PROJECT REPORT

iCrew

An application for air crew assistance, Lufthansa

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Under the guidance of
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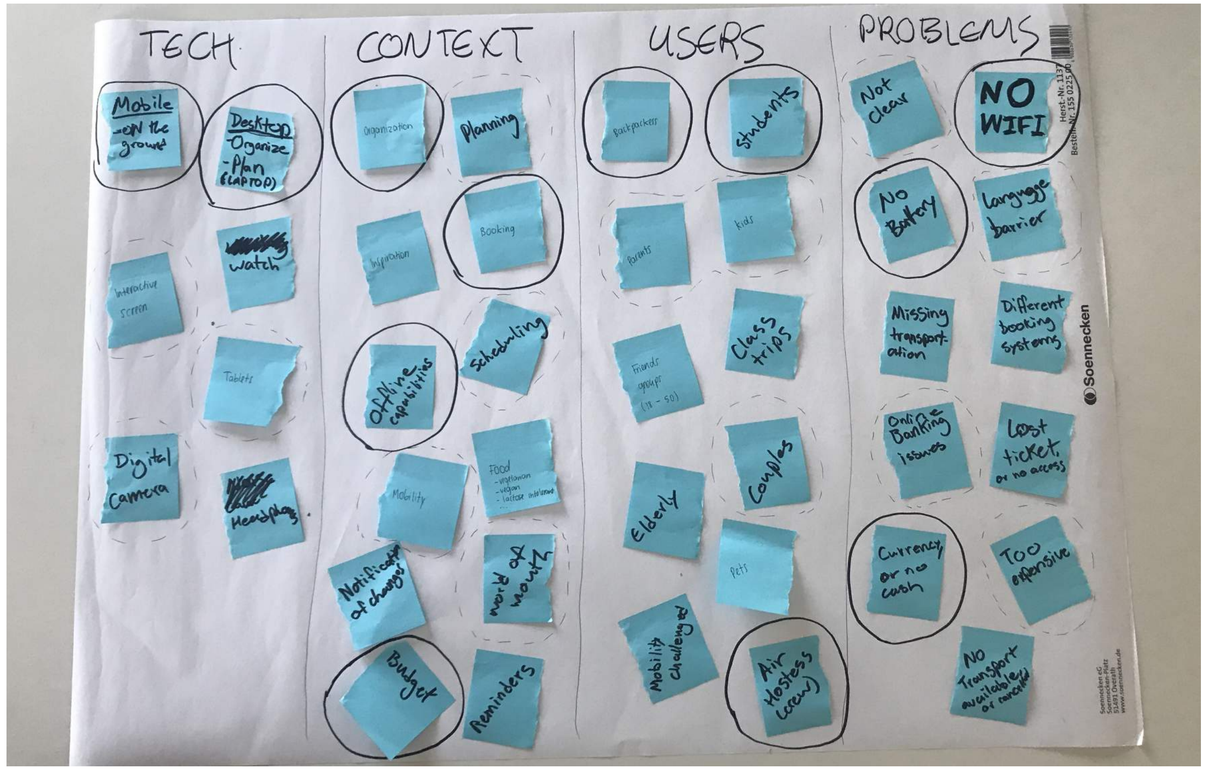
Acknowledgement

I would like to extend my heartfelt gratitude to Prof. Jonathan Bolz for guiding me through this process and being motivational at every stage.

This was a group project done with Beatriz Vargas. I would like to thank Beatriz for her constant cooperation and support. It has been a pleasure working with you

Contents

Let’s explore



To begin with we decided to explore different areas present during traveling by doing a brainstorm. We took into account the technology people use, the contexts in which they might find themselves, what kind of users are usually traveling and which are the main problems while doing so. After finishing with the brainstorm we went through all the different topics highliting which options were the most and least popular while traveling. In this point we discussed with our peers about what we have found so far and where we think we could find the most opportunities to work on. We decided to work with flight assistants since they are a population with a lot of needs that are not being met. Because of the users we chose to work with, we knew research was going to key for us in order to be able to understand fully these needs and how we could help.

Seeing an untapped potential in air crew members as the target user group, we chose them to work for

Air crew members

Roles

Loadmasters: calculate cargo and passengers to determine gravity limits throughout the flight and prevent overloading

Pursers: responsible for money aboard the flight, and typically take an off-board role.

Flight attendants: responsible for the overall well-being of passengers, serving food, drinks, and maintaining their health and safety.

Requirements

High school diploma

Helpful degrees: travel, tourism, hospitality management, leisure, languages or nursing

Valid passport

Disclosure and Barring Service (DBS) check

Safety trainning course (with airline)

Minimun height/reach

Regulations

The pilot and co-pilot can’t eat the same meal

Only certain reading material is permitted

Pilots are encouraged to not eat shellfish

Pilots are encouraged to eat at different times

Flight crew must have minimum rest periods

Flight attendants must wear different uniforms on the ground and during flights

Avoid conversations

No use of personal devices

Behind all the flying

Motivation

Enjoy the chance to interact with a wide range of people and the opportunities to explore and enjoy global destinations are almost unparalleled.

Access to discounted travel for your immediate family.

Likely to be paid a base starting salary of around £13,000 to start with, rising to around £20,000 with experience

Bonuses for in-flight sales and performance and for the number of languages spoken

Chance to work with a variety of people from different cultures.

Work shifts

The flying for a given pilot can vary greatly from one month to the next. We think of a month's flying as consisting of a series of 1, 2, 3, or 4-day trips (or even more in some cases).

For example, a 1-day trip for a 737 pilot based in Denver might be a 10 am departure to Orlando, and then a return to Denver after maybe an hour on the ground.

A 3-day trip for the same pilot might look like this:
Day 1: Denver (DEN)-Chicago (ORD)- Boston (BOS);
Day 2: BOS-LAX-SFO; Day 3: SFO-ORD-DEN.

Mindset

Air crew members tend to be predominantly investigative individuals, which means that they are quite inquisitive and curious people who often like to spend time alone with their thoughts. They also tend to be enterprising, which means that they are usually quite natural leaders who thrive at influencing and persuading others.

Being an air crew member implies a lot of energy and following rules. We want to help them by making their tasks easier while they work.

Flight steps

Before the flight

Approximately one hour before each flight, attendants are briefed by their captain. Weather conditions, possible turbulence, flight duration, and other factors that may affect the upcoming flight are discussed in detail. They are also briefed on safety details and emergency equipment supplies relevant to the aircraft they will be flying. A list of passengers is verified and attendants are notified if any special needs passengers, small children, or VIPs will be boarding the flight. After the briefing, flight attendants inspect the aircraft, ensuring the safety equipment is in place and working properly. If a piece of equipment, such as a fire extinguisher, is found unserviceable, flight attendants must replace the item prior to takeoff.

Pre- takeoff

Once passengers are called to board, flight attendants assist with the boarding process. They aid any special needs passengers, children, or VIPs to ensure they receive the proper care while boarding. Tickets and seating positions are verified, and attendants check for both accuracy and possible fraudulent or stolen tickets. Attendants also monitor passengers; they are trained to detect suspicious behaviour and evidence of malicious intent, to prevent hijacking or terrorism. In addition, they help passengers load carry-on baggage, checking that each adheres to aircraft or airline size and weight restrictions. light attendants are also responsible for briefing the passengers on safety standards specific to the aircraft in a safety demonstration. Passengers are made aware of how to locate their nearest emergency exit, how to properly buckle their safety belts, what to do in the event of turbulence, how to operate safety vests or flotation devices, and how to use the drop-down oxygen masks. In some cases, passengers will watch a short video covering this information while the flight attendant monitors their behaviour. After the safety demonstration, attendants secure the cabin, making sure electronic devices and cell phones are turned off, carry-ons are stowed correctly, seats are in an upright position, and tray tables are stowed. The entire procedure, from boarding to takeoff, is known as pre take off service.

Flight steps

In the air

After the plane is safely in the air, flight attendants check for passenger comfort. They deliver headphones or pillows to passengers who request them and serve food or drinks. In addition to serving the customers, flight attendants must conduct regular safety checks and listen for unusual noises. Once the plane begins its descent, attendants must ensure all trash has been removed from the cabin and seats are in their correct positions before performing a final safety check. After landing, attendants assist passengers in safely deplaning the aircraft.

Generally, they work no more than 12 hours per day, but may work up to 14. Attendants typically fly for 65 to 90 hours and 50 on the ground per month.

