



Photo: Mike Reid

# Data-Driven Display

Atlantis Hub of San Juan Islands

## Process Book

Interaction Design Studio I

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# Table of Contents

- 3 - 4** First Look
- 5 - 6** Data Modeling
- 7 - 8** Iteration 1
- 9 - 10** Iteration 2
- 11 - 15** Iteration 3
- 16 - 23** Iteration 4
- 24** Pitching & Learning

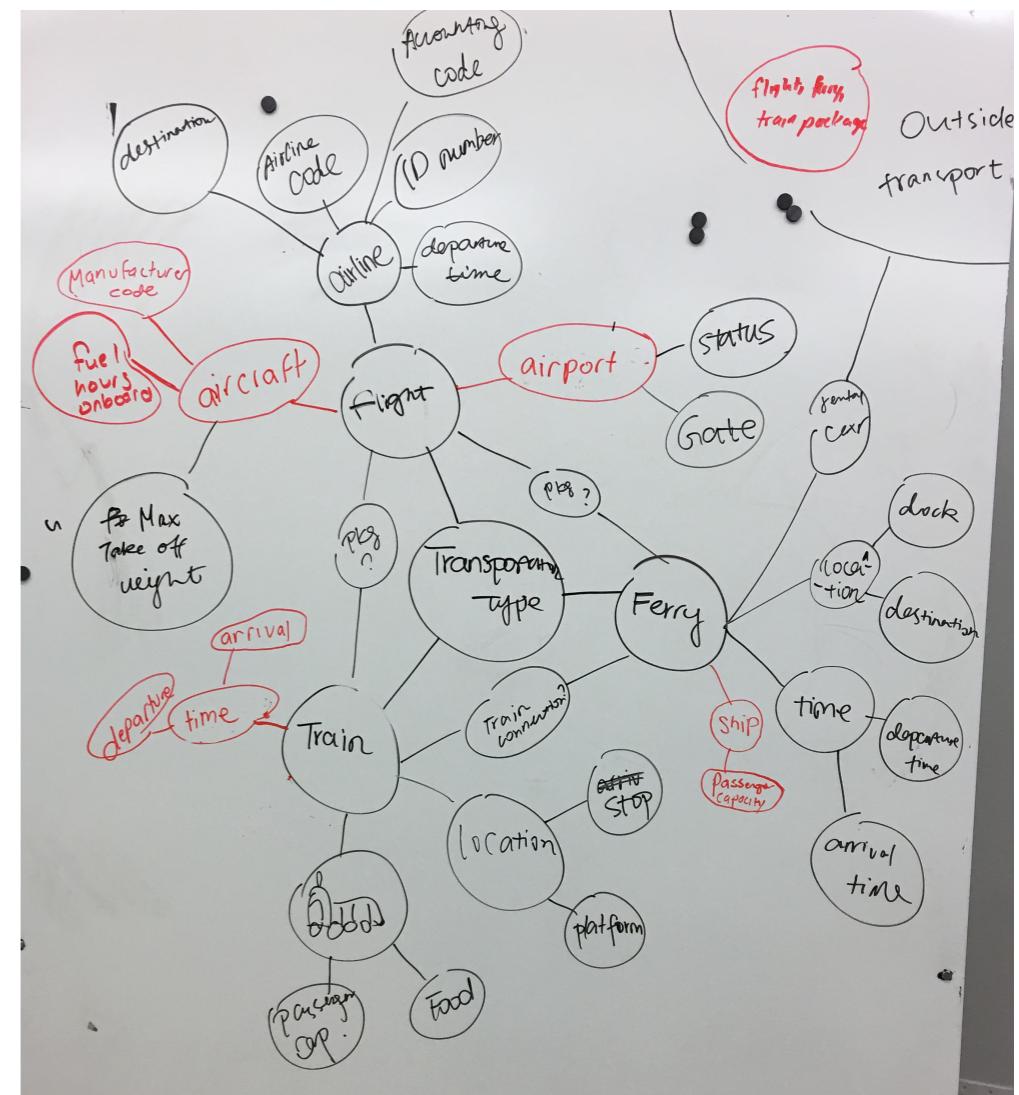
# First Look

## Making Sense of the Data

Place	Flight	Aircraft												Train				
		Destination	ID Number	Gate	Departure Time	Status	Fuel hours onboard	Aircraft Manufacturer	MTOW (Maximum Take Off Weight)	Flight, Ferry, Train Package	Airline	Airline Code	Accounting Code	Route	Platform	Stop	Departure Time	Stop (Destination)
Orcas Island	1051	A9	6:11	Departed	3.00	MD	22,760	N	American	AA	001	Express	A	Atlantis Hub	8:00 AM	Roche Harbour		
Friday Harbour	1123	A1	6:17	Departed	3.13	Boeing	27,750	N	American	AA	001		B	Atlantis Hub	8:00 AM	Friday Harbour		
Roche Harbour	1001	A11	7:01	Delayed	4.28	Airbus	22,450	N	American	AA	001		A	Atlantis Hub	11:00 AM	Roche Harbour		
Seattle	8901	A9	7:15	On Time	3.75	Umbrebro	16,750	N	American	AA	001		B	Atlantis Hub	11:00 AM	Friday Harbour		
Stuart Island	7602	A27	7:23	On Time	4.13	MD	28,000	N	American	AA	001		A	Atlantis Hub	2:00 PM	Roche Harbour		
Orcas Island	7689	A29	7:30	Cancelled	4.00	MD	28,000	N	American	AA	001		B	Atlantis Hub	2:00 PM	Friday Harbour		
Victoria	1032	D2	9:45	On Time	5.00	MD	28,000	N	American	AA	001		A	Atlantis Hub	5:00 PM	Roche Harbour		
Victoria	1066	D4	11:45	On Time	6.75	MD	22,760	N	American	AA	001							
Victoria	6529	C3	5:45	Departed	2.75	Umbrebro	17,240	N	Delta Airlines	DL	006							
Victoria	4356	C4	5:50	Departed	2.75	Boeing	27,750	N	Delta Airlines	DL	006							
Victoria	4319	C19	6:26	Delayed	3.00	Airbus	28,500	N	Delta Airlines	DL	006							
Victoria	4123	C21	6:55	On Time	5.25	Umbrebro	16,750	N	Delta Airlines	DL	006							
Seattle	1001	C1	7:50	On Time	4.50	Boeing	27,750	N	Delta Airlines	DL	006							
Seattle	2199	C8	9:00	On Time	7.75	Airbus	28,500	N	Delta Airlines	DL	006							
Seattle	2194	C17	11:20	On Time	7.75	Airbus	28,500	N	Delta Airlines	DL	006							
Orcas Island	8991	B1	5:04	Departed	3.50	Cessna	7,000	Y	San Juan Air	SJ	097							
Stuart Island	8719	B9	5:21	Departed	4.25	Cessna	7,000	Y	San Juan Air	SJ	097							
Friday Harbour	8888	B15	6:15	Departed	2.75	Beechcraft	12,000	Y	San Juan Air	SJ	097							
Orcas Island	8341	B3	6:57	Boarding	3.50	Cessna	7,000	Y	San Juan Air	SJ	097							
Friday Harbour	8009	B1	7:32	Boarding	2.25	Cessna	7,000	Y	San Juan Air	SJ	097							
Roche Harbour	8686	B2	8:10	Delayed	2.75	Cessna	7,000	Y	San Juan Air	SJ	097							
Stuart Island	8943	B8	8:35	On Time	3.25	Beechcraft	12,000	Y	San Juan Air	SJ	097							
Friday Harbour	8331	B1	8:36	On Time	3.00	Beechcraft	11,500	Y	San Juan Air	SJ	097							
Orcas Island	8332	B2	8:40	On Time	2.75	Beechcraft	9,750	Y	San Juan Air	SJ	097							
Friday Harbour	8336	B7	8:56	On Time	3.25	Cessna	7,000	Y	San Juan Air	SJ	097							
Roche Harbour	8335	B9	9:00	Cancelled	3.25	Beechcraft	12,000	Y	San Juan Air	SJ	097							
Stuart Island	8996	B3	9:16	On Time	2.75	Cessna	7,000	Y	San Juan Air	SJ	097							
Orcas Island	3227	D15	6:11	Boarding	3.00	MD	20,400	Y	Southwest	WN	526							
Friday Harbour	3216	D12	6:17	Boarding	3.13	Boeing	20,400	Y	Southwest	WN	526							
Roche Harbour	3215	D11	7:01	Boarding	4.28	Airbus	28,500	Y	Southwest	WN	526							
Seattle	4107	D16	7:15	Boarding	3.75	MD	22,000	N	Southwest	WN	526							
Stuart Island	4109	D14	7:23	On Time	4.13	MD	22,760	Y	Southwest	WN	526							
Orcas Island	3556	D15	7:30	On Time	4.00	Umbrebro	23,000	Y	Southwest	WN	526							
Victoria	3214	D11	8:47	On Time	5.00	MD	21,980	Y	Southwest	WN	526							
Victoria	3244	D9	10:30	On Time	6.75	MD	11,987	Y	Southwest	WN	526							

We began our project by modeling the relationships between different elements of the data. From the original Excel file, above, we noticed that information was divided into three sections according to what type of transportation (plane, train, ferry) the trip pertained to. Within each mode of transportation, the data was further separated into columns denoting information such as "Status" or "Manufacturer".

In our diagram (right), we followed the hierarchy of information in the Excel document. Starting with a large bubble for transportation hub, we created bubbles for each of the three trip modalities. Connected to each modality were bubbles indicating (1) trip scheduling details (departure time, arrival time), (2) vehicle information (fuel hours onboard, passenger capacity), and (3) location information (platform, gate). The last step in our model was to make connections between transportation modalities, such as the train-flight connection and ferry-car rental connection.

