, he receives an alert suggesting him to go back to boarding gate.

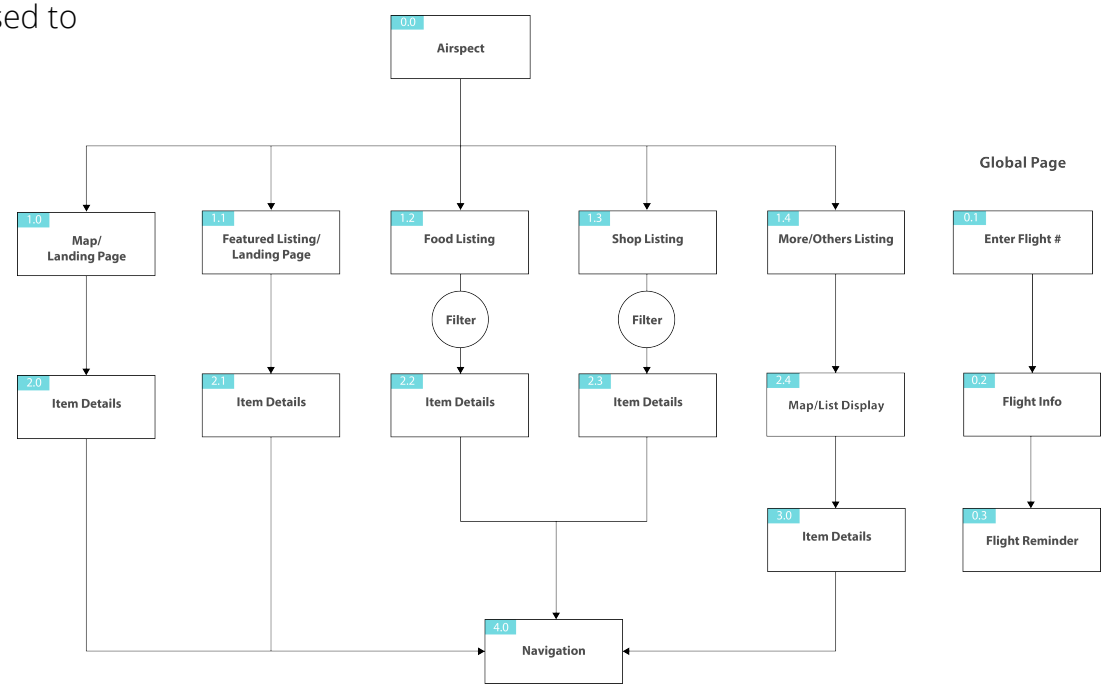
In the second storyboard, Jack travels with his family. Jack's wife wants to check out the duty free shop, while his son is looking a kid's place. Jack uses the app to locate the closest duty free shop for his wife and closet playground for his son, and navigates to both places.





05 INFORMATION ARCHITECTURE

We created a high level representation of the organizational structure for our application. It maps out all pages in our application and the relationship amongst them and it was used to guide our application design afterwards.

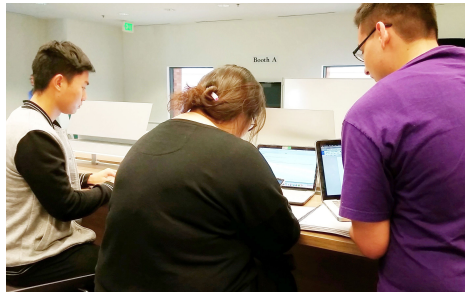


06 PROTOTYPING

During our prototyping phase, we created a low-fidelity prototype on Axure focusing on translating our ideas into a quick wireframe, a paper prototype focusing on getting quick user feedback, and finally an high-fidelity prorotype on Proto.io.

We did a low-fidelity prototype before our paper prototype and realized that this caused some problems, such as the participant clicking on unclickable things, thinking that our app was a little more developed than it actually was, and technical issues (Axure files did not fit the aspect ratio of the phone perfectly).

LOW-FIDELITY PROTOTYPE



To further design what each page of the app will be like and test this idea, we created a low fidelity prototype of some selected screens in Axure. This digital mockup is meant to be simple and rough, it focuses on functions rather than visual design.