Interview insights

Pilot

Pilots sleep during long overhaul flights

Last drink policy 12h before flight

Pilots/cabin crew use a “bidding system” to decide what flights they get. Bid with priority, and seniority means better flights. Every airline has a different bidding system

Fatigue is a big issue

Cabin crew are unlicensed, so they don’t have legal responsibilities

Pilots and especially cabin crew have specific appearance/makeup codes

Flight Assistant

24h layovers

Resting time

Not a lot of “free” time

System for bidding

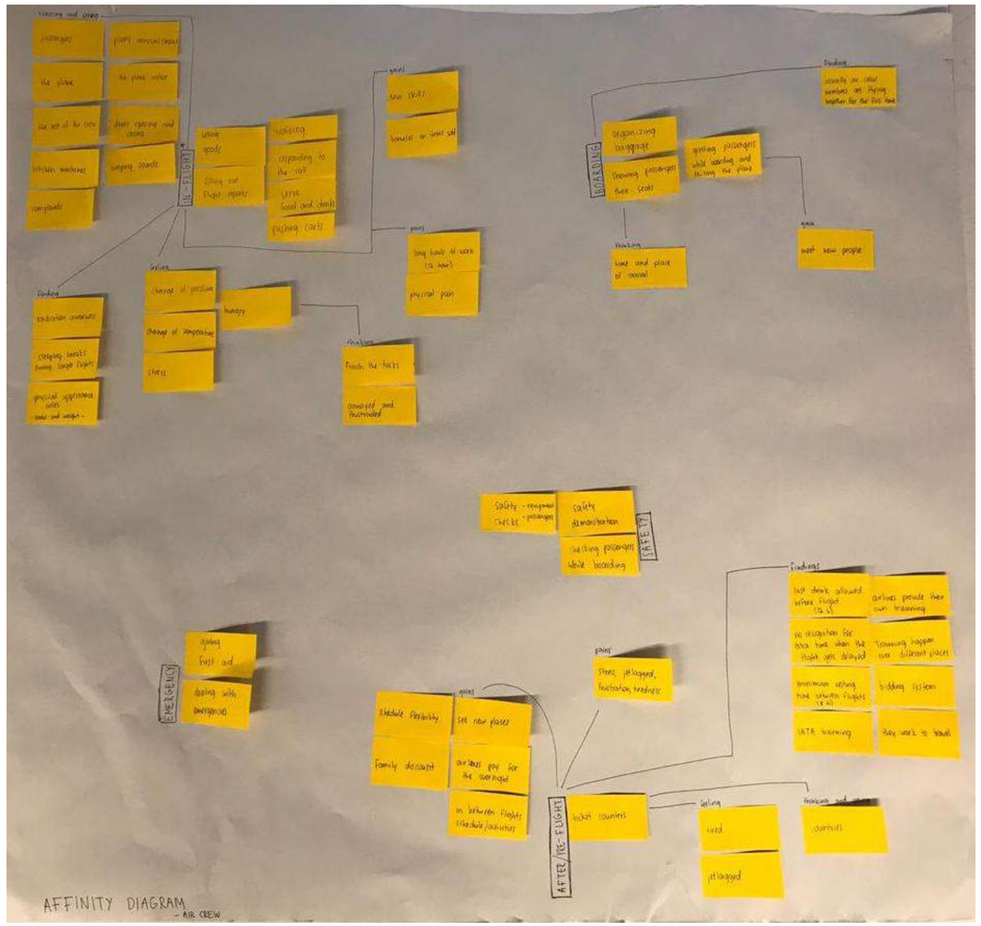
Health issues related to stress

Pilots and flight attendants have different rules

Looking for recommendations

No apps known for flight attendant

Looking for potential



Based on the secondary research and all the interviews conducted with the pilots and air crew members, we drew up the different tasks, feelings, problems that they encounter during the whole flight experience, and did an affinity mapping with them to understand the clustering of problems to find an area to scope down onto.

Locating trouble

Primary

Organize amenity kits, bowls and prepare drawers

Answering to requests

Accommodating passengers

Meeting passengers needs

Secondary

False call bells

Special treatment passengers

Bar service

Attend medical cases and conflicts in between passengers

Constant check up on bathrooms

Tertiary

Pick up, clean up and lost & found

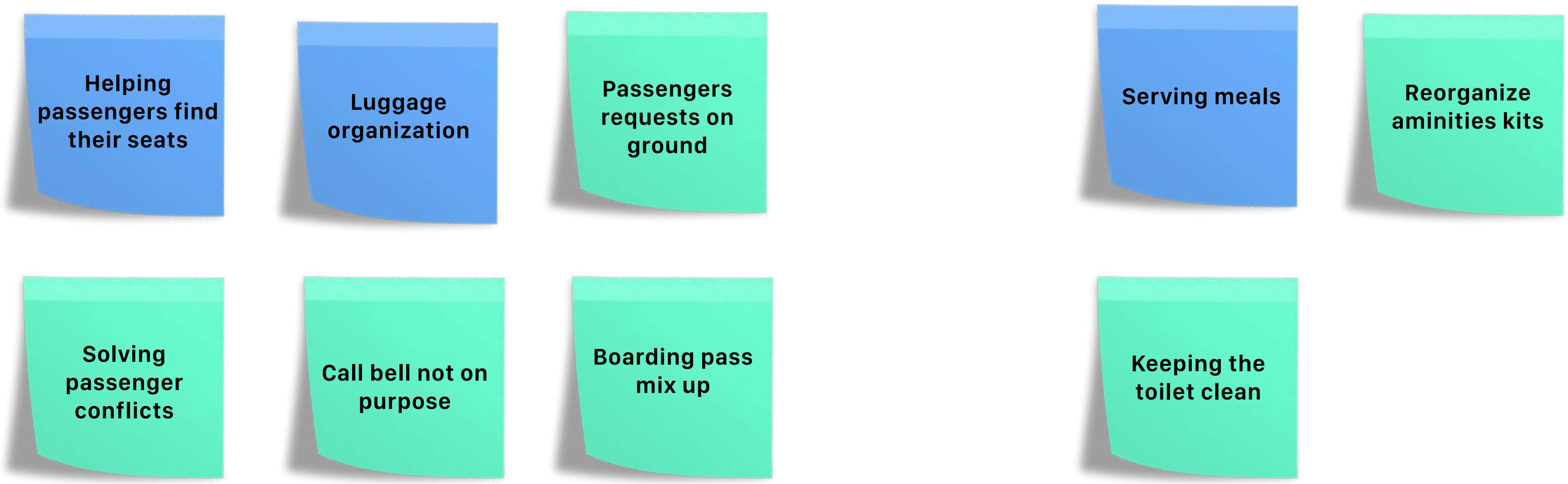
Already know what they are doing in the destination

A lot of cultural shock and always flying with a new air crew

Crews will change accordingly to the fleet

To understand better where air crew members face the most problems we divided their pain points in three sections.

Pain points



Since not all of the problems are fixable with an interface, we chose the ones in which we could make a difference for the flight assistant.

Our intervention

HMW question
How might we use existing smartwatch technology to improve communications between the crew and with the passengers?

Principle
Facilitating cabin operations

Review
We have found out through our research that the cabin crew - being working tourists - have been ignored in the development of their work environment, something that has not changed in a long time. In order to aid them in their jobs, we have envisioned a smartwatch based technology that each member uses throughout the flight.

Task flows

Task Flows

Task flows were drawn up for the chosen pain points, to better identify solution paths and to simplify the process of drawing up an information architecture. The following tasks were drawn up:

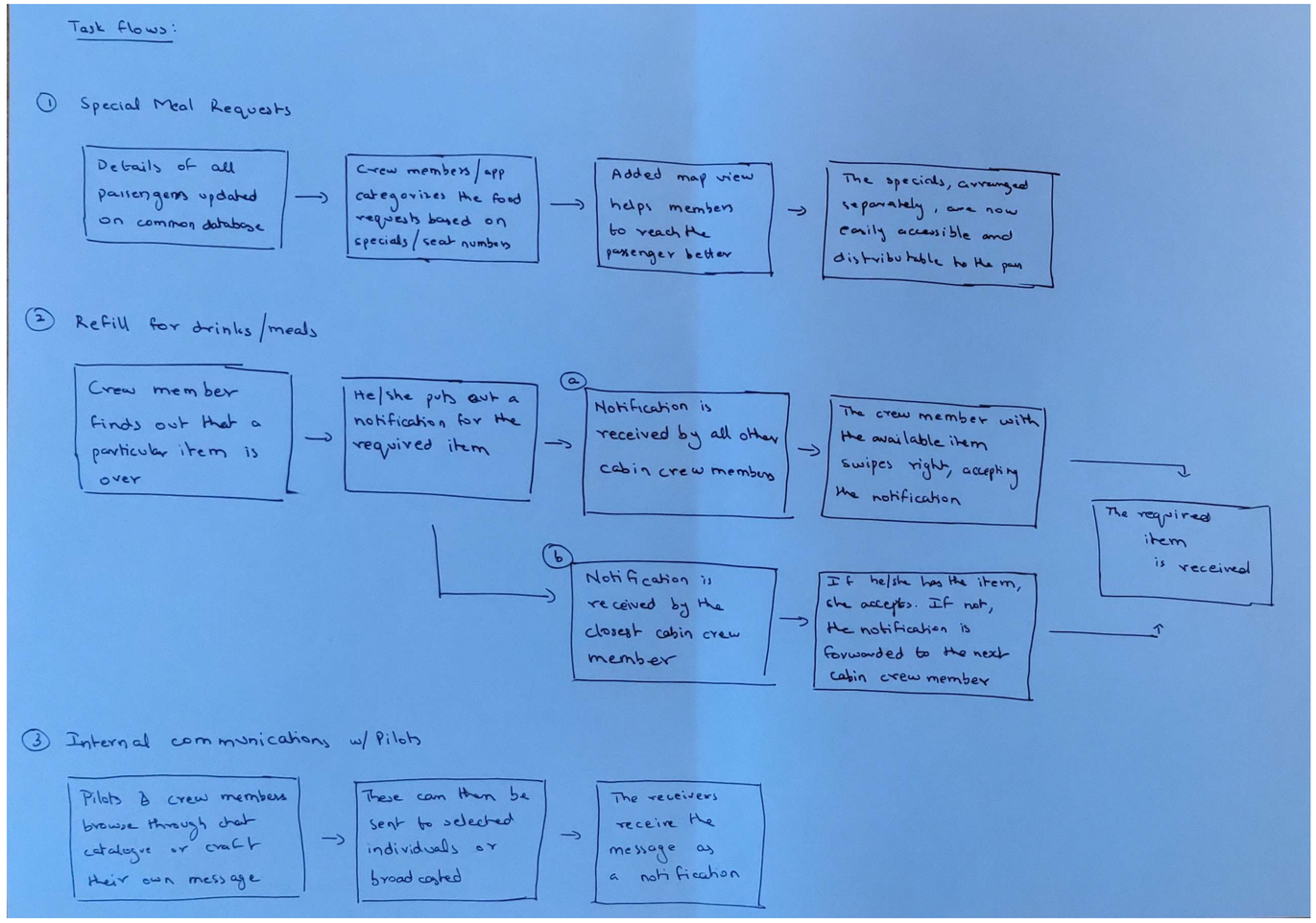
Meal requests

Refill for drinks/meals

Internal communications

Breaks

Passenger Calls



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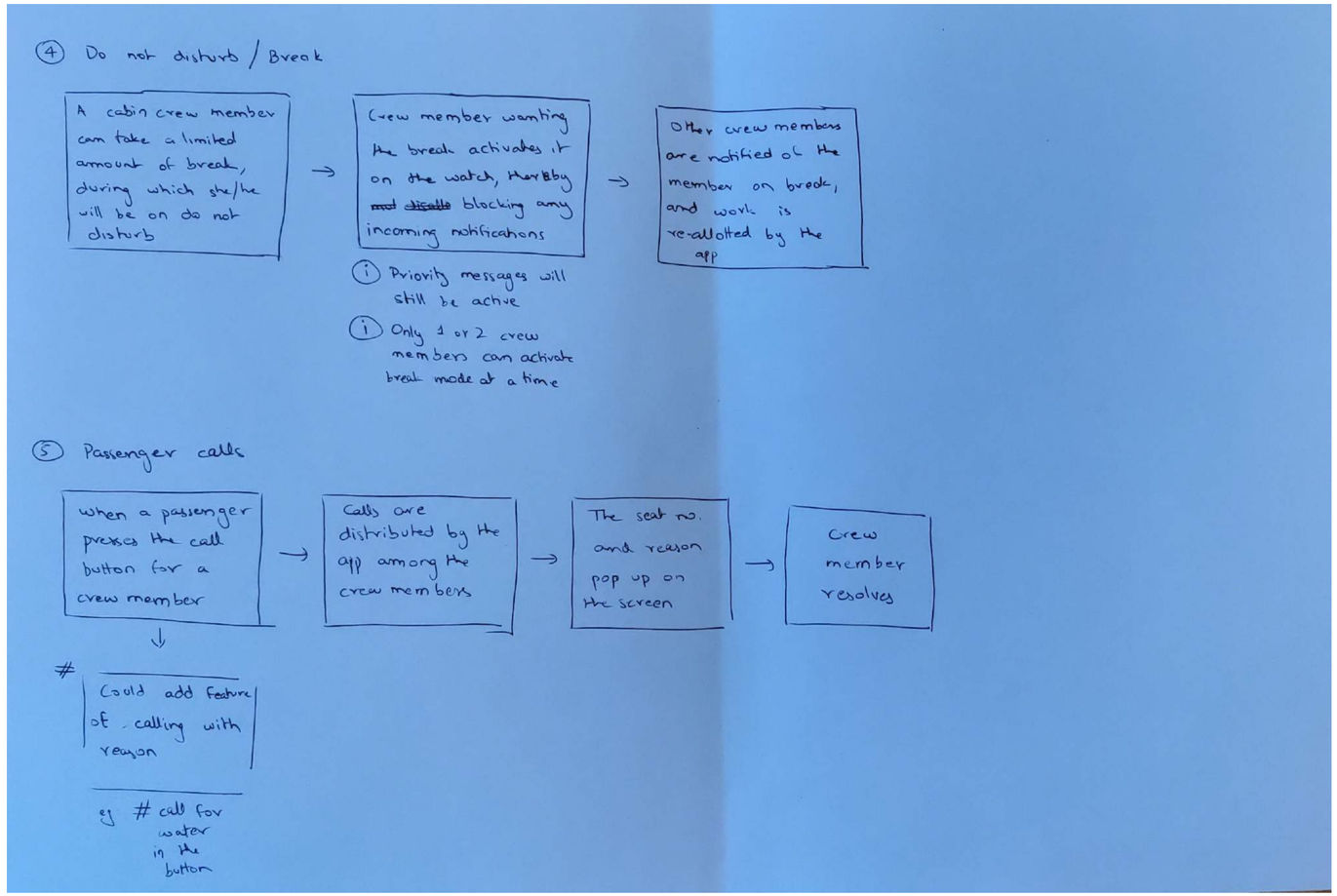
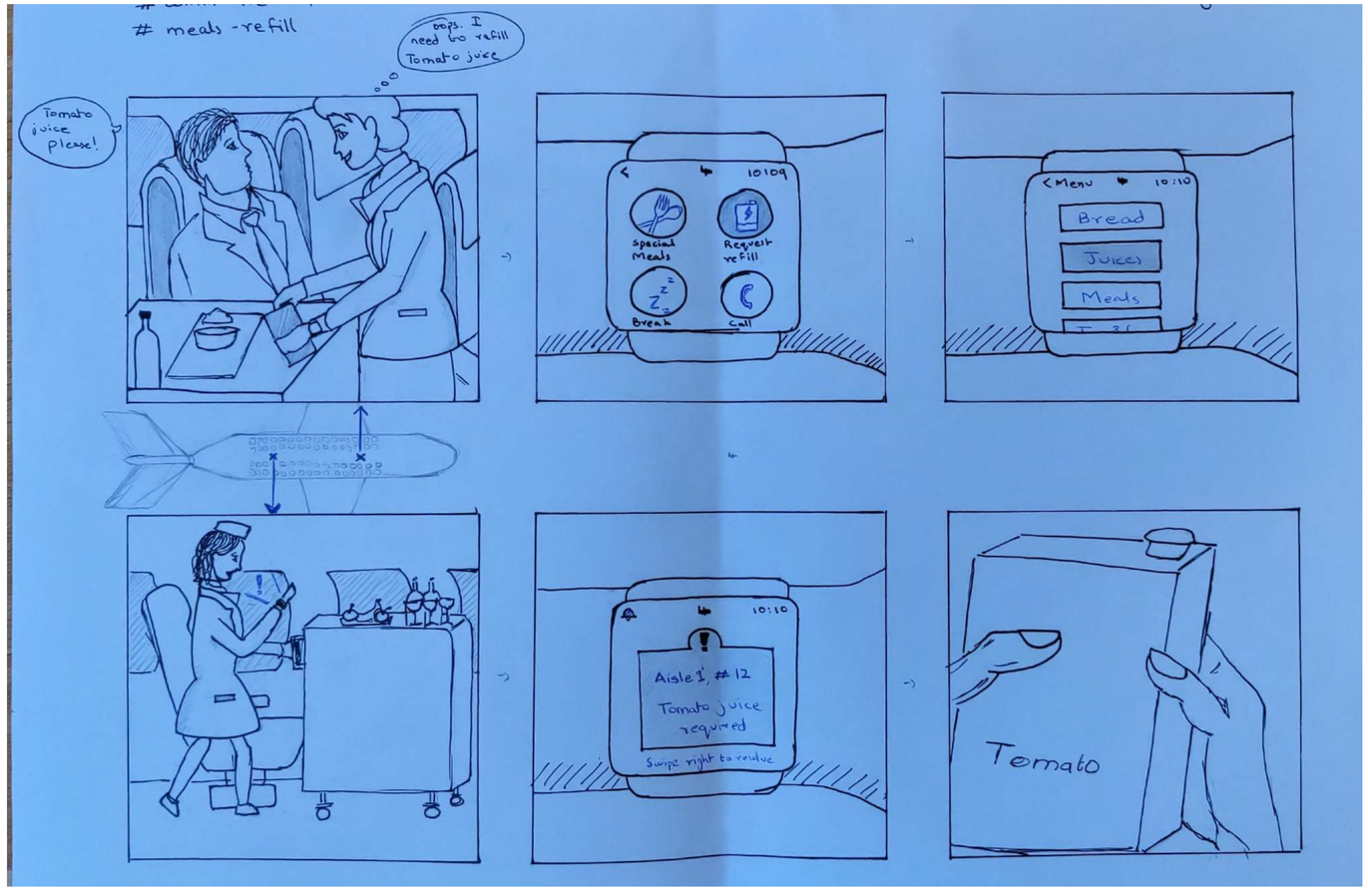


Storyboarding

One particular flow, that of drink request, was visualized and then an attempt to storyboard it was made. This helped us imagine the type of interaction the air crew member would have and gave us the first glimpses of how it would look in a screen.



Would it work?

Confirming viability

Some airlines only have one galley to serve the food because they don’t do the set up, this also changes according to the plane.

Every galley team has a manager and sometimes assistants.

The safety equipment routine needs to be done in more than 7 different languages accordingly.

Smartwatches are not allowed in all airlines.

Supervisors keep track of all events going on in the plane.

Pilots shouldn’t text, but hey do have and iPad and can do it.