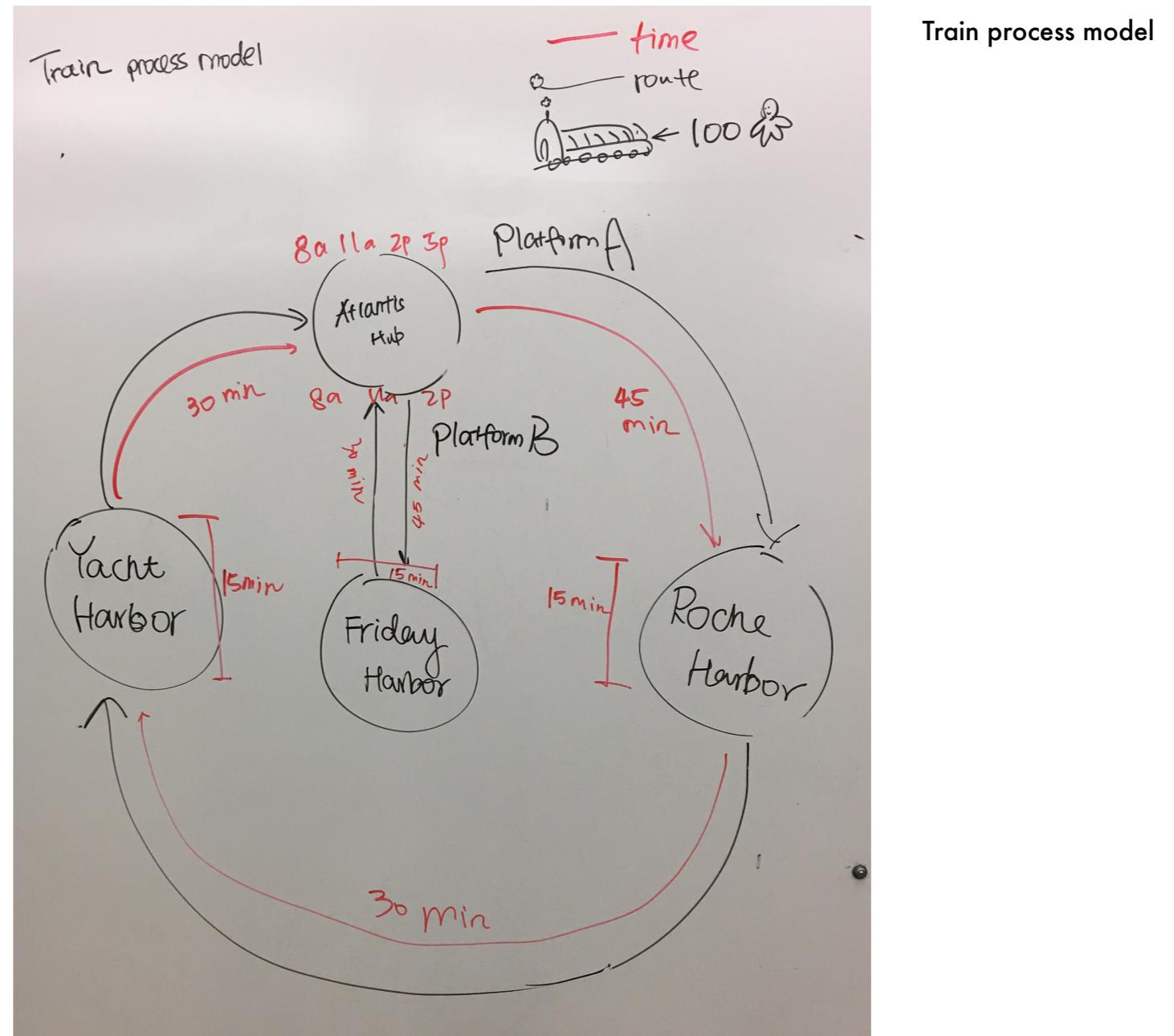


# First Look

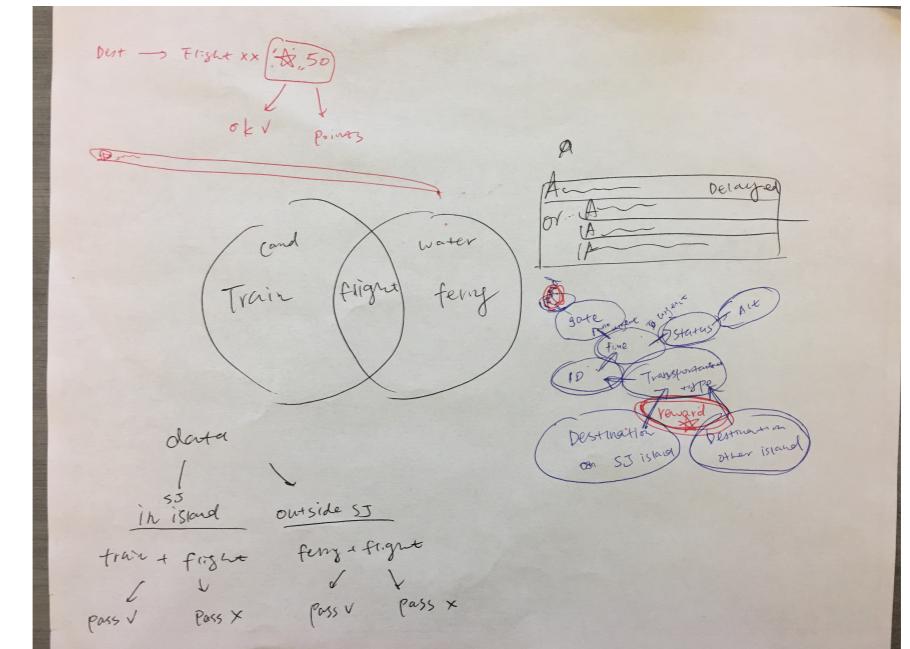
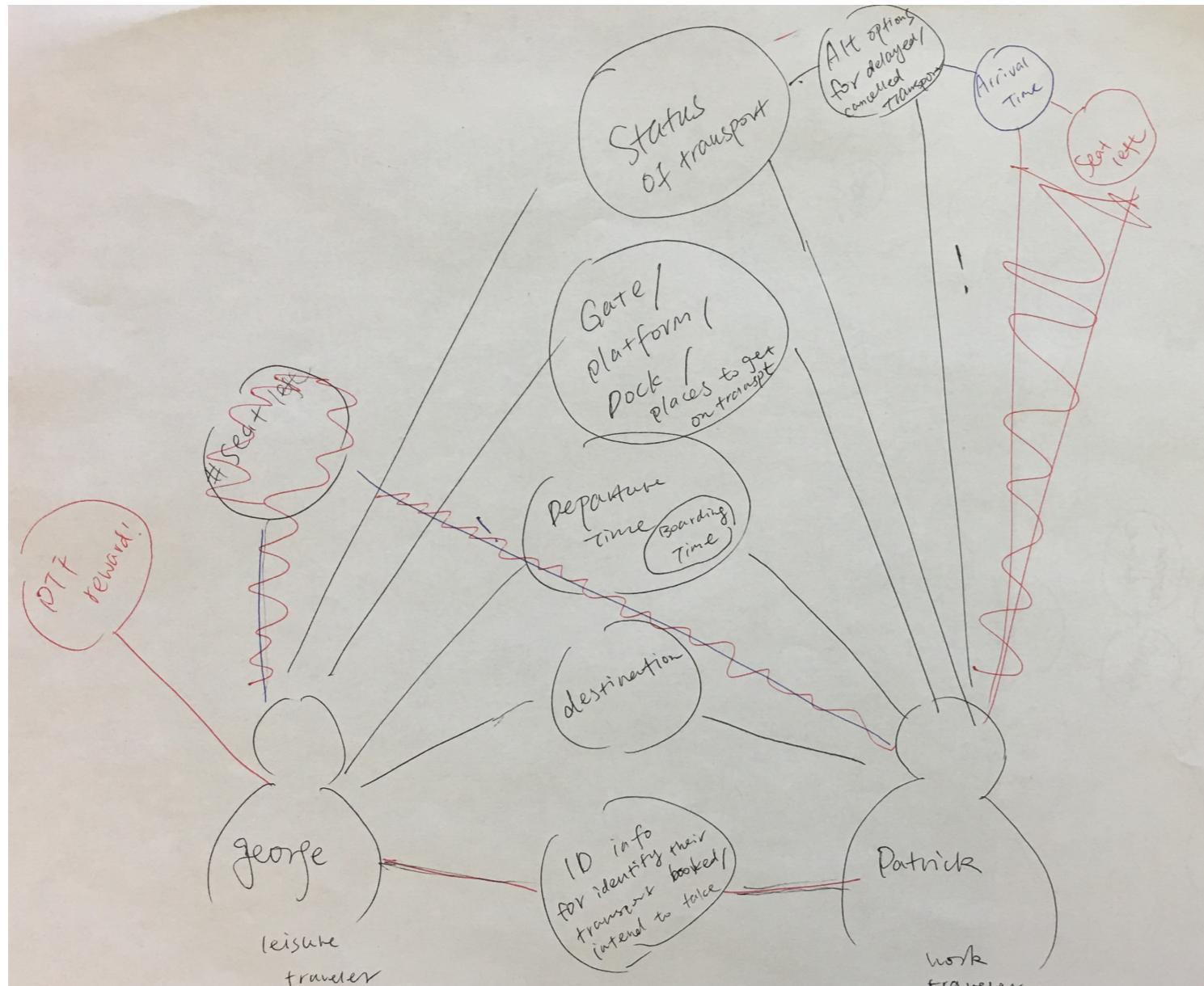
## Making Sense of the Data

Having modeled all of the data from the Excel sheet, we looked to expand on the relationship between trains and ferries that we noticed from our general model. Using train information from the Excel document, we noticed that trains went to one of three harbors: Yacht Harbor, Friday Harbor, Roche harbor. From there, ferries departing from those harbors make trips to other locations around the San Juan islands.

We also noticed that unlike planes and ferries which went from origin to destination, trains traveled in a loop, originating from Atlantis Hub and going back to Atlantis Hub. We decided to model this circular system as a separate process model. In this model, the direction, duration, and destination of each train trip is highlighted. We observed that departure times of trains adhered to a regular schedule, for example, leaving every 30 minutes from Yacht Harbor to Atlantis Hub. If a train remained at a harbor for a certain amount of time, such as 15 minutes, we also made a note of that in the model.