After we finished developing our lo-fi prototype, we wanted to ensure our application had a good flow. We conducted guerilla usability tests with University Washington students in Allen Library. From these short tests, we were able to gain valuable feedback that led to a series of design changes. In the testing, our research questions revolved around five vital aspects of usability: effectiveness, efficiency, likeability, intuitiveness, and error-tolerance. We conducted the tests on our phones using Axure files with some interactivity matched with specific tasks given to the users. The user was able to click on certain buttons on the phone screen that enabled them to complete the appropriate task.

Our major findings included:

1. The bottom flight status bar was not obvious. In our next iteration we will include an arrow on the status bar indicating it can be pulled up to display more information and add color as well to create contrast. Due to the nature of lo-fi prototypes, we did not include color.

2. The map did not show how the filters on the side would affect what showed up on the map. Again, due to the nature of the lo-fi prototype it was difficult to show what would happen when something was clicked.

PAPER PROTOTYPING

In addition to the lo-fi prototype, our group created a paper prototype with modification based on the feedback we got from our lo-fi prototype testings.

With our modified paper prototype, we did another round of guerilla usability testing at Allen library. We followed the same usability testing plan as before, but had one of our team member to interact with the participant as the “smart phone”.

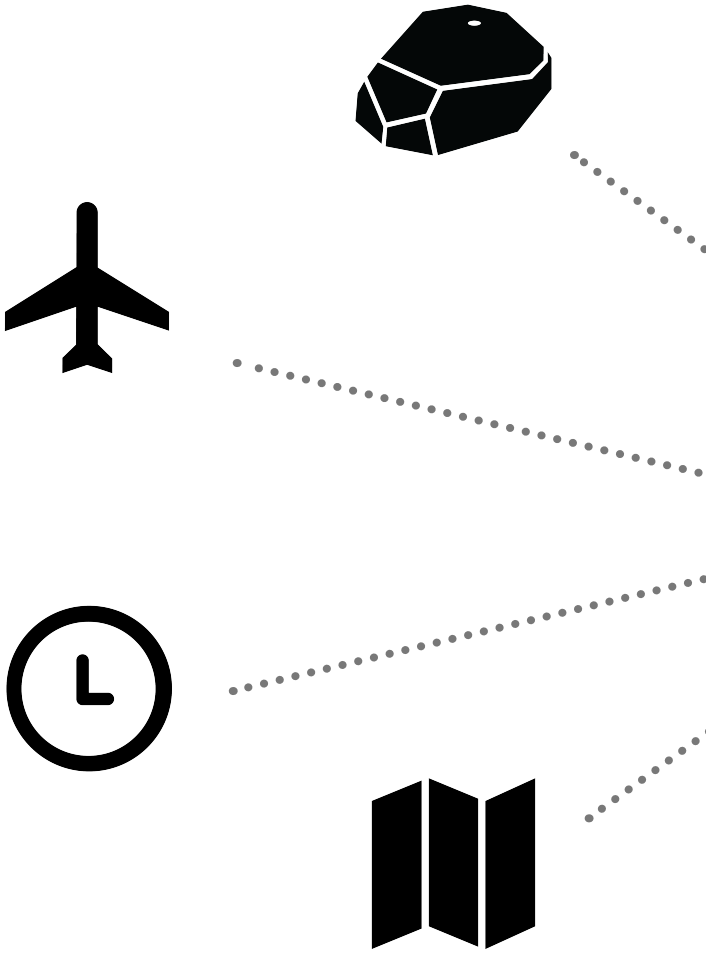
Our major findings included:

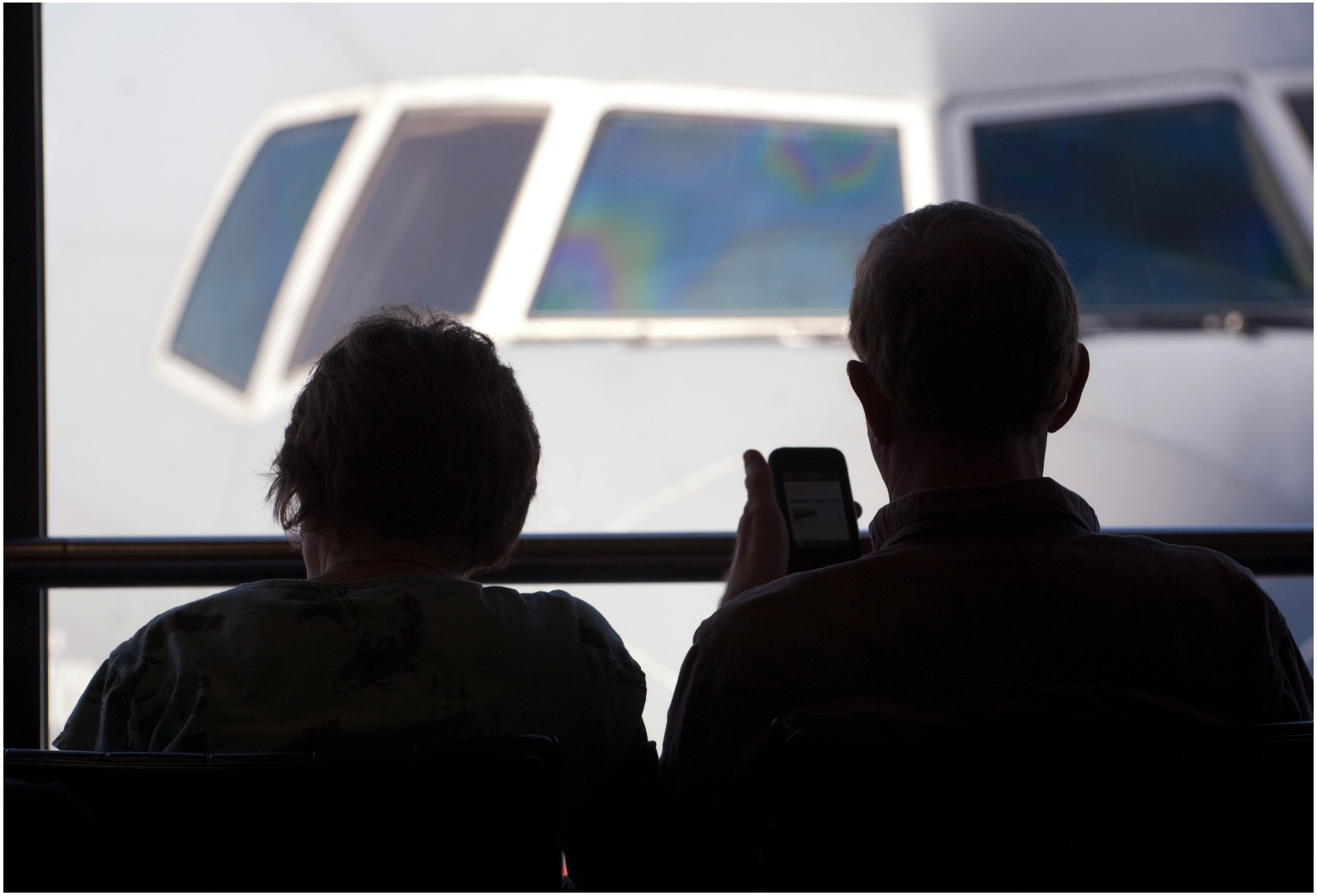
1. The burger menu we had in our prototype made it harder and costed more time for our participants to navigate and find what they are looking for. Information is being hidden under the stacks of the burger menu.

2. Participants got confused when they interact with the map. They weren’t sure how to find a place and navigate to there, nor exit the map view after they finished.