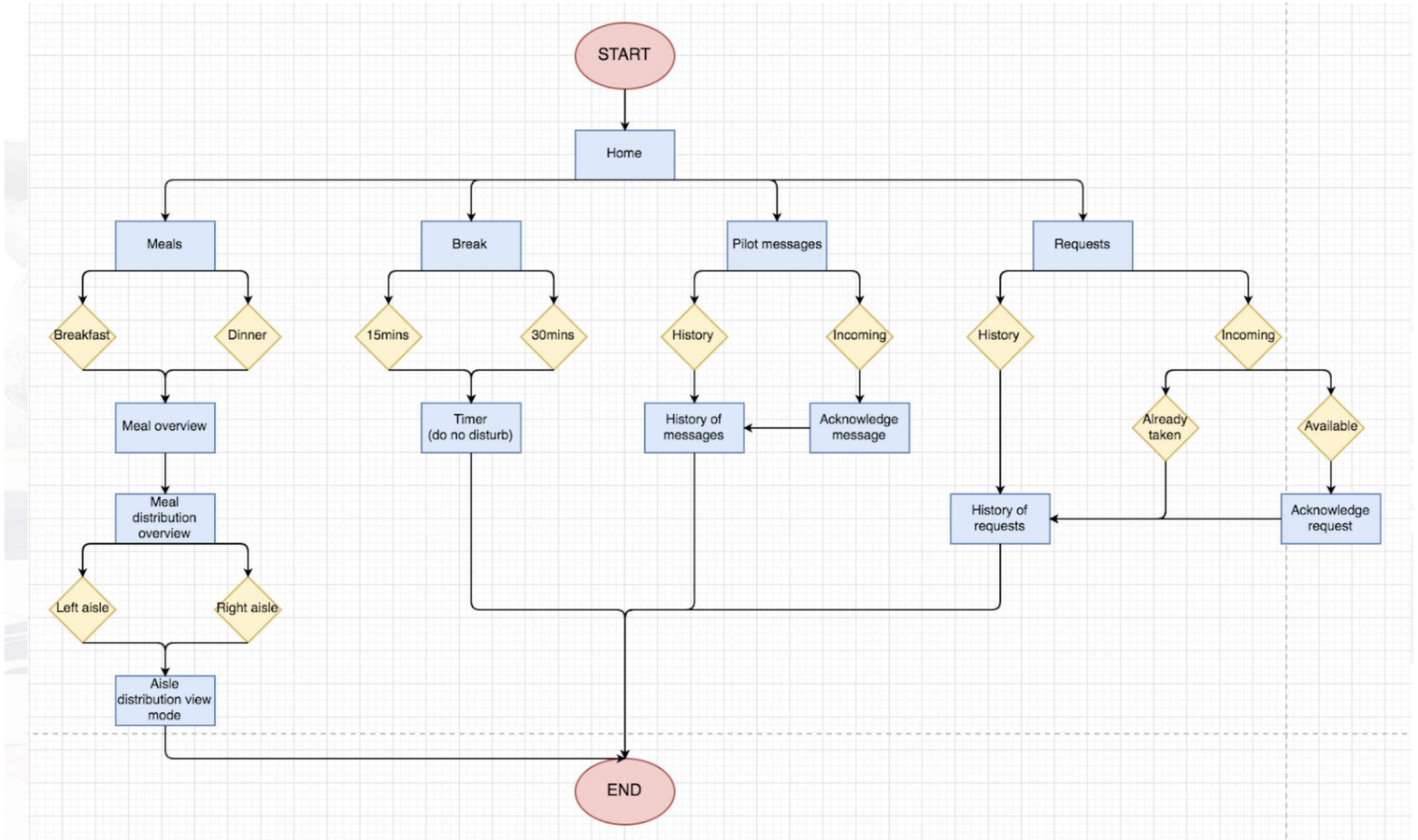
Air crew members don’t always have wifi connection during the flight (company device might work), that is why calls from the pilot are mandatory and the safest connection.

Once we had our project main idea, we iterated with another interview to find out if it would be possible and which assumptions we were making.

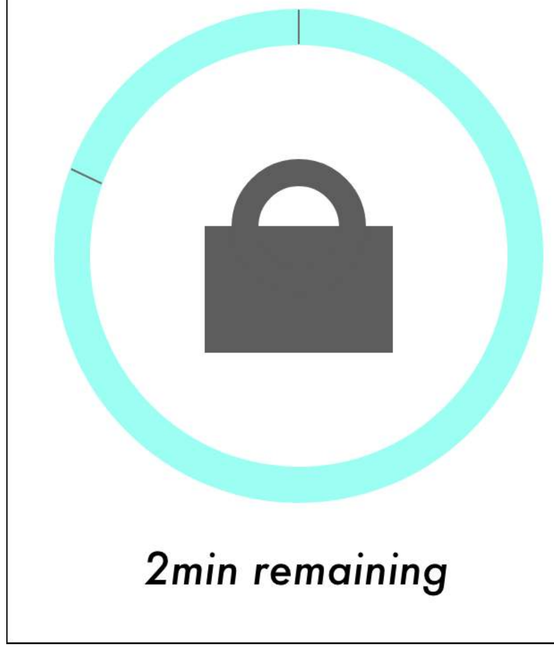
Organizing info

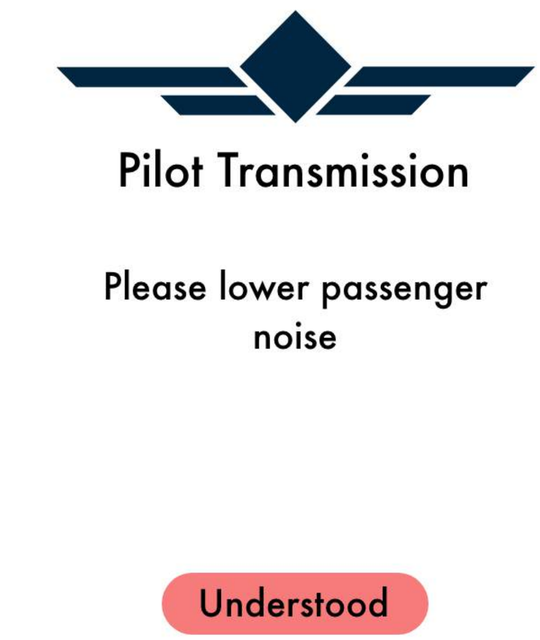
First Information Architecture

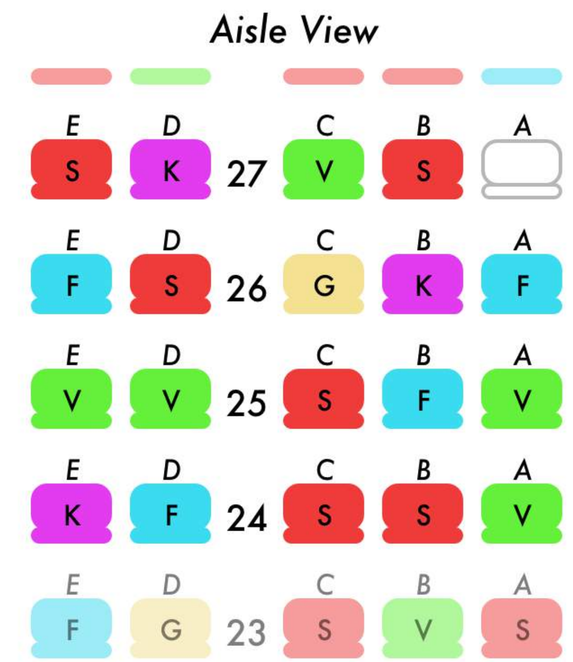
Based on the pain points and user flows, we drew up the first information architecture. Based on this information architecture, low fidelity wireframes were drawn up



Low-fi wireframes





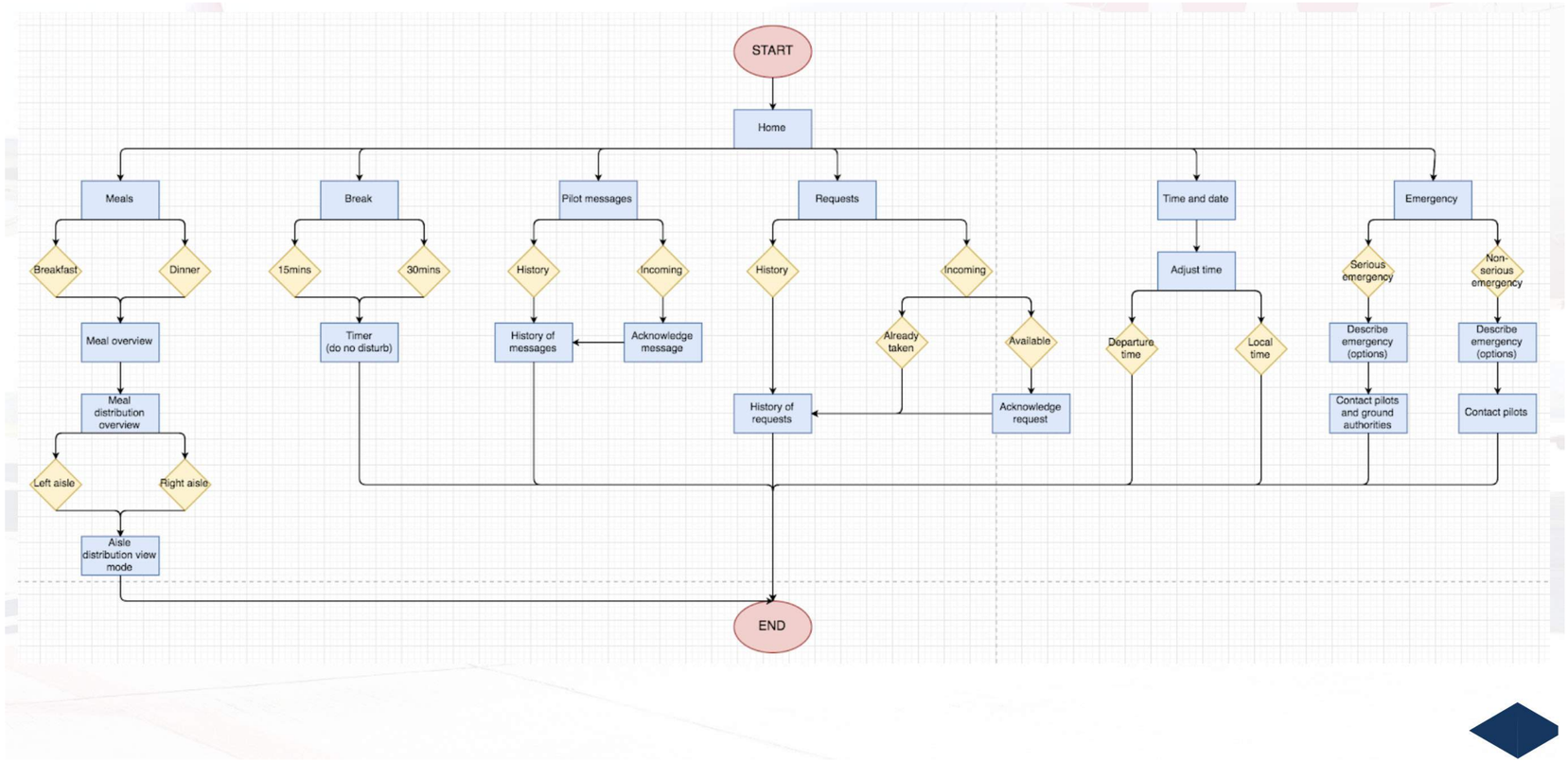


A few low fidelity screens were drawn up based on the first information architecture