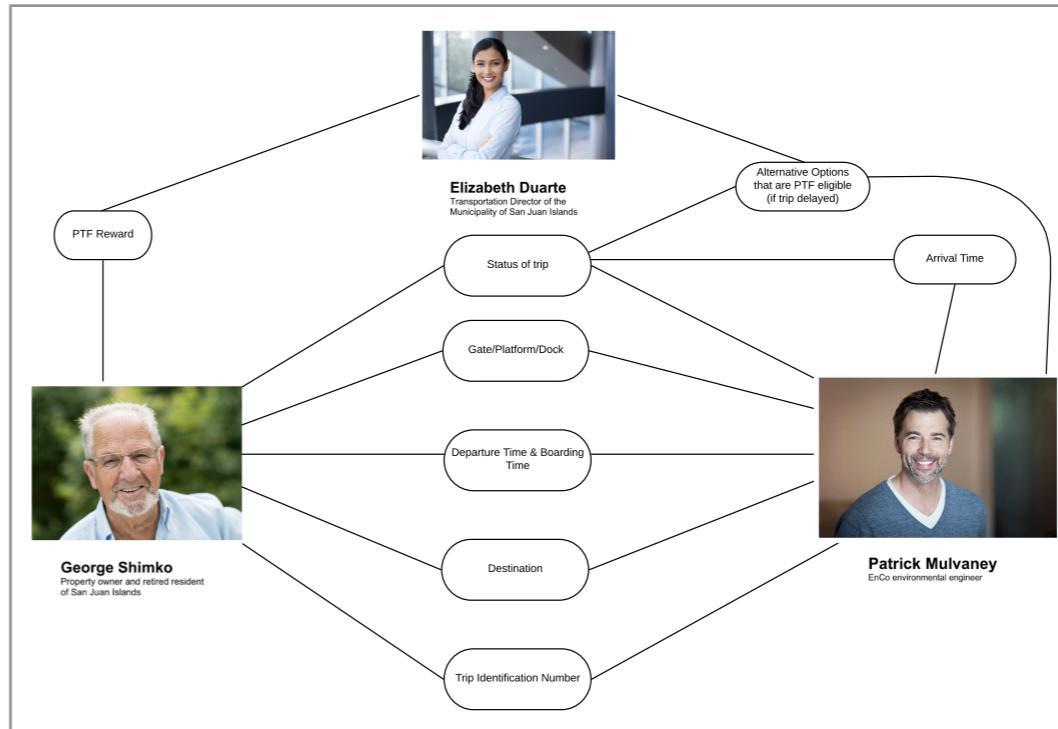
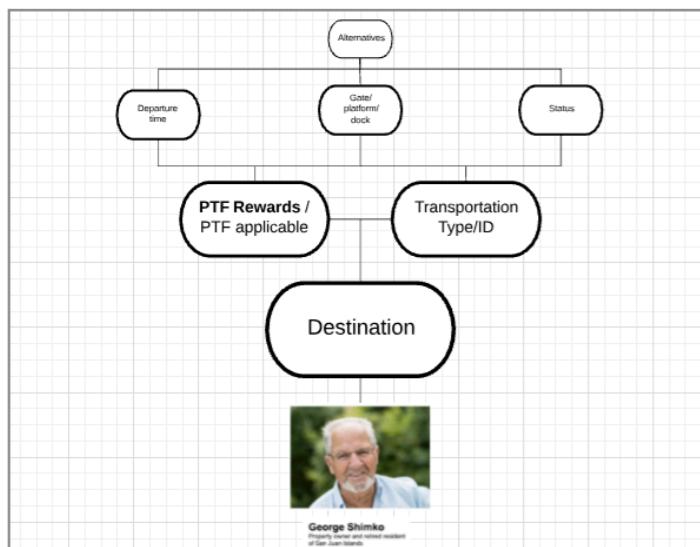
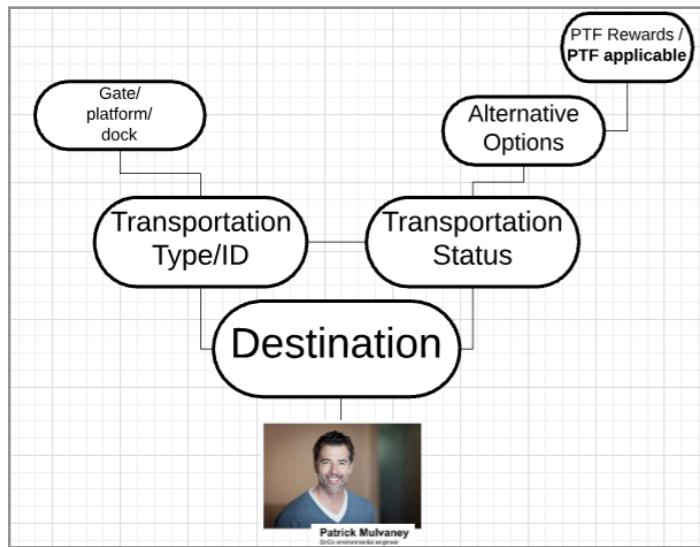
# Data Modeling Incorporating Personas



In class, we were introduced to one client and two users. The client, Elizabeth Duarte, is the Transportation Director of Atlantis Hub and is looking to meet the needs of her customers, represented by George Shimko, a PTF pass holder looking to plan a family vacation, and Patrick Mulvaney, a frequent traveler.

We looked at our data process models and mapped each element of relevant data to the users, George and Patrick. There were several data points that would be important to both of them, as well as some that would be more important to one than the other. Having categorized these elements, we began digitizing them.

# Data Modeling Incorporating Personas



The digital model of our personas' relationships with the data models shows what information is important to each stakeholder, as well as to our client, Elizabeth. In the largest diagram above, the shared bubbles in between George and Patrick show which elements of the data are relevant to them. Connections with Elizabeth are also depicted.

In our individualized models of Patrick and George (left), we aimed to highlight the hierarchy of information. The larger the bubble and thicker the border, the more important this particular information was to that user. Both Patrick and George care about their destination, for example, but Patrick would care more about the status of his trip more than George. Conversely, George would care more than Patrick about applying his PTF rewards towards his trips.

# Iteration 1

# Hand Sketches

In the first iteration of our data display, we sketched each of our ideas for the main board on a white board. We wanted to start with our different ideas to see what different elements we would each prioritize, and then come together to combine the best parts of our design and discuss places we had all struggled or where one team member's design was working better than the others.

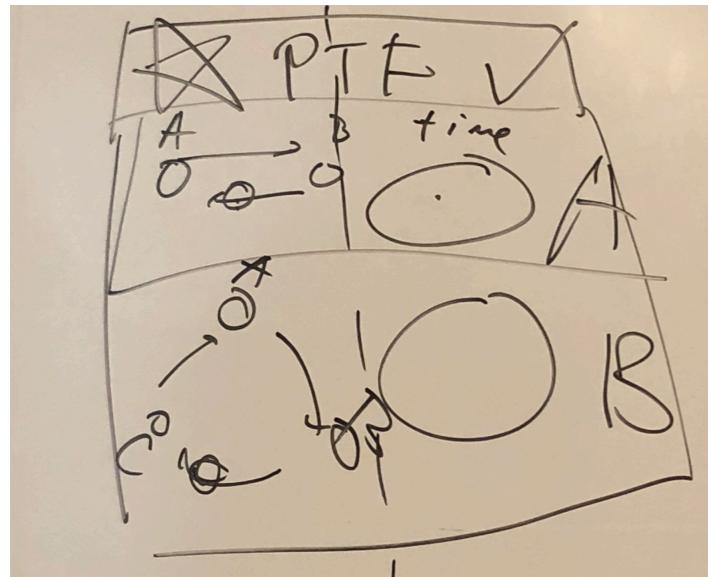
Our individual sketches varied greatly, from horizontal or vertical orientation, icons or words, and the order in which information would be displayed. This gave us several ideas to tinker with, and we discussed as a team which parts from our separate designs that we wanted to incorporate into our second, digital iteration.

## Faye's design

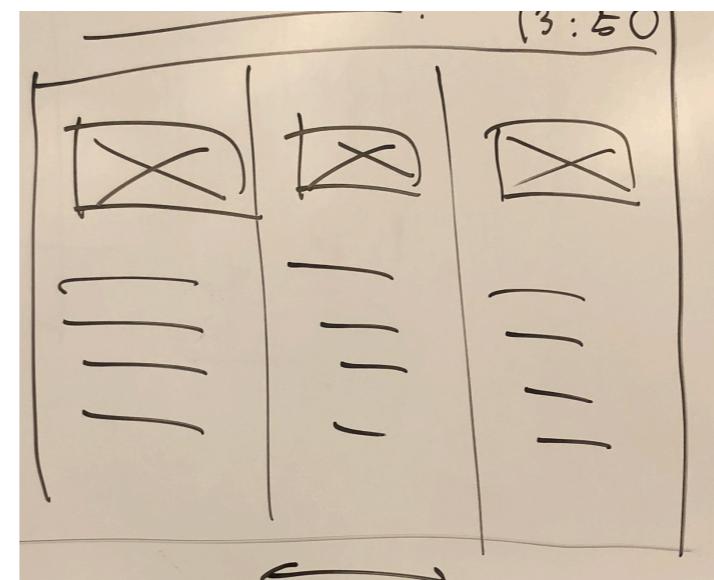
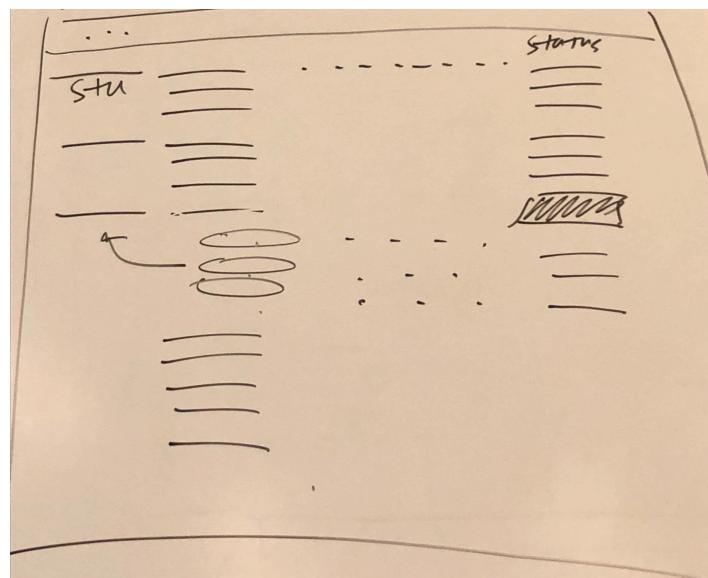
## Lindsey's design

## Amanda's design

# Iteration 1 Hand Sketches



We experimented with designs of different components of the final display. For example, there were multiple ways to illustrate the train route: one way the circular system we had created in our original process model, another was a linear representation with a live tracking dot. We also tested out how we wanted to portray information that might be important to someone like Patrick, but less important to someone like George. For example, would Patrick find the flight status most useful immediately next to the listed destination, or would he be okay with it being on the other side of the screen? We wanted to keep these considerations in mind before moving on to the digital iteration.