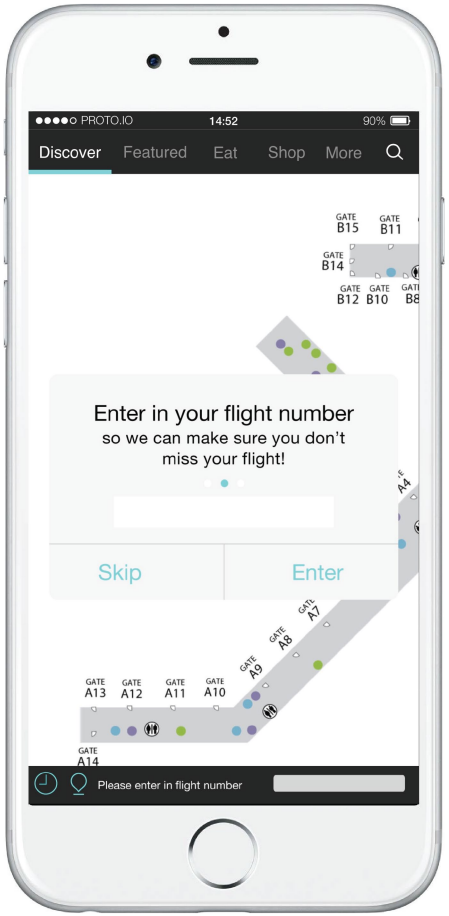
07 AIRSPECT

With 37 million people traveling through SeaTac annually, and 52.8% of them waiting at the gate for 30 min to an hour, we wanted to help people explore their surroundings as they wait for the airplane to depart. Airspect gives people the sense of security of being able to go out and explore the airport and returning to their gate in time for departure. Airspect does this by utilizing beacons located throughout SeaTac airport and using your flight number. As a traveler walks through the airport, the application knows your current location and the walking time to your boarding gate. Travelers are alerted when any flight changes occur and when it's time to head back to the gate for departure. Giving travelers the power to control their airport experience is valuable to travelers by making the most of their time and giving airport vendors more exposure. Promoting lesser known events such as music performances advocates for artists and reduces anxiety for travelers with relaxing music.





DESIGN SPECS



START

When the app is first opened, users are prompted to enter their flight numbers. It allows the app to access users' flight information, which is essential for the app to provide users with relevant information.

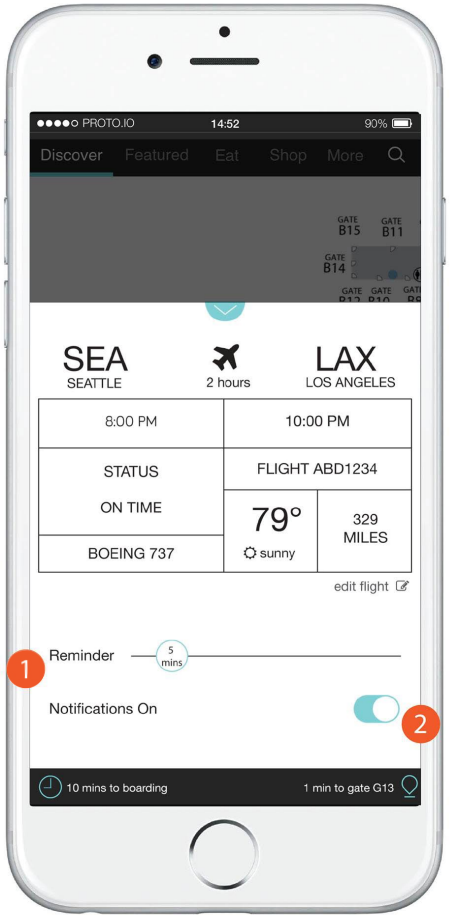
DISCOVER

After users enter their flight information, they will see a map of the airport, allowing them to a get basic overview of the location. Each venue in the airport is represented by a dot and categorized by different color.

1 Menu bar allows users to go to different pages.

2 User's current location is represented by a blue dot and the route from user's location to the gate is highlighted on the map along with the walking time.

3 The flight status bar on the bottom shows a glimpse of how much time is left until boarding, how long it takes users to walk back to their gate, and the gate number. This status bar will always be on every screen of the application, as this information is most important to users.