Organizing again

Second Information Architecture

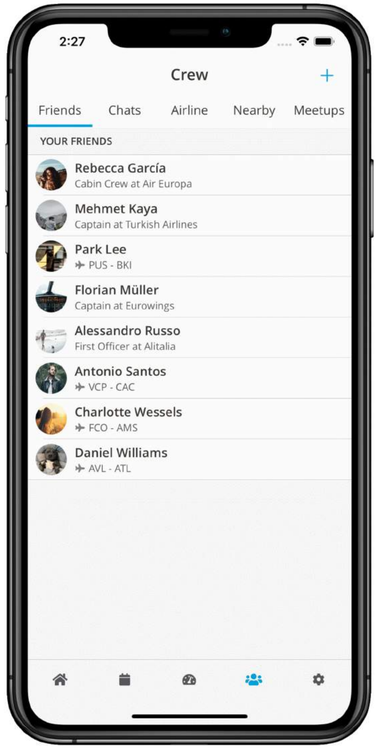
After drawing up the low fidelity wireframes and revisiting the pain points once more, we realized that the first architecture does not hold up since it disregards major pain points, and also provides a complex relationship between its screens. And so we tried drawing up a second architecture

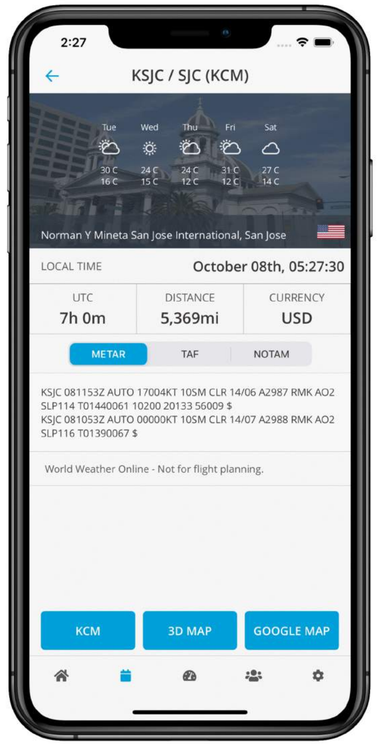


Weighing competition

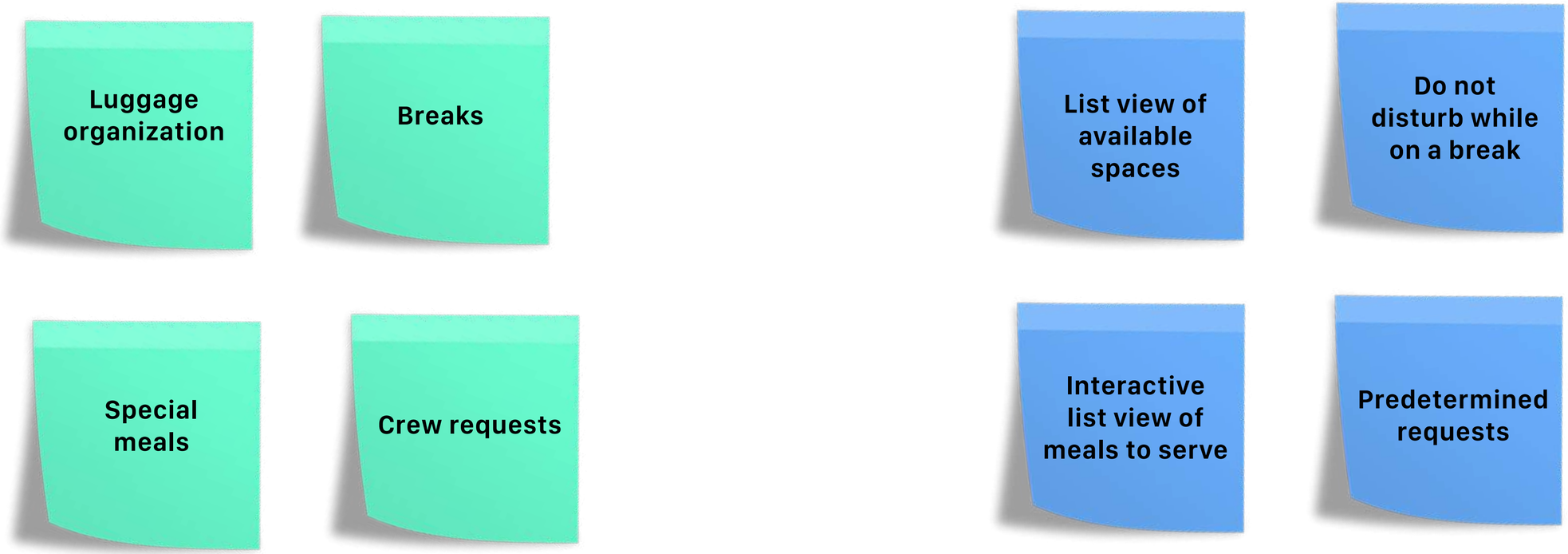
Roster Buster

We did a competitor analysis to figure out the strengths, weaknesses and task flows of similar apps. But there weren't any apps in the market which catered to the same functionalities that we aspired to.
The most similar application was Roster Buster, but this was just a roster organisation app which offered other special features like friends and followers in nearby flights, rolling blocked hours, map view of flights and destinations. There was no app which offered in flight assistance.





Pains to solutions



After a final iteration, we fixed upon the four main pain points and drew up their solutions in the application

Assumptions

Speculations and Assumptions

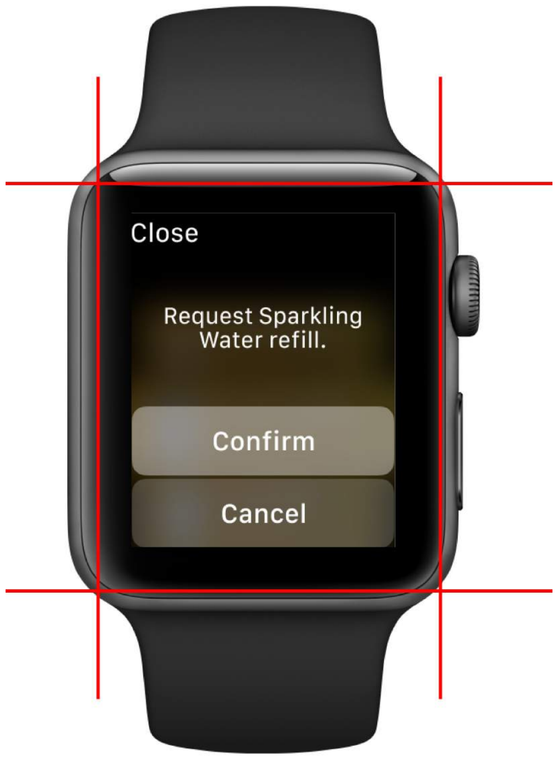
This product is placed along with a few speculated products, which could be installments in flights. This involves all flight equipment to be connected over IoT, giving a constant feedback of status; sensors, attached to the seatbelts to know if they are buckled or unbuckled; sensors, installed within the overhead luggage compartment to know how muc space is left in the compartment; A local GPS that tracks the position of the watch within the flight.

A few assumptions have been made while designing this app, with respect to the technology available on the flight models

Interface decisions

Apple Watch vs. Round Watches

On deciding that a watch application would best suit the needs and work flow of air crew members, the next thing to decide was which watch interface would be better to design for. In the current market, there exists a higher number of round faced smart watches than rectangular. But that wasn't an important criteria as we were designing specific to a brand, so the choie needn't be genralized. The Apple watch was brought into consideration as the WatchOS had a complete design documentation out of which we could build out the app, as designing for a watch is a different game altogether.
From our wireframes, we decided that the app would have list based interfaces and interactions, for which a rectangular screen would be optimal. Also, the rectangular display of the Apple watch gave us much more screen real estate than a round watch. Hence we decided to go ahead with the Apple Watch.