# Iteration 2

# First Digital Mockup: Main Display

Based on the feedback we received during the first critique, we came up with our first digital mockup. We reconsidered how to set the bounds of information, so that we can show more condensed but relevant information to the users. We also improved the presentation of the transport types and transport numbers so that they are less distracting.

We divided our main display to be three quarters of transportation information, and one quarter of dynamic information. The transportation information is presented in rows, which fits the convention of current existing displays in transportation hubs so that users don't need to relearn the way to access this information.

ATLANTIS HUB TRANSIT SCHEDULE							ALTERNATIVES					13:05	
DESTINATION	TRANSPORT	PTF	DEPARTURE	GATE	STATUS	TRIP	ALTERNATIVES	PTF	DEPARTURE	ARRIVAL	GATE	SEATS	
<b>FRIDAY HARBOUR</b>	AA 1051	----	13:30	G4	ON TIME	SJ 8888	SJ Train	★20	14:45	15:45	B	7	
	WN 7698	★80	13:45	G8	ON TIME		SJ Train	★20	15:25	16:25	A	4	
	SJ 8888	★80	14:20	G4	DELAYED		FK 3729	★60	15:40	17:05	C33	5	
	SJ Train	★20	14:45	B	ON TIME	Friday Harbour	Roche Harbour	★40	14:15	15:45	C	3	
<b>ORCAS ISLAND</b>	SJ 8332	★100	13:30	G4	ON TIME		SJ Train	★25	16:55	18:00	A	10	
	Friday Harbour	★40	14:00	B	CANCELED		FK 3729	★60	15:40	17:05	C33	5	
	Roche Harbour	★40	14:15	A	ON TIME	AA 2343	Friday Harbour	★30	14:15	15:45	C	3	
<b>PORLAND</b>	VX 5483	----	13:45	C19	BOARDING		Roche Harbour	★25	19:30	19:55	A	10	
	VX 5426	----	15:35	C19	ON TIME		LS 1028	★60	17:15	17:55	C33	5	
	VX 5495	----	16:40	C19	ON TIME								
<b>ROCHE HARBOUR</b>	SJ Train	★20	13:15	A	BOARDING								
	WN 7698	★80	13:45	G8	ON TIME								
	SJ 8888	★80	15:40	G4	DELAYED								
	SJ 1274	★80	15:45	G12	ON TIME								
	UA 1274	----	16:05	G9	ON TIME								
<b>SAN FRANCISCO</b>	SJ Train	★20	13:15	A	BOARDING								
	WN 7698	----	13:25	G8	BOARDING								
	WN 7698	----	14:45	G13	ON TIME								
	SJ 8888	----	15:55	G9	CANCELED								
<b>SEATTLE</b>	UA 1274	----	16:05	G8	ON TIME								
	UA 1274	★20	12:15		BOARDING								



**Plane**



**Train**



**Ferry**

Sign up for our PTF pass program!

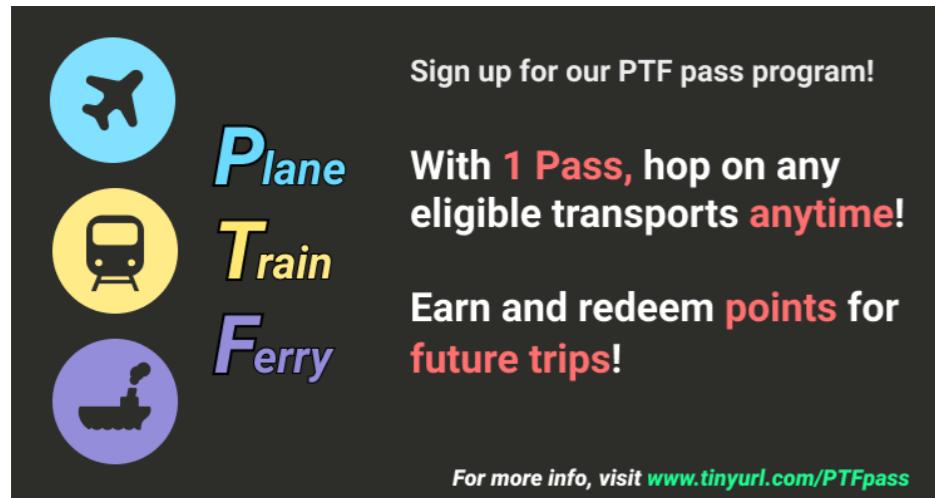
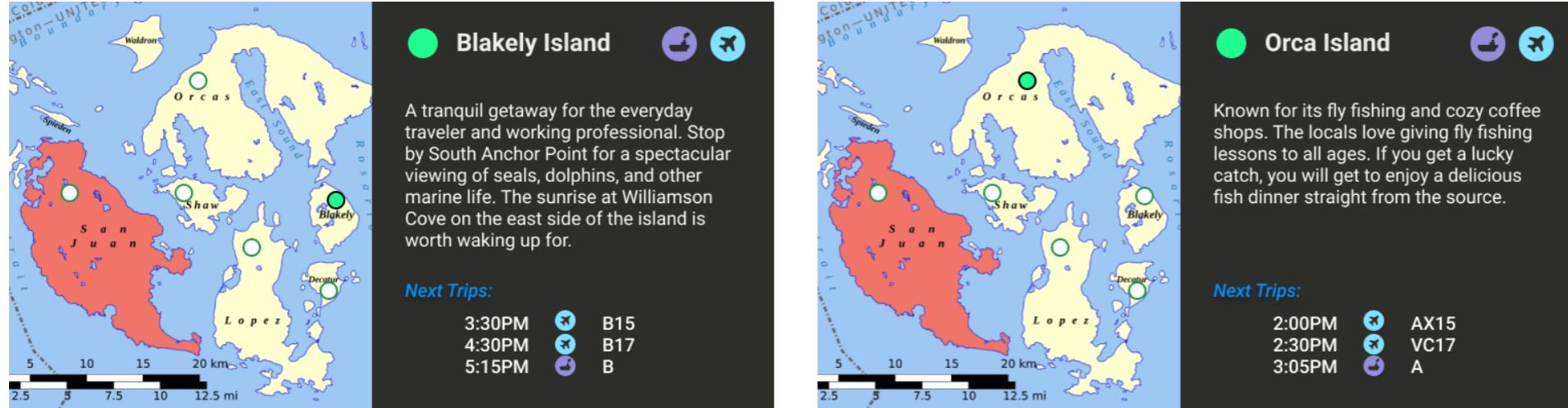
With **1 Pass**, hop on any eligible transports **anytime!**

Earn and redeem **points** for future trips!

For more info, visit [www.tinyurl.com/PTFpass](http://www.tinyurl.com/PTFpass)

# Iteration 2

## First Digital Mockup: Sliding Screens

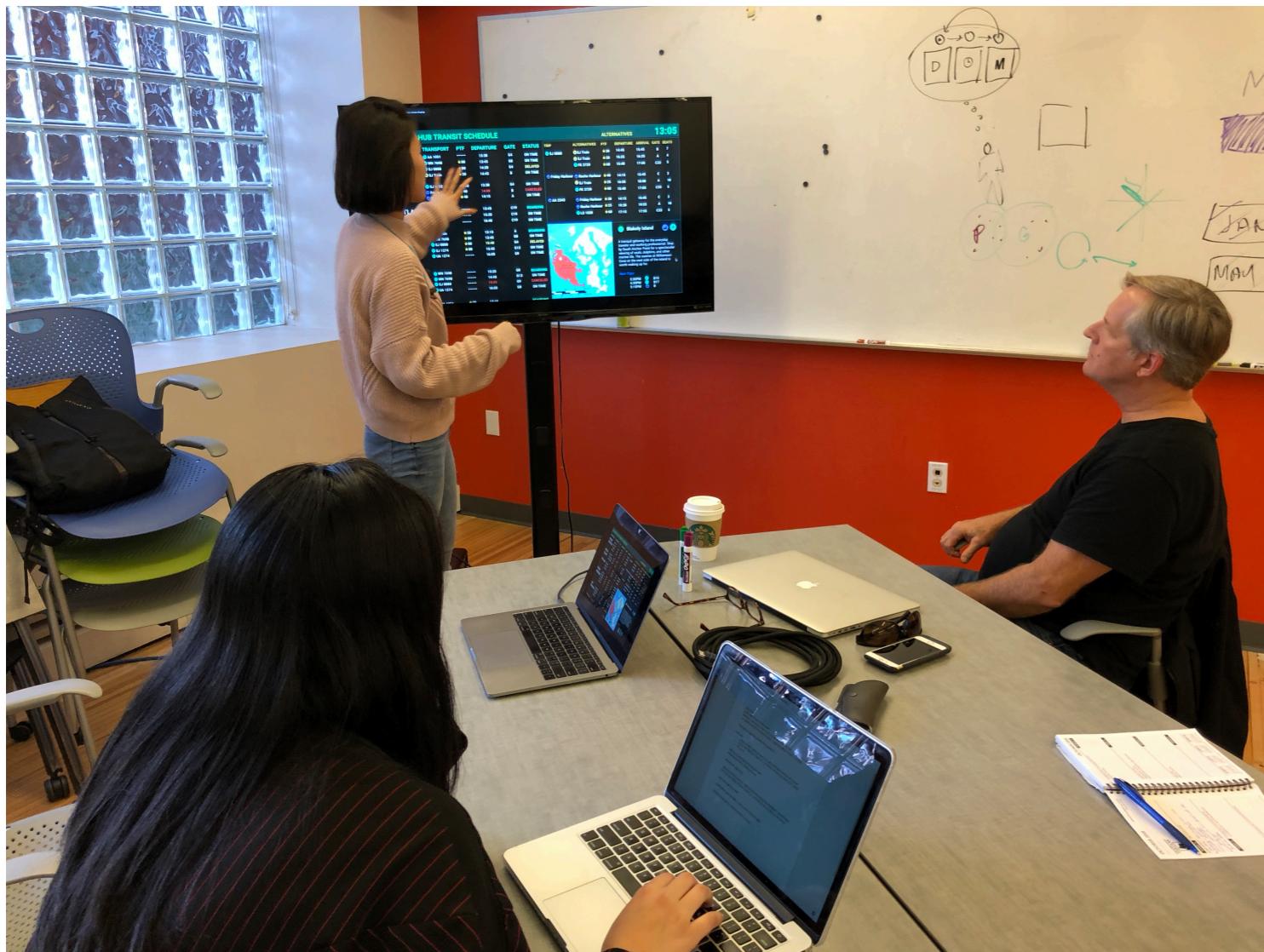


The bottom-left corner of the entire display is our dynamic section that contains different types of information other than transportation data. We decided to include travel recommendations in order to fulfill the needs of travelers who are looking for spontaneous trip ideas. We also included a PTF pass advertisement in order to meet our persona Elizabeth's need of promoting the PTF program.