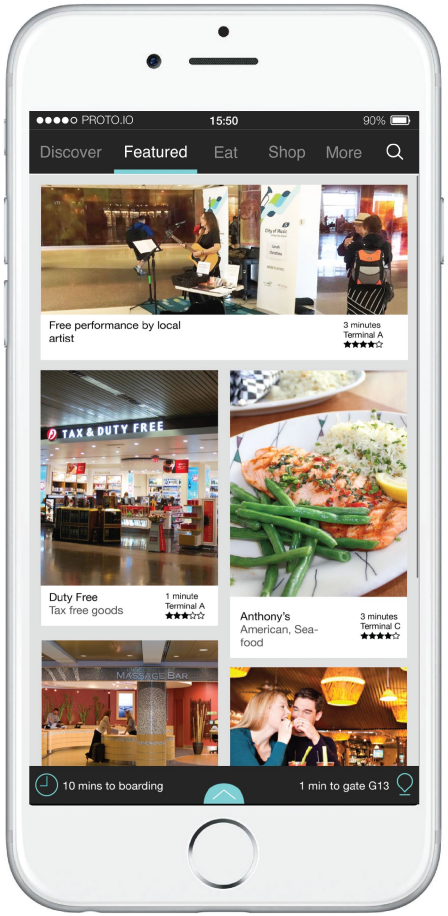


FLIGHT INFORMATION

From any place in the application, users can click or swipe up the flight status bar to get even more information about their flight, such as origin and destination, departure and arrival time, distance, weather, etc.

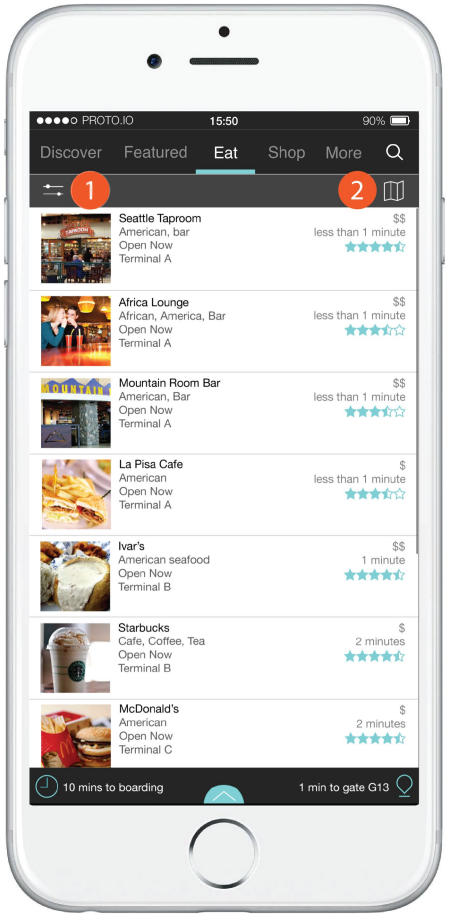
1. Users can customize their alert by adjusting the slider.

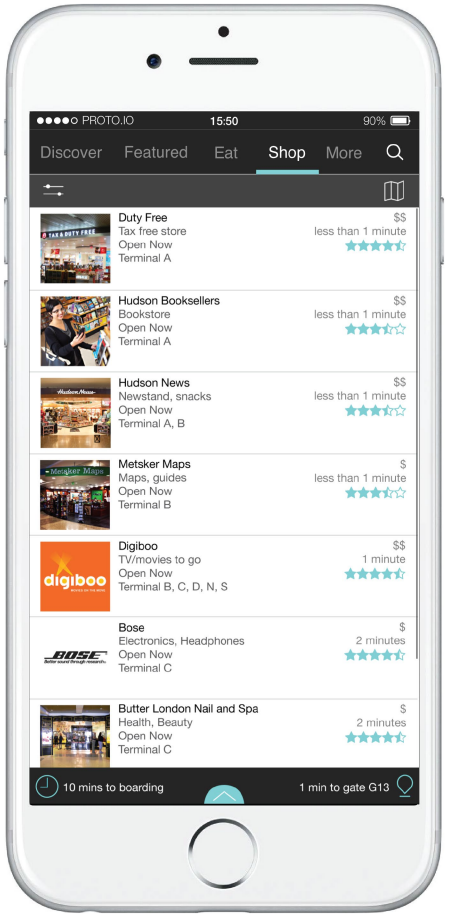
2. Users can choose to turn on or off the notification feature by using the toggle button.



FEATURED

This page displays places the airport features or recommends to users based on popularity and the user's location. It ranges from restaurants and shops, to places like lounges and special events. To know more information about a specific item, users will just need to tap on that item and they will be directed to a detailed page of that item.