Due to its open source guidelines, more real estate, and the decision to have a list based interface, the Apple Watch was chosen for the application

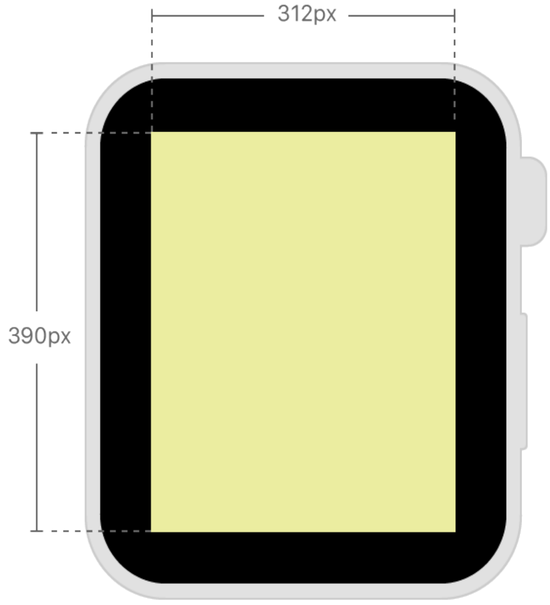
Design guidelines

Considerations

Air Crew are constantly dealing with passengers. So they cannot take out a lot of time to use the watch. The app should assist them without calling for too much interaction while using it. Screens have to be designed such that the critical information is quickly conveyed and navigation systems should be easy to understand and should not present a cognitive load on the users.
Moreover, owing the highly mobile working style of Air crew members, we also had to keep in mind the ergonomics of using the device, as they cannot have their hand lifted up for long to interact with the watch. Hence we had to utilize haptic alerts and animations; features native to the Apple watch.

Screen Size

After a few discussions during the interview, 42 mm was chosen as the optimal size, as that was the size that was big enough, yet not interrupting or getting in the way of air crew members doing their jobs, handling all the flight equipment in limited space.



Design guidelines

The online documentation of the design guidelines were heavily studied, and we picked a few points we thought were critical for our app and added a few more guidelines, on the basis of their work restrictions and on researching more about designing for smart watches. The following were the final guidelines we drew up to follow:

Glance, don't touch
Due to its limited screen real estate, the focus while designing must be on displaying only the most critical information. The user should be able to consume content made for a smartwatch in less than 5 seconds.

Ergonomic
While designing this app for the smart watch, there must be continuous usability and user testing to evaluate the physical cost of any given interaction.

Save time
Flows must be efficient and should help the user complete tasks quickly. Complex experiences that rely on multiple steps to get a task done should be avoided.

Alerts
Apple watch uses vibrations and tones as primary ways of attracting users' attention. It also offers haptic alerts. So while designing, we have to be thoughtful about how often and how we want to alert the users.

Colors
Colors have to be utilised such that only the most critical information stands out. Avoid using color as the only way to show interactivity. Keep colors light to guarantee legibility and contrast against the black background.

Alignment
Keep text left aligned as it is easier to read.

Black n White flows

Few screens were prototyped in black and white to fix content placement and sizes, and after adding color, they were tested for usability.

Look and Feel

A few preview screens which convey the look and feel of the final design of the application.

Atoms and Molecules

Colors

On choosing Lufthansa as the brand to design for, we incorporated the primary colors of Lufthansa into the app and iterated to build the app by using the least amount of colors possible.

#FFAC00

#FFC346

#FFFFFF

#A3A3A3

Typography

Type sizes had to be constantly iterated and tested to find the optimal size for our needs. SF pro was chosen as it was the recommended one for WatchOS. We finally came down to three type styles and sizes.

SF Compact Display, Semibold, 16
For main headings

SF Compact Display, Medium, 16
For sub headings, list items

SF Compact Display, Regular, 14
For description texts

Icons

We designed icons which were to be used in the app. While designing, it was kept in mind to design with metaphors that are universally understood. All icons were fill icons and have rounded edges so that in small sizes it doesn't look too sharp and illegible.

Aisle

Unbuckled belt

Respiratory problem

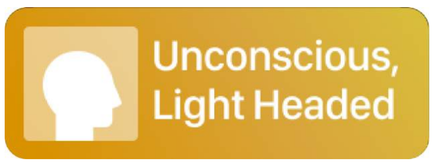
Vegan

Atoms and Molecules

Cards

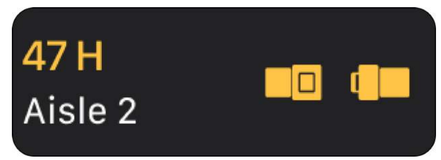
On deciding that our interface will majorly be list based, we decided to present all information in the form of list cards. These cards would hold all types of information in the application, and hence defining how each of them would look visually was important

We divided the major application contents into two types: **actionable** and non actionable. Actionable content would act like buttons and would trigger a new page, or display a particular information. A non actionable card would have information to be read only. The next step was to design these two major cards such that they follow a similar visual language, but stand out for themselves so as to not rise confusions.
The third type of card/button were system buttons, which contained the system actions of Confirm, Cancel and Back.



Actionable card

High contrast with the dark background of the application, designed to feel ‘clickable’, overlaps over other actionable cards on scrolling.



Non-actionable card

Low contrast with the dark background of the application, used to display information that is only to be read, not clickable, and has a fixed scroll behaviour with no overlap.

Two types of cards were selected as containers in the application: one which is actionable and acts like buttons, and the other, just readable

Atoms and Molecules

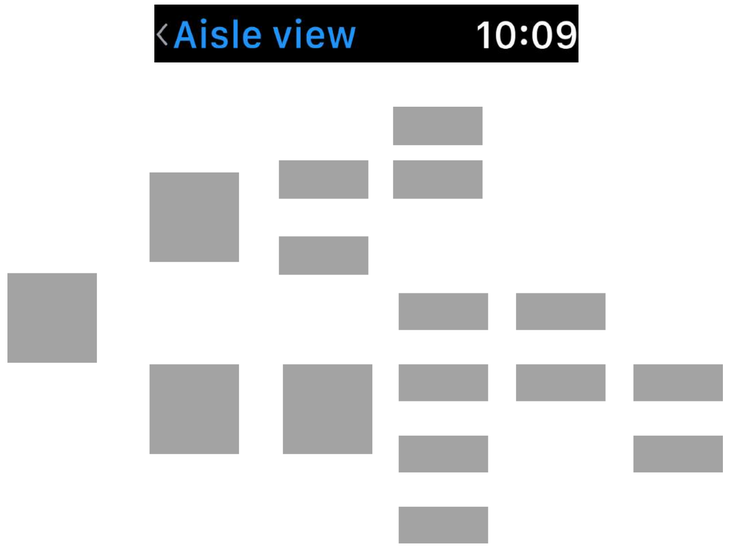
Navigation

While drawing up information architectures and the wireframes, we iterated with the following navigation systems to decided what would be most optimal for the app: Hierarchial, page based and linear

Hierarchial Navigation (scrapped)

This system of navigation would be used in flows which require the user to backtrack to the previous screens, or flows whi provide the user multiple options to branch out to which can be returned to. This level of complexity was not favourable in our case.
Through our app, we wanted users to take minimal time in completing functions, and wanted to minimize the chances for confusion.

Hence we decided to establish a linear flow



Hierarchial navigation systems were scrapped as they posed too much confusion in their flows and we wanted lower complexity

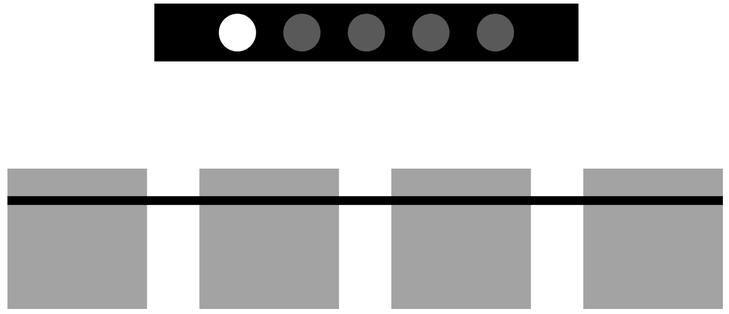
Atoms and Molecules

Navigation

While drawing up information architectures and the wireframes, we iterated with the following navigation systems to decided what would be most optimal for the app: Hierarchial, page based and linear

Page based Navigation (scrapped)

This system of navigation would be used in flows which have multiple pages that were peer to each other.
We tried incorporating this system of navigation for screens showing product requests, but decided on list view for consistecy and quick movement through the items.



Page based navigation system was scrapped as we had different requirement for the screens and flows we were designing for

Atoms and Molecules

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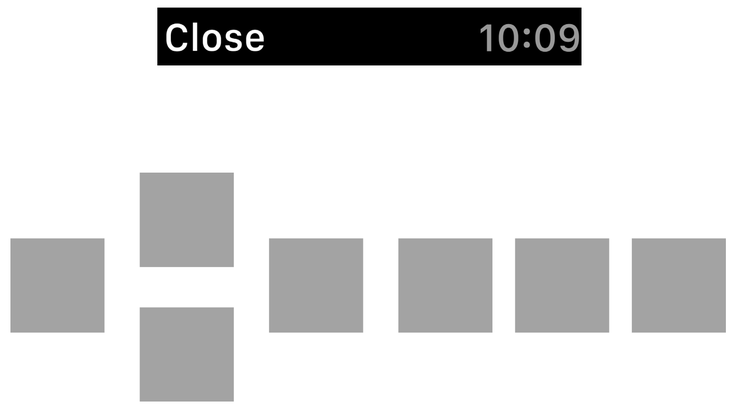
Modal Page Navigation (Chosen)

The chosen system of navigation was the Modal Page navigation system. This offers a linear flow, which encourages users to complete a self-contained task that cannot be navigated away from until the task is completed or cancelled.
This way we designed each user flow such that the user need not have to backtrack at any point and would either see the task to completion or just cancel to the main page, minimising time wastage.
Here every new page has a cause and action relationship with the previous one, and the only return function, ‘Close‘ takes you back to home page.

The only inconsiteny in this system arises when the app raises confirmatory actions, where the user can choose to go back, but this return option is presented as a separate button.