We left clues of how we would use motion in this iteration without actually implementing it, so that we can get some quick feedbacks on it without distracting our colleagues with extra visual effects. The main display will have a scrolling effect, and the dynamic display will be presented with a slider effect.

# Iteration 3

## Planning: Incorporating Critique Feedback



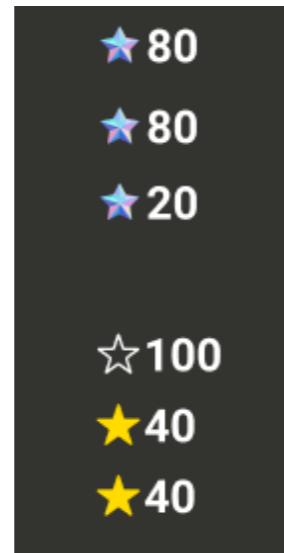
We brought our first draft of digital display in for critique, and we realized that we had so many details that were not well taken care of - we have misaligned texts, inconsistent font size, and inconsiderate usage of capitalized letters.

More importantly, we had too many colors that were inhibiting each other's ability of being semantic carriers of meaning. These colors were meant to be an aid to better convey the information, but they turned out to be distractions instead.

To proceed to our next step, another important piece of advice we received was to create concrete use cases for our personas. These use cases would inform us of better design decisions, and help us tell a coherent story using the display.

# Iteration 3

## Adjusting Display Color



In order to better understand the information architecture of the data on our display, we converted the screen into grey scale so that we can see the data hierarchy more clearly without the distraction of colors. During this process, we discovered some of our inappropriate usage of color, such as adopting different colors for information that are on the same hierarchy.

We then listed all the colors we used, and eliminated the same colors that are used for different information, so that they wouldn't compete with each other. In order to find a substitute color or visual representation, we explored different options and chose the one we believed to be the best. For example, our attempt of changing the PTF star color so that it doesn't interfere with the yellow color for "delayed" status.

**ATLANTIS HUB TRANSIT SCHEDULE** 13:05

DESTINATION	TRANSPORT	PTF	DEPARTURE	GATE	STATUS	ALTERNATIVES						
						TRIP	ALTERNATIVES	PTF	DEPARTURE	ARRIVAL	GATE	SEATS
Friday Harbour	AA 1051	---	13:30	G4	ON TIME	SJ 8888	SJ Train	★ 20	14:45	15:45	B	7
	WN 7698	★ 80	13:45	G8	ON TIME		SJ Train	★ 20	15:25	16:25	A	4
	SJ 8888	★ 80	14:20	G4	DELAYED		FK 3729	★ 60	15:40	17:05	C33	5
	SJ Train	★ 20	14:45	B	ON TIME							
ORCAS ISLAND	SJ 8332	★ 100	13:30	G4	ON TIME	Friday Harbour	Roche Harbour	★ 40	14:15	15:45	C	3
	Friday Harbour	★ 40	14:00	B	CANCELED		SJ Train	★ 25	16:55	18:00	A	10
	Roche Harbour	★ 40	14:15	A	ON TIME		FK 3729	★ 60	15:40	17:05	C33	5
PORTLAND	VX 5483	---	13:45	C19	BOARDING	AA 2343	Friday Harbour	★ 30	14:15	15:45	C	3
	VX 5426	---	15:35	C19	ON TIME		Roche Harbour	★ 25	19:30	19:55	A	10
	VX 5495	---	16:40	C19	ON TIME		LS 1028	★ 60	17:15	17:55	C33	5
ROCHE HARBOUR	SJ Train	★ 20	13:15	A	BOARDING							
	WN 7698	★ 80	13:45	G8	ON TIME							
	SJ 8888	★ 80	15:40	G4	DELAYED							
	SJ 1274	★ 80	15:45	G12	ON TIME							
	UA 1274	---	16:05	G9	ON TIME							
SAN FRANCISCO	WN 7698	---	13:25	G8	BOARDING							
	WN 7698	---	14:45	G13	ON TIME							
	SJ 8888	---	15:55	G9	CANCELED							
	UA 1274	---	16:05	G8	ON TIME							
SEATTLE	WN 1274	---	12:45	---	BOARDING							

**Blakely Island** ● ● ●

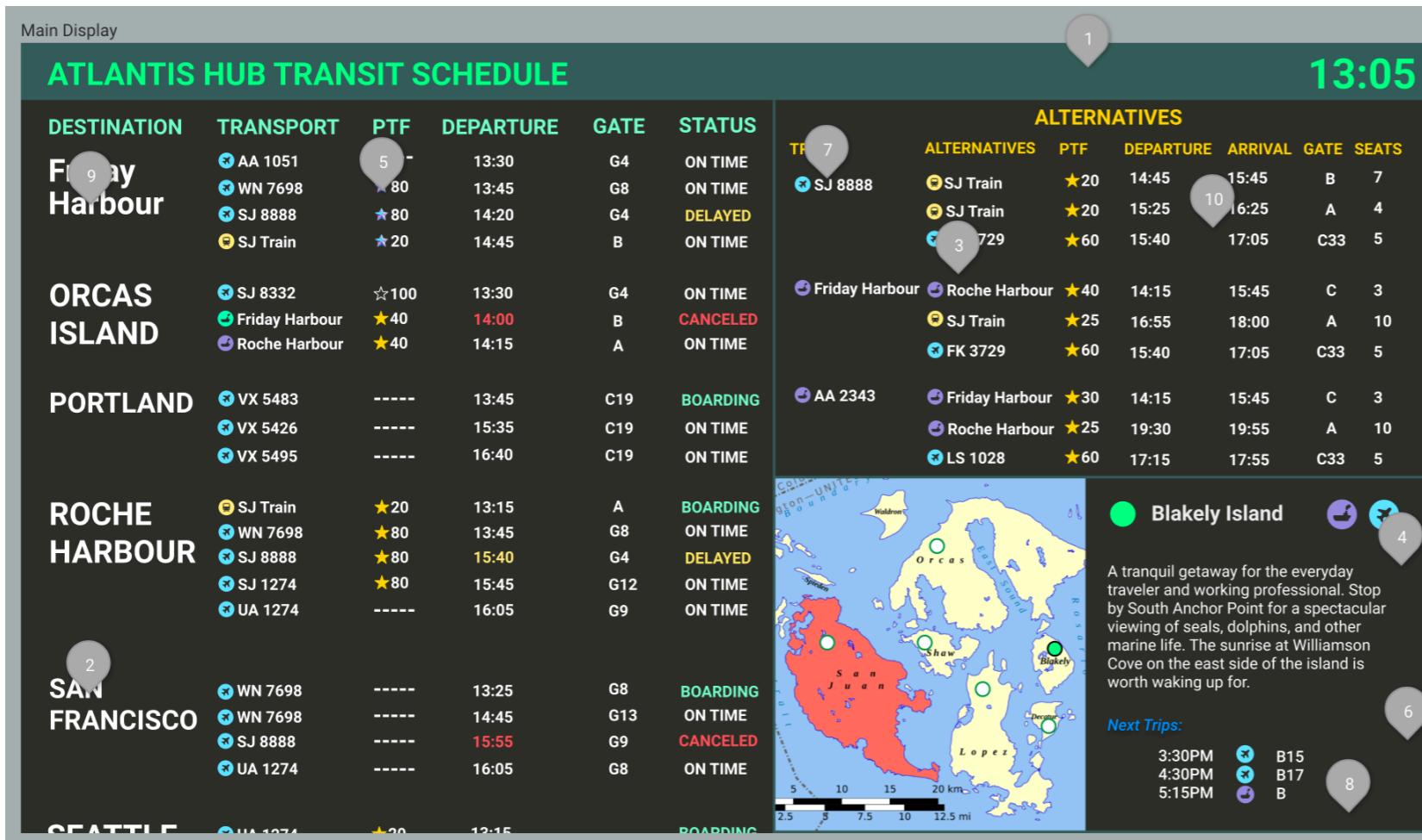
A tranquil getaway for the everyday traveler and working professional. Stop by South Anchor Point for a spectacular viewing of seals, dolphins, and other marine life. The sunrise at Williamson Cove on the east side of the island is worth waking up for.

Next Trips:

- 3:30PM ● B15
- 4:30PM ● B17
- 5:15PM ● B

# Iteration 3

## Updating Display Details



We then referred back to the notes we took during the critique, regarding the details that need to be worked on. We projected our display onto a big screen, and fixed the inconsistent type sizes and leadings. We also changed the layout of the whole display to be cleaner.