EAT

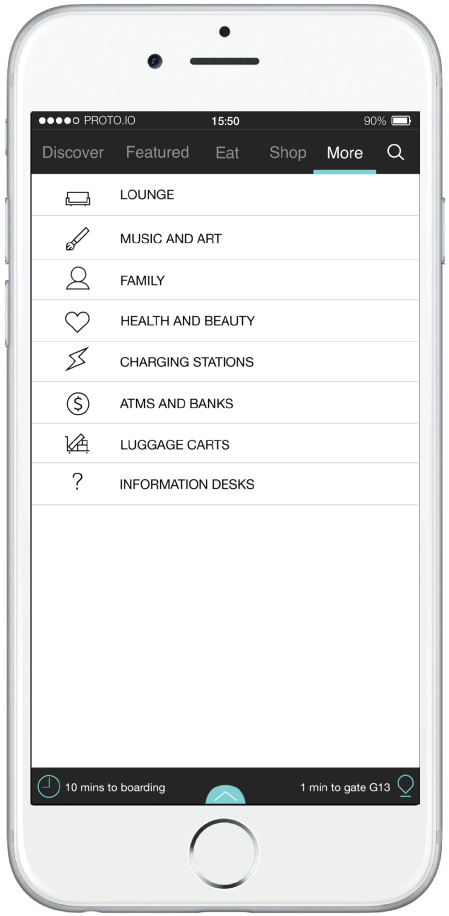
This page is a list of restaurants for users to choose from. As same in feature page, to know more information about a specific one, users just need to tap on it.

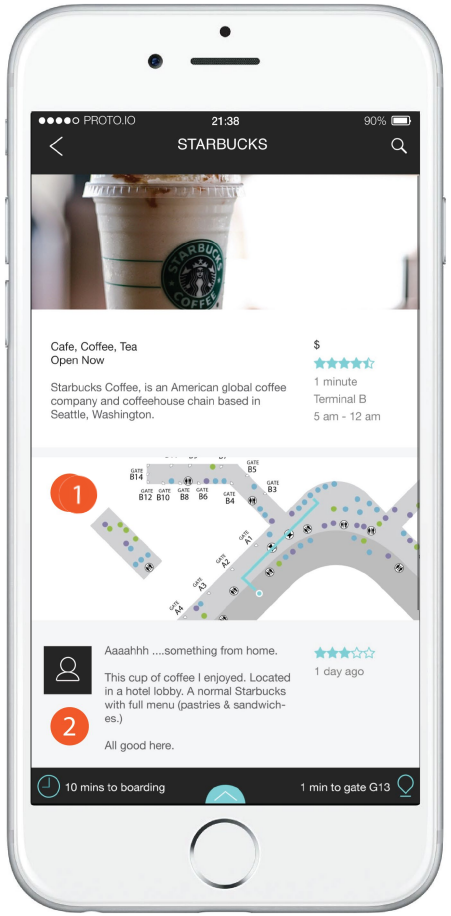
1 The filter tool allows users to choose what to show based on their preference of price, distance, or popularity.

2 The map button allows users to toggle between a map view and a list view of the restaurants.

SHOP

Similar to Eat page, the shop page highlights shops near the users.





DETAIL

This page provides comprehensive information about a place, including a description, location, business hours and more.

1 The map shows where that place is and how to get there from user's' current location.

2 Customer reviews to let users gain more confidence before they go.

MORE

This serves as a directory of the airport, allowing users to find places they need. When they choose a category, a map or a list containing the location and information of that category will be shown.