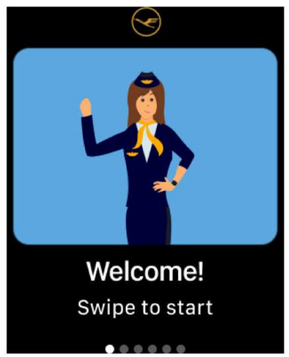


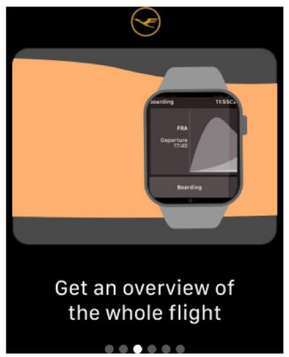
Modal pages were chosen as for air crew members, we needed to design flows in such a way that they are completed quickly and efficiently

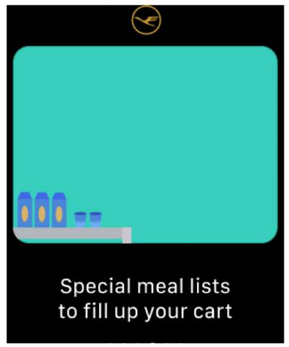
Atoms and Molecules

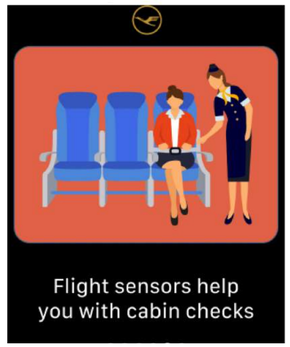
Onboarding

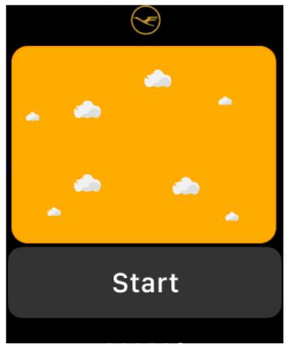
This is a type of application that currently does not exist in the market. Its functionalities are new and not used before. And hence, we found it necessary to add onboarding screens which exlplain the functionalities of the app and how air crew members can use it to make their processes more efficient.
Microanimations were used to make the onboarding screens to give the air crew members a more holistic understanding of the app.





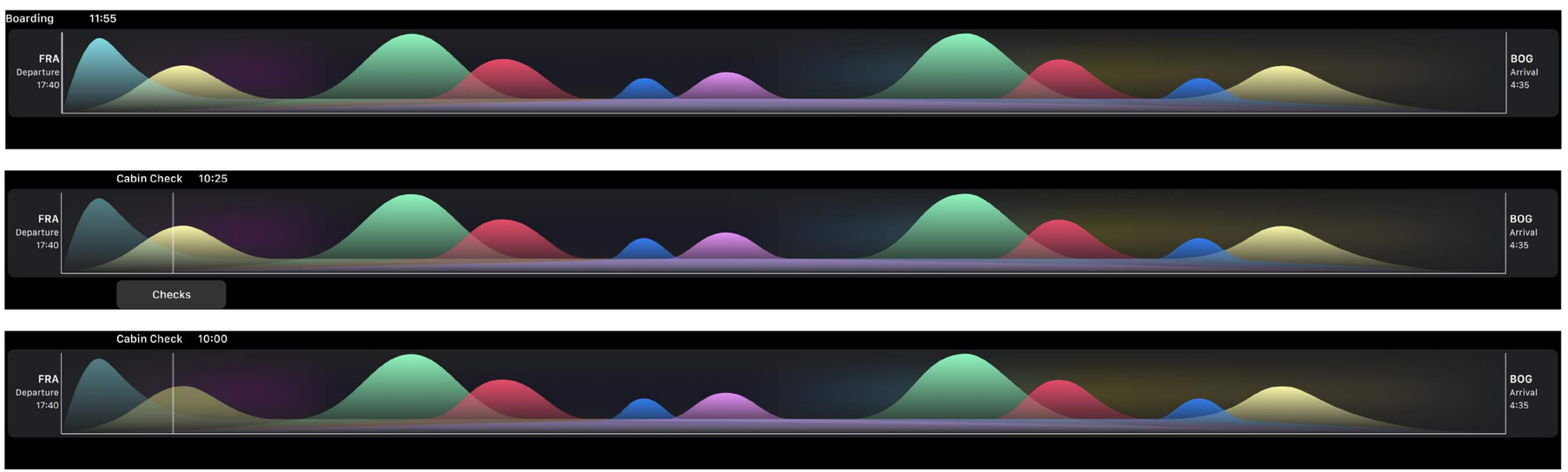






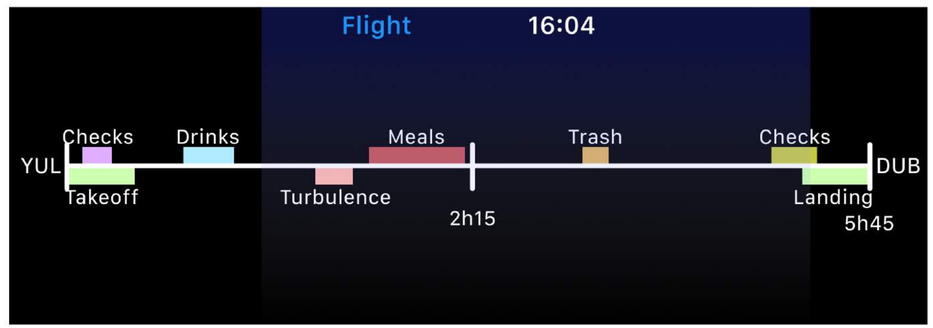
The Timeline

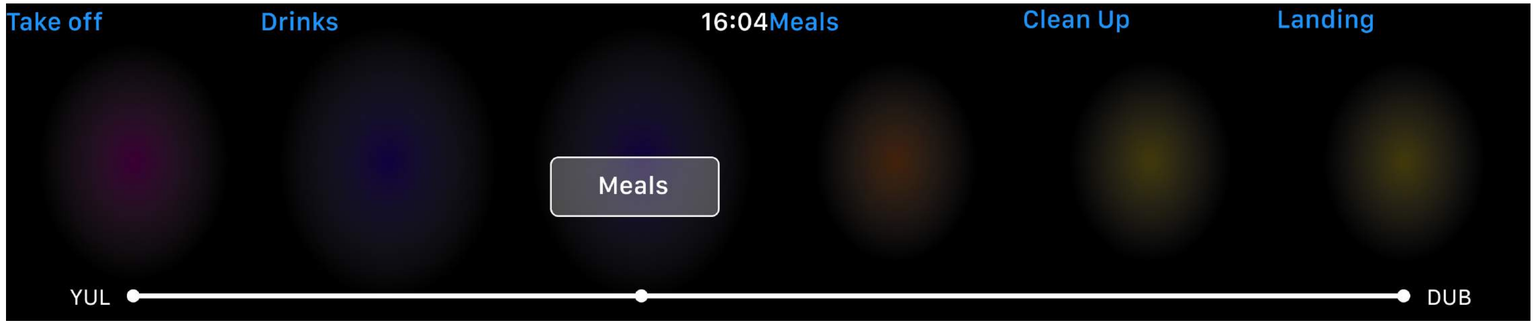
We inititally were tinkering with a menu screen, which would give the user the option for all the tasks. Soon we realized that the tasks that the air crew had to do during a flight were all on a time basis, and hence it doesn't make sense giving a menu which offers a free choice of choosing a task.
Moreover, we alson wanted to incorporate the Glanceable feature and show the status of their work and flight in one glance.
Combining them both, we decided to scrap the idea of having a menu sreen, and to have a time based app, which constantly displays a timeline of your work and task, and as the time for a task comes about, the task pops up in the timeline. After the completion of the task, you come back to the timeline.



The Timeline

These are a few iterations for the design of the timeline

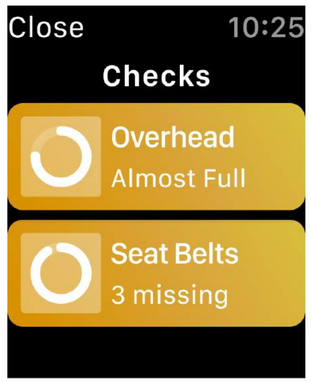


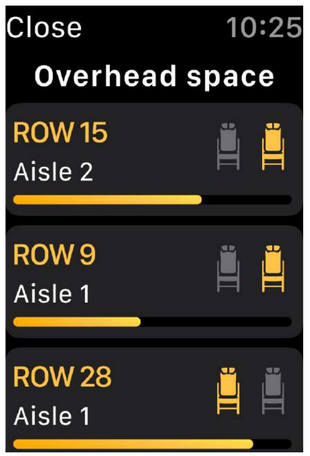


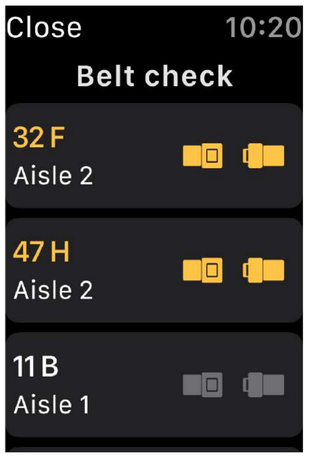
Flows

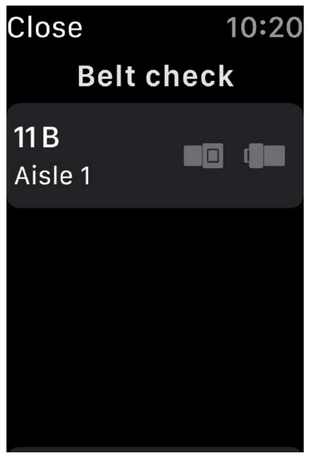
Checks

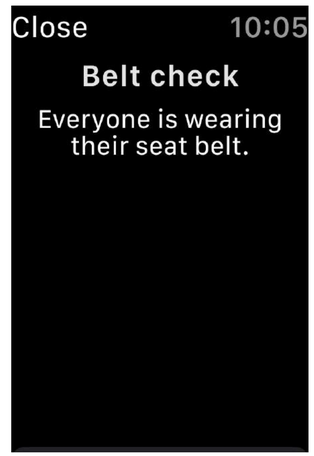
This particular flow helps air crew members know which are the closest overhead luggage compartments which have space, so that they can direct passengers accordingly, and it also tells them if a belt is unbuckled at any point of time.