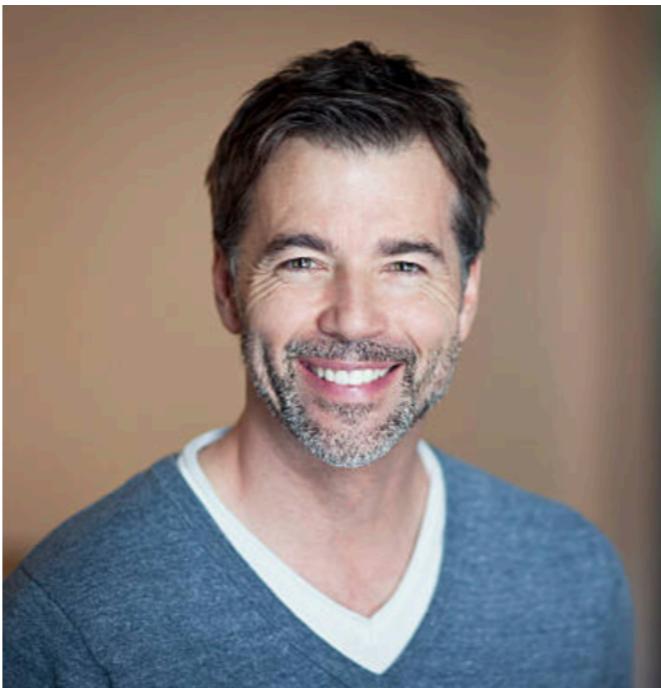
We changed the value of some colors used in the display in order to avoid unnecessary competition among different information. Furthermore, we gave more thoughts on the presentation of the information using different types of texts and groupings.

# Iteration 3

## Implementing Use Cases

Informed by the critique, we decided to come up with some use cases for our user personas so that we can approach our design with more empathy and tell a better story with the display. We learned that not only should designers be familiar with the personas, but they also need to understand them to the extent of knowing different types of use cases, and take these details into account while making design decisions.

Before creating these use cases, we made decisions purely based on the key features and needs described in the personas, and our own idea of how these needs can be fulfilled. With these use cases, we started to approach problems from our users' perspectives, following users' journey or decision making process, and make more informed decisions in this way.



### Use Case 1

Flight is delayed and needs to take an alternative trip to make it to his destination on time.

### Use Case 2

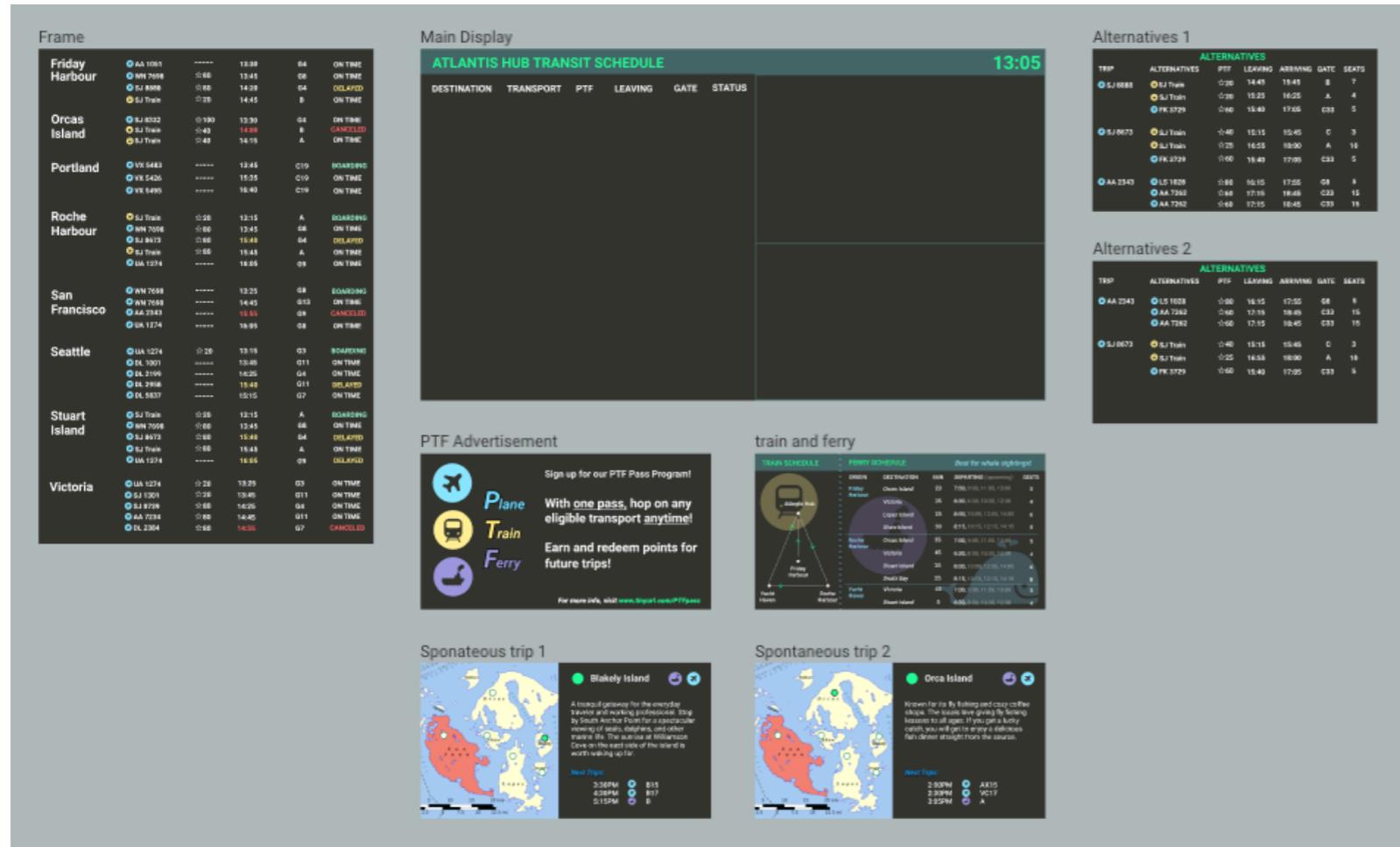
Meeting gets canceled and has entire day to explore the San Juan Islands.

### Use Case 3

Invited the whole family to San Juan Island to go on spontaneous leisure trips.

# Iteration 3

# Adding Motion



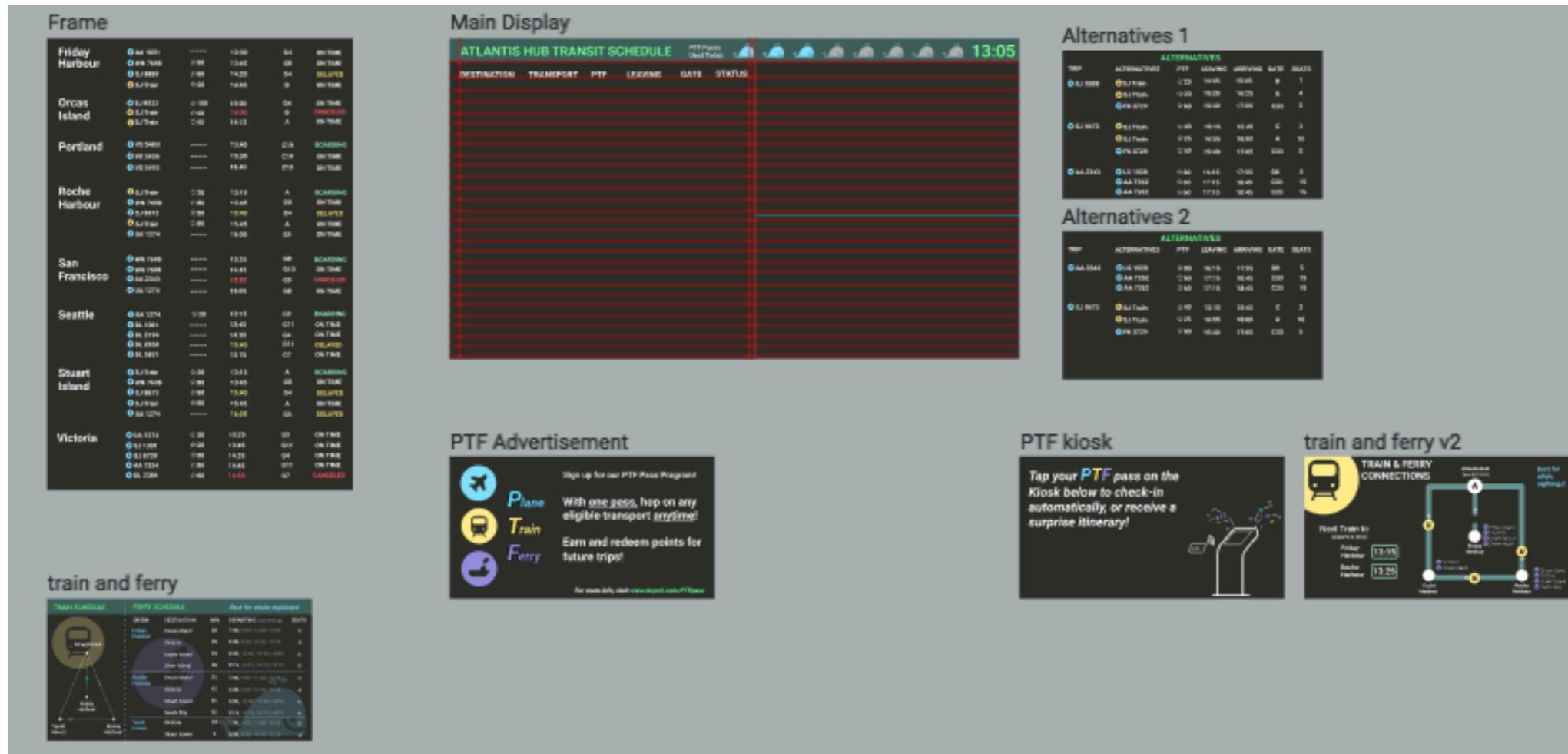
Our last step of Iteration 3 was adding the motions. We planned to first realize the motions we ideated during the last iteration, and improve on it more after getting some feedbacks.

After finalizing the colors and visual details, we exported different sections of the display to individual screens, and started to explore AfterEffect. We discovered that the scrolling motion can be achieved using an existing effect in the program, and we watched some Youtube tutorials in order to learn how to make slideshows to rotate through our dynamic screens.

It was an interesting experience understanding how motion works in this program, which is essentially setting a state before the motion, and a state after the motion, then connecting the two states to create motion.

# Iteration 4

# Refining Motion



Based on feedback from our critique, we revised the following motions in our final display:

- Slowing down the scroll for the flights.
  - Fixing the abrupt transition between carousel screens.
  - Making the Alternatives screen fades in-out.