VALUE & FUTURE

VALUE

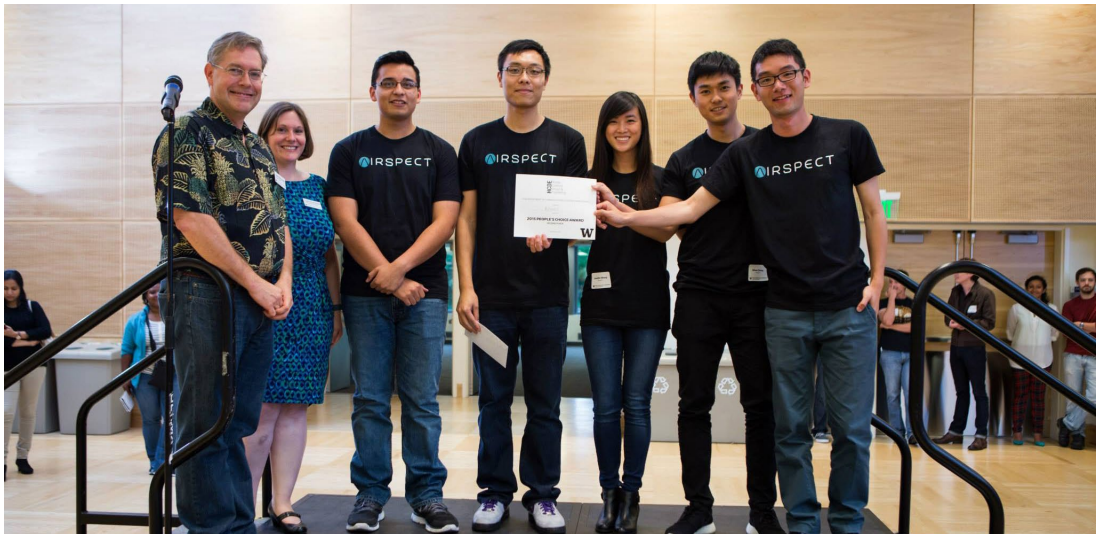
We believe that Airspect adds value to both travelers and the airport. For travelers, it is important to create a good experience beginning at the airport. Travelers can use Airspect to control their airport experience by always knowing their flight status no matter where they are. With this assurance, they can find restaurants and shops and discover special events in the airport. Each airport is a unique place and provides different experience, so travelers shouldn't have to be bored and sit at waiting areas for hours. For the airport, our app helps increase its concession revenue and promoties its events. Airspect can be the perfect application to connect the airport with travelers, and therefore improving the airport experience. Most traditional airline apps focus on booking tickets and flight information. But with Airspect, airports can have a place to promote their business, services, and culture.

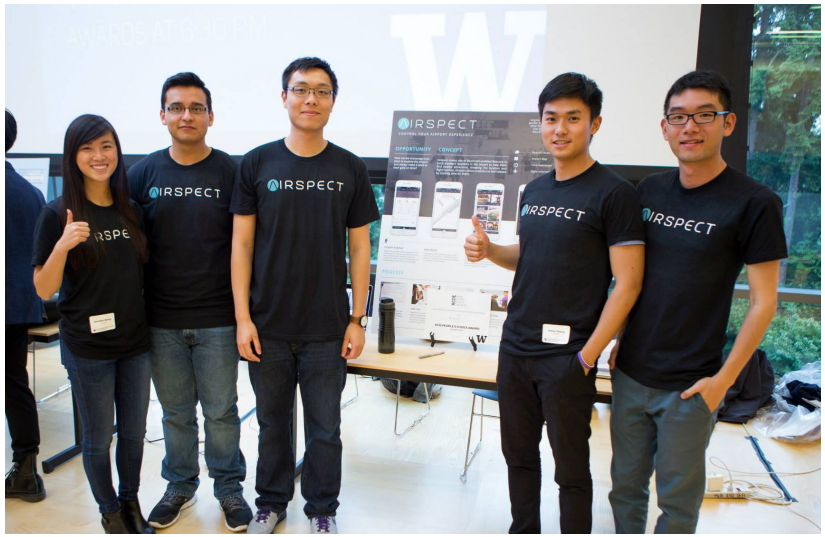
FUTURE

Airspect has a lot of potential to become the new mobile platform for SeaTac Airport. For our next steps, our team is going to meet with David Wilson from SeaTac Airport to present our design and prototype. Our concept can be a good start to build an app for the airport and test with real data from the beacons already placed in the airport.

We would like to make our application work across different platforms. Our design can also be expanded into a web application or even a wearable app to help travelers in different methods. Considering the increasing popularity of wearable devices and the different ways of huamn-computer interaction, doing design for both mobile and wearable devices may give us more room to explore different solutions.

REFLECTION





Throughout our project, we followed on a user-centered design process to create a solution that aims to improve travelers' experience in airports. Our team worked hard and collaborated towards creating the best design and our project turned out successful. We received a lot of positive feedback from our Department's Open House and received second place for the People's Choice Award.

However, there are things that we would like to have improved. The one thing we would definitely improve on is to include more usability testing and evaluation in order to iterate on our designs further. Our group did two sets of guerilla usability tests, but didn't get the chance to conduct a complete a formal usability test in a controlled environment.

AIRSPECT

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