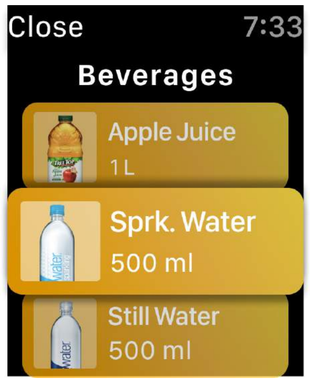


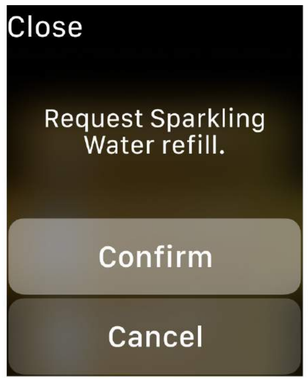


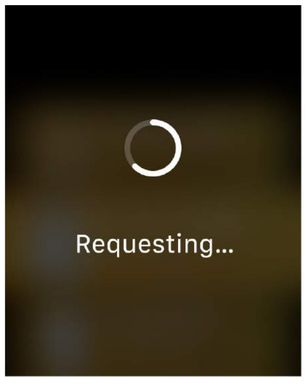


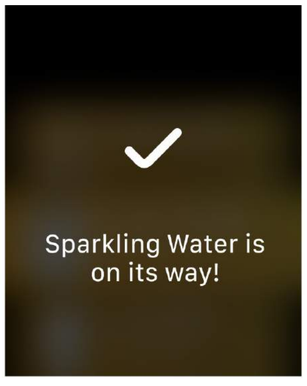
Refill requests

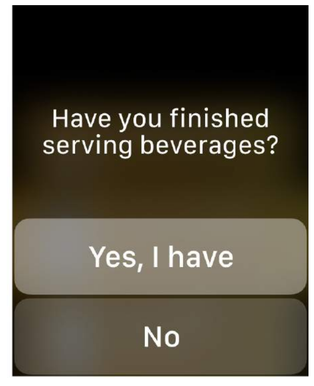
If during meal service or beverage service an air crew member runs out of a particular item, he/she can quickly browse through the list of items and request for it. The request goes to the nearest crew member. The list items are populated based on the most recently requested ones.







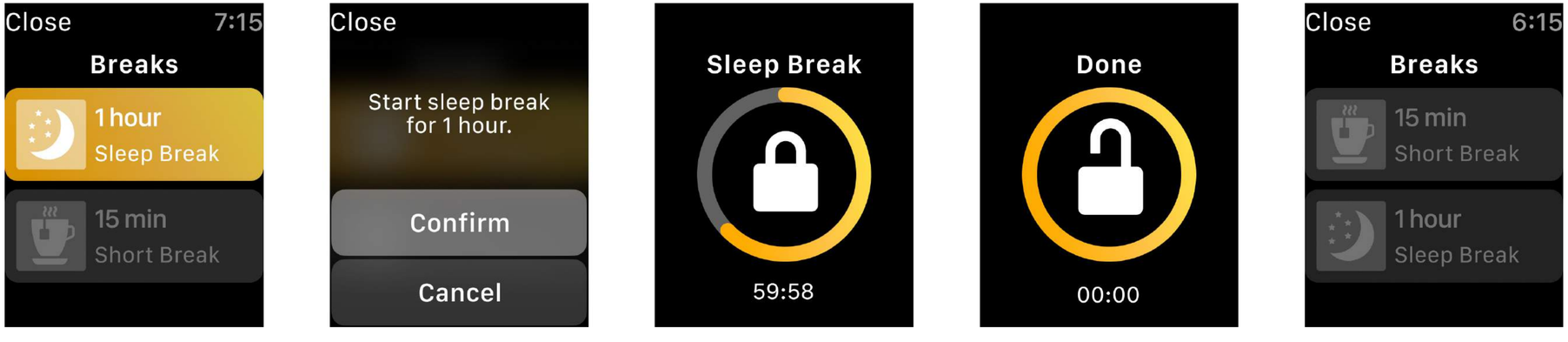




Flows

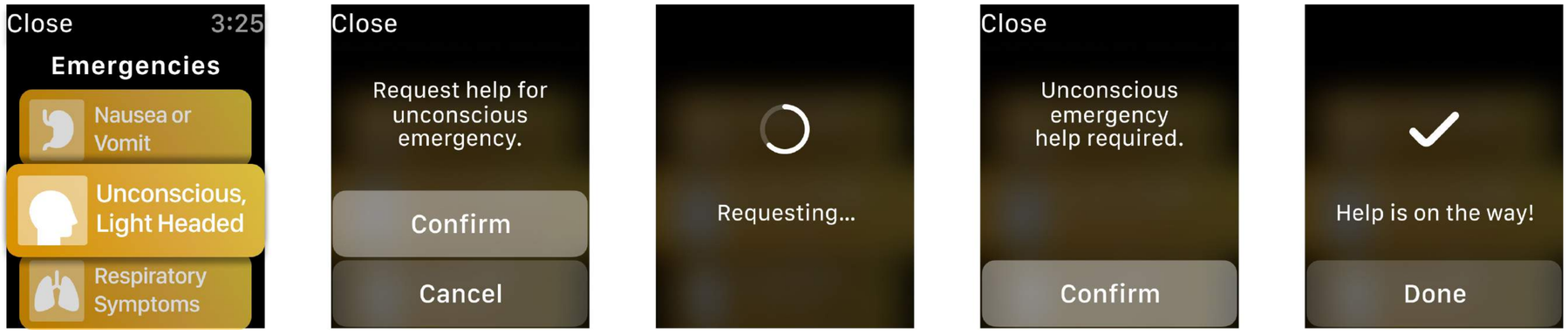
Breaks

Each air crew member is allotted a few breaks in flight. These can be activated through the app. Activating a break will disable all notifications and functions and lock the app in the break mode



Emergencies

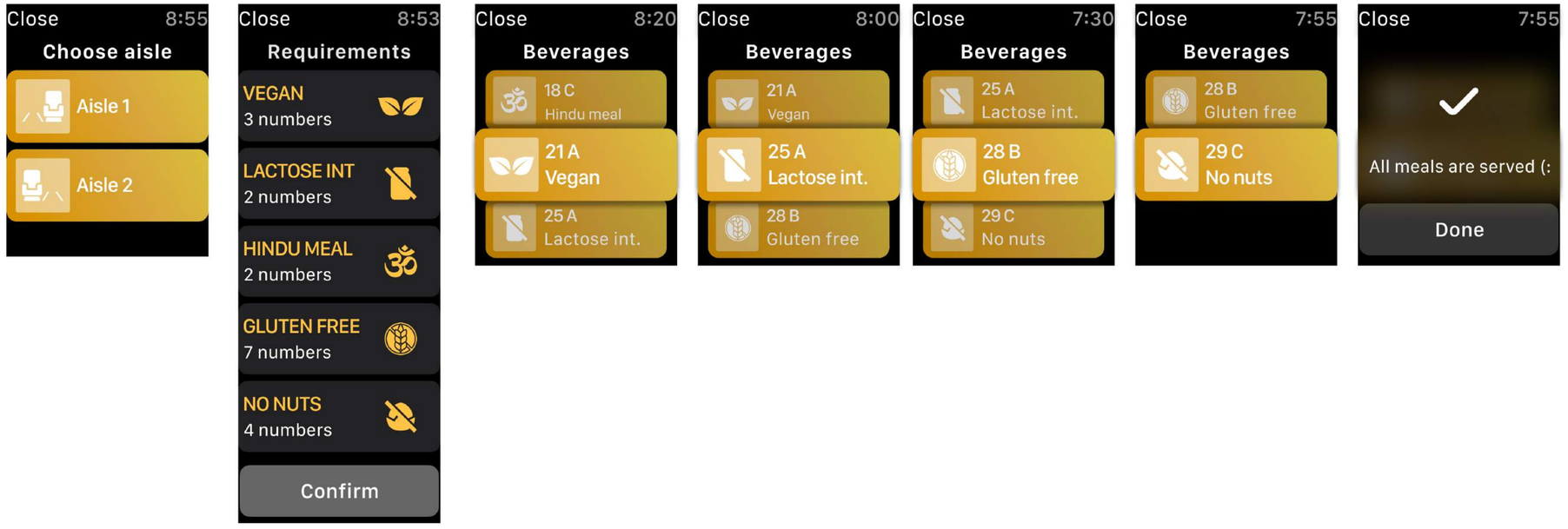
In case of a medical emergency, instead of causing a chaos trying to draw attention, a single hard tap on the app will open up the emergency screen, and choosing the emergency will alert all the other crew members of the location and emergecy, so that they can readily react and bring supplies



Flows

Meals

The air crew member can select the aisle they are about to serve in and see the required number of special meals in that aisle, so hat they can fill their trays with that many of them. After they start the service, their local GPS is tracked and the next nearest special request is shown on their screen. This list automatically updates as they move with their trays



Final application

https://www.figma.com/proto/QDa0I0pcILlerY8RRTXf8N/Air-Crew?node-id=316%3A2476&viewport=435%2C566%2C0.7312001585960388&scaling=scale-down

Click on this link for the complete click through prototype.