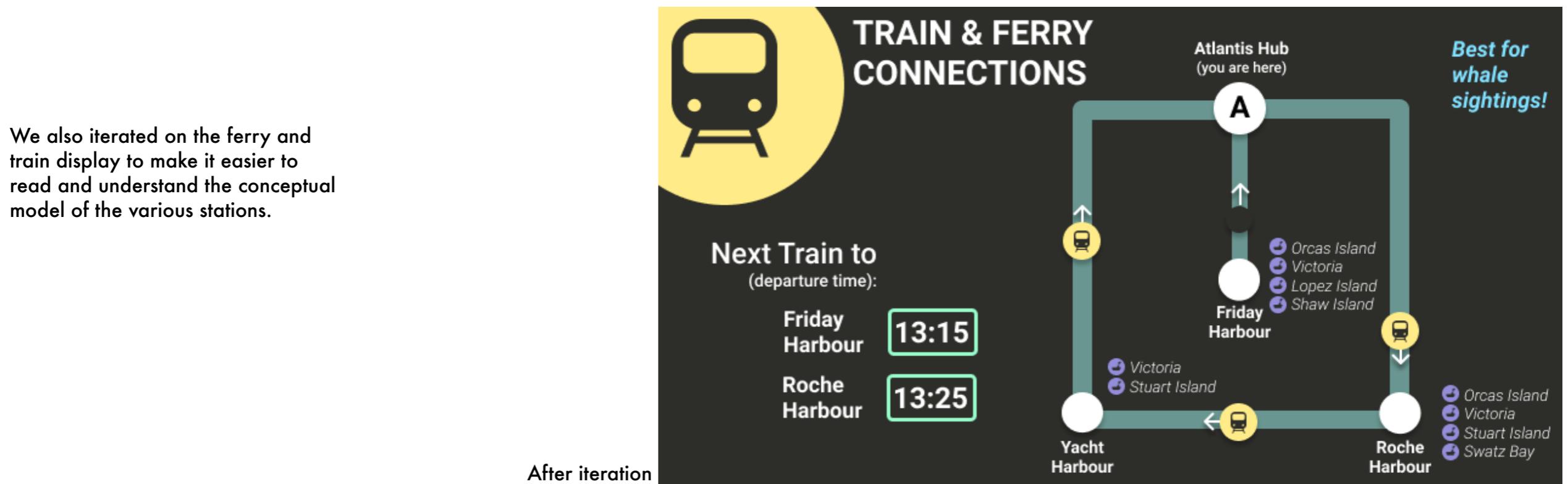
We also adjusted the timing of motion changes between the screens on the display so that they would not overwhelm the user.

# Iteration 4

## Updating Ferry & Train Display

TRAIN SCHEDULE	FERRY SCHEDULE		Best for whale sightings!		
	ORIGIN	DESTINATION	MIN	DEPARTING (upcoming)	SEATS
 Atlantis Hub	Friday Harbour	Orcas Island	20	7:00, 9:00, 11:00, 13:00	5
		Victoria	35	6:30, 8:30, 10:30, 12:30	4
		Lopez Island	25	8:00, 10:00, 12:05, 14:05	6
		Shaw Island	30	8:15, 10:15, 12:15, 14:15	8
	Roche Harbour	Orcas Island	35	7:00, 9:00, 11:00, 13:00	5
		Victoria	45	6:30, 8:30, 10:30, 12:30	4
		Stuart Island	35	8:00, 10:00, 12:05, 14:05	6
		Swatz Bay	25	8:15, 10:15, 12:15, 14:15	8
 Yacht Haven	Yacht Haven	Victoria	45	7:00, 9:00, 11:00, 13:00	5
		Stuart Island	5	6:30, 8:30, 10:30, 12:30	4

Before iteration



# Iteration 4

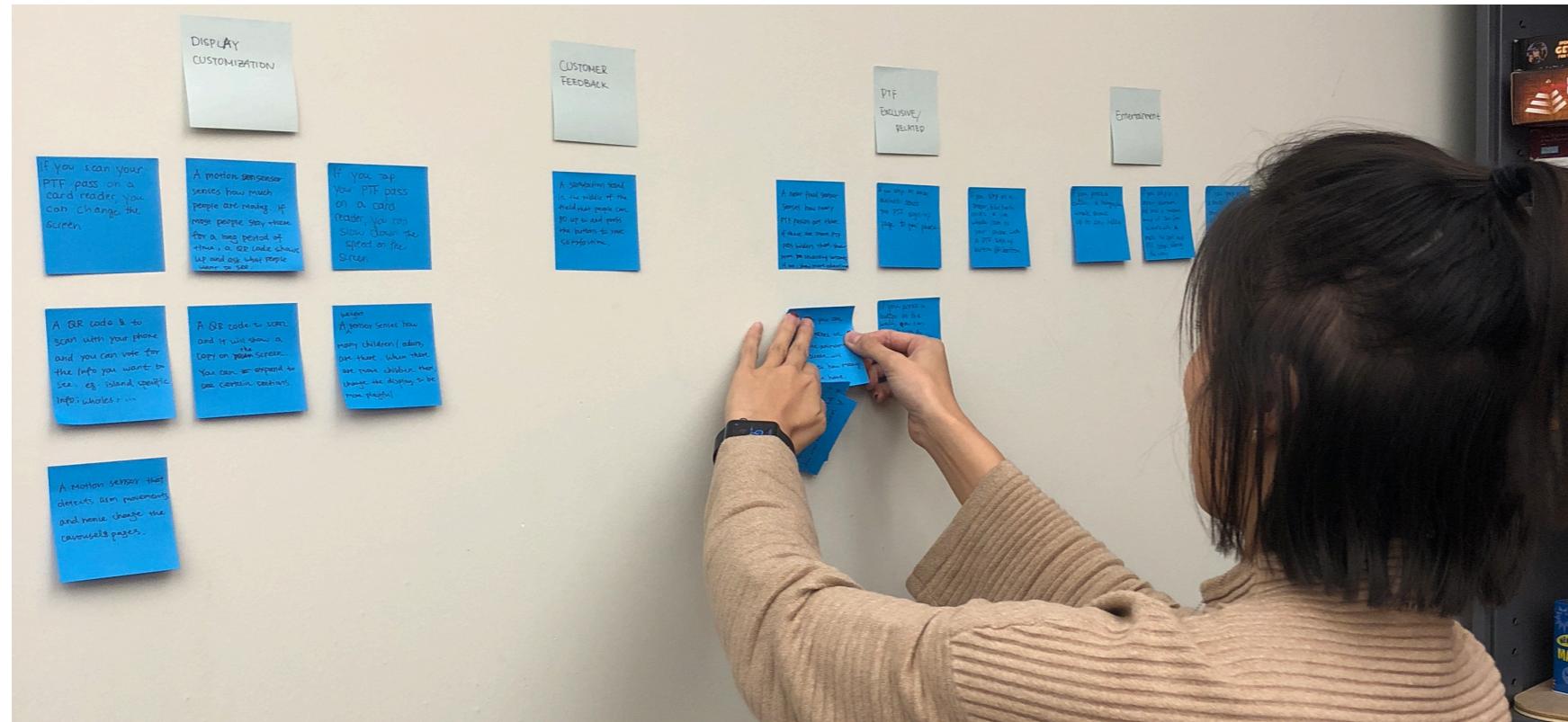
## Ideating the Control

We spent 20 minutes rapidly iterating possible control ideas. The sky was the limit. Here are some wild and playful ideas that we came up with:

- Step on a sensor on the floor, and a holographic whale pops up to say hello.
- Tap your PTF pass on a kiosk, and you will receive instructions for a treasure hunt on the San Juan Islands.
- Tap your PTF pass on a kiosk, and a live Orca whale cam shows up on the display.

Coming up with those blue-sky ideas helped us make connections to more feasible solutions, too:

- Tap your PTF pass on a kiosk, and you can automatically check into your trip.
- Tap your phone on a kiosk to be sent a form to provide feedback on your PTF pass experience.
- Press a button, and you can see how many PTF points have been used in Atlantis Hub so far today.

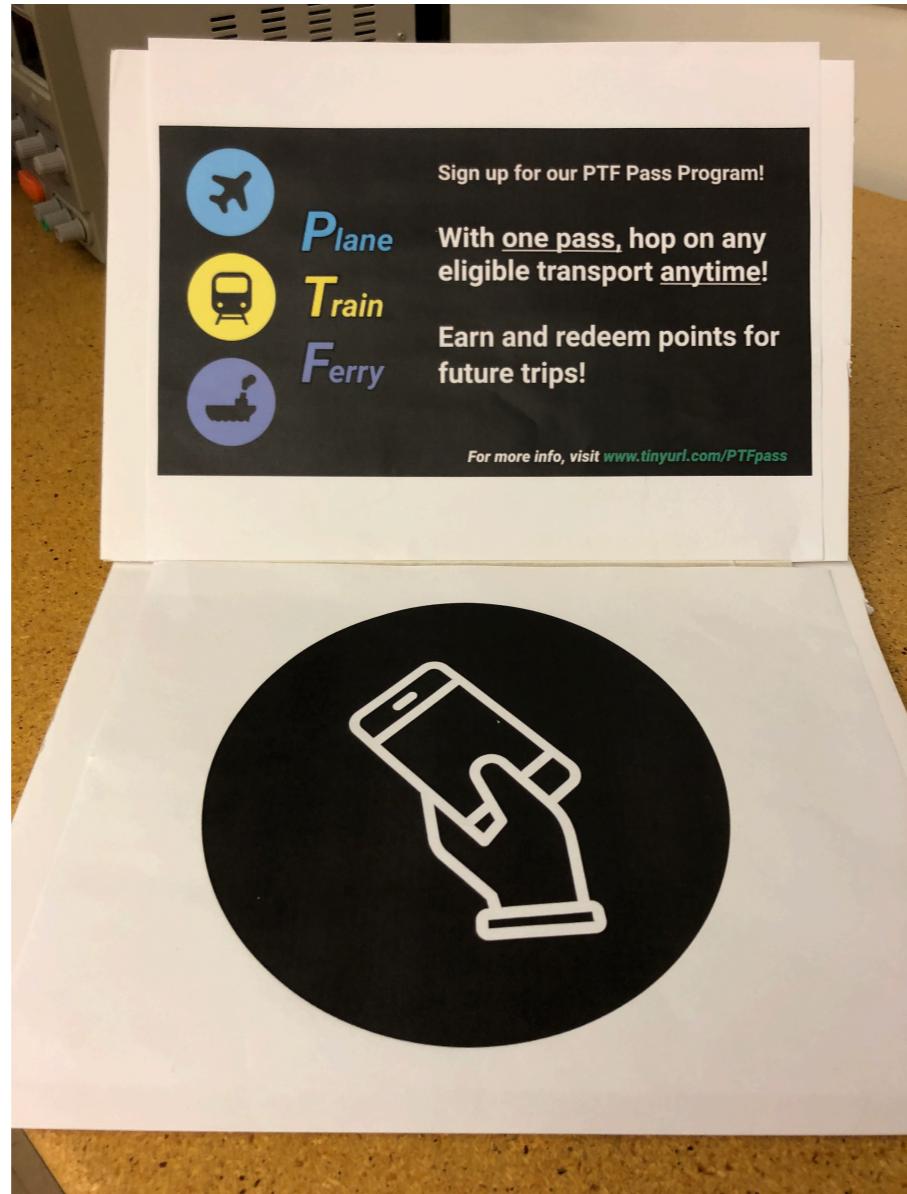


After 20 minutes were up, we categorized our 30 ideas and were able to combine some of our ideas to fit the following persona needs:

- track the success of the PTF program (Elizabeth)
- easily check into your flight when you are focused on getting to your meeting (Patrick)
- enjoy the family-friendly appeal of the San Juan Islands (George)

# Iteration 4

## Creating the Control



When a traveler who does not have a PTF pass walks up to the kiosk, they can easily see how they can sign up for one by typing the listed link on their phone, which takes them here:

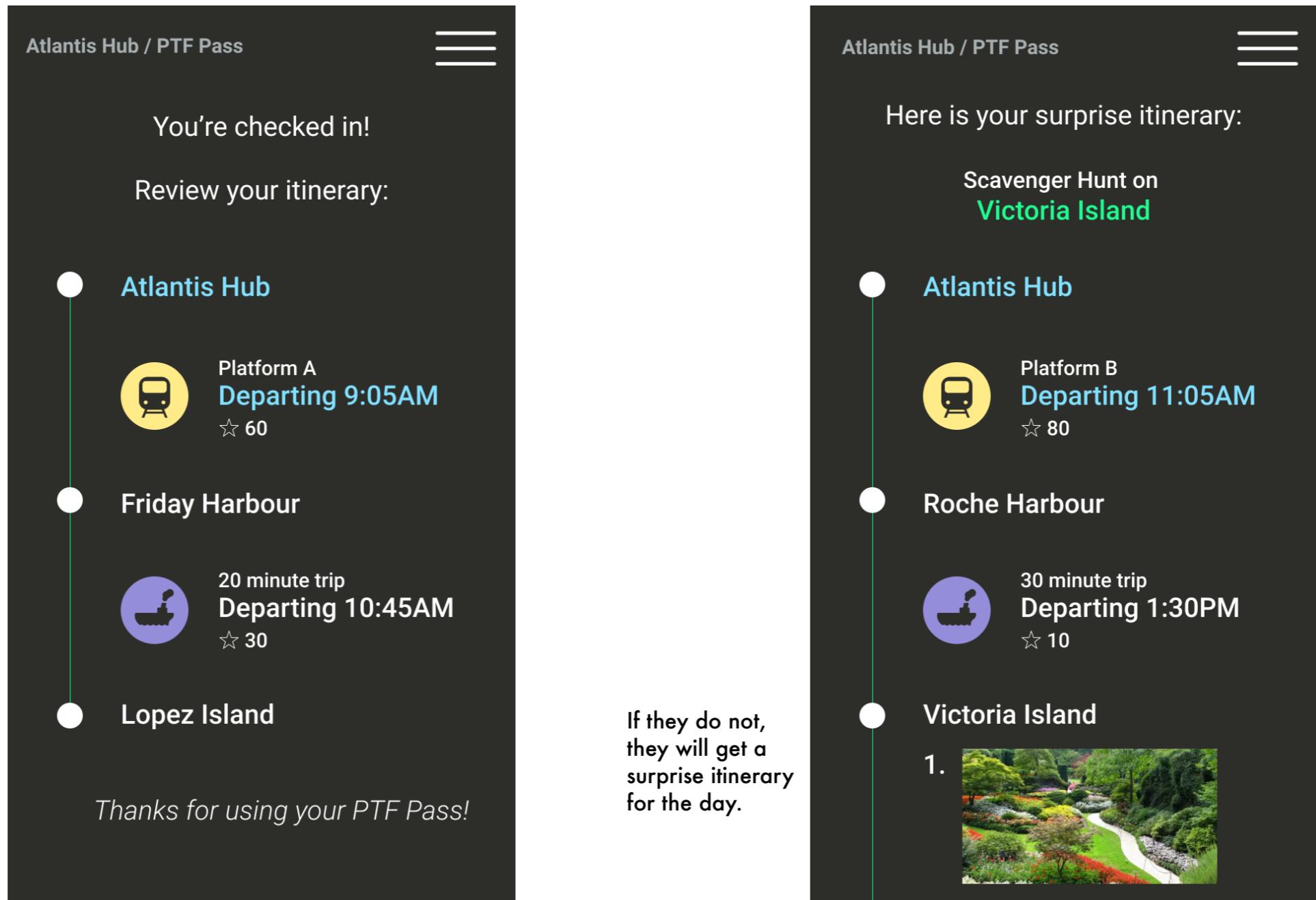
A screenshot of a mobile application's settings screen. The title 'Settings' is at the top in a purple bar. Below it are three tabs: 'GENERAL', 'PRESENTATION', and 'QUIZZES'. Under the 'GENERAL' tab, there are two sections. The first section, 'Requires sign in:', contains two checkboxes: 'Restrict to users in Carnegie Mellon University and trusted domains' and 'Limit to 1 response'. The second section, 'Respondents can:', also contains two checkboxes: 'Edit after submit' and 'See summary charts and text responses'. At the bottom right of the screen are two buttons: 'CANCEL' and 'SAVE'.

When a PTF pass holder taps their phone on the kiosk...

# Iteration 4

## Creating the Control

...the PTF app on their phone will recognize whether or not they have a PTF-enabled trip booked.



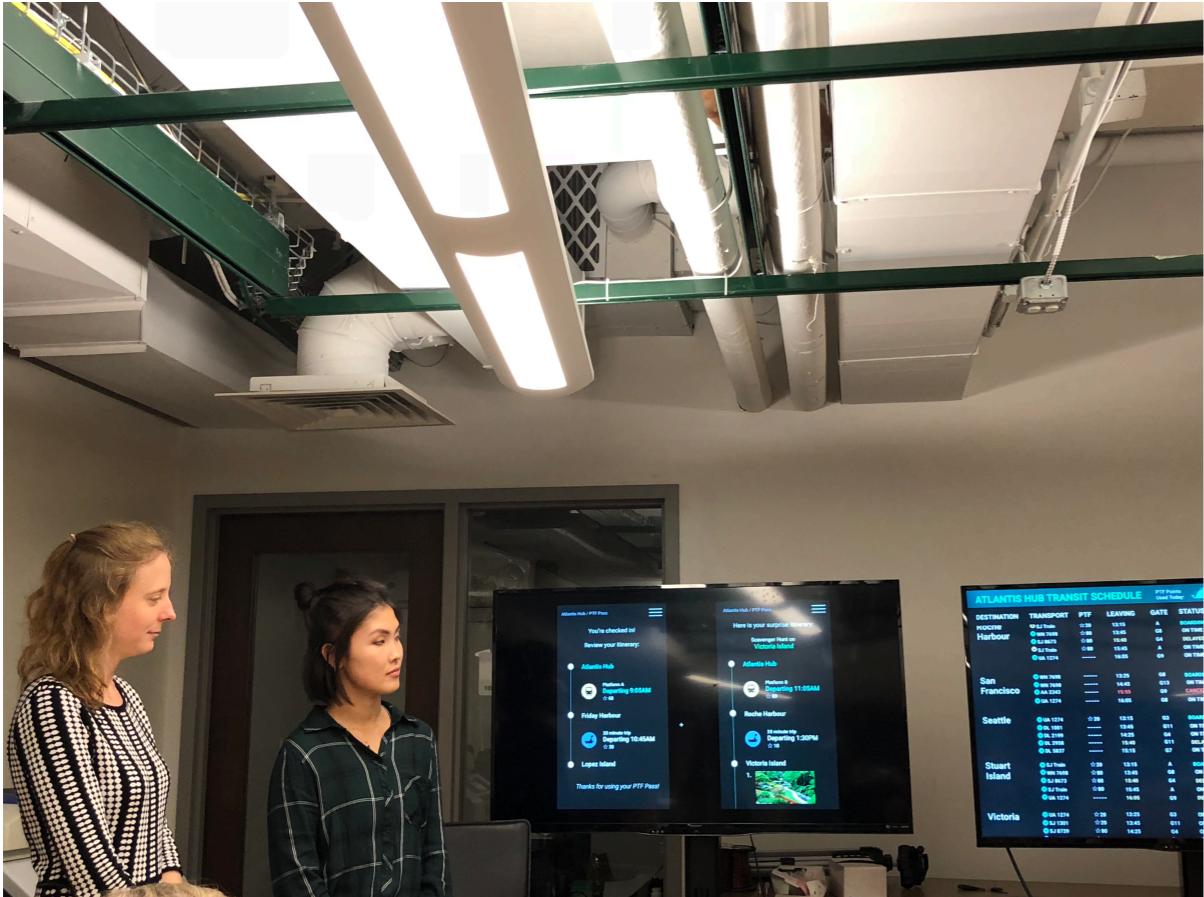
# Iteration 4

## Combining Control & Display



We also added a progress bar of whales to the top of the display which indicates the number of PTF Points that have been used so far that day. That way, people can be enticed to sign up for the PTF pass and contribute to a delightful shared experience.

# Client Presentation Pitching & Learning



We learned a lot from pitching our display and control. If we were to iterate again, we would consider the following:

- Balancing amount of information we can display with the amount of motion. Atlantis Hub stakeholders commented on how overwhelming it still seemed.
- Designing for smartphone-less adults, like senior citizens, who would be missing out on the ability to access the kiosk. Perhaps we could develop a sensor-enabled card.