

TASK TWO EVALUATION REPORT

**DECO2200 Interaction
Design**

10/10/18



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TASK TWO

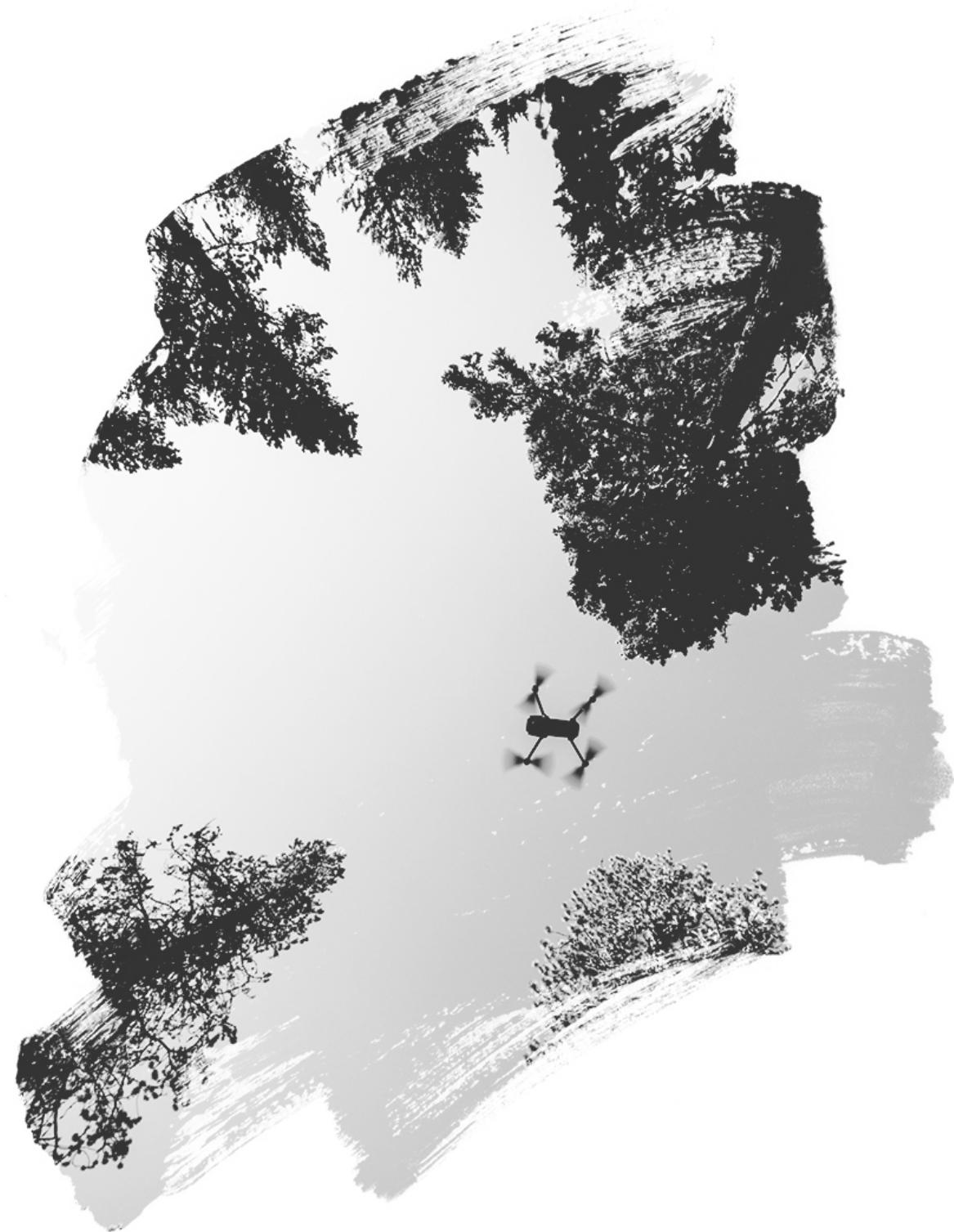
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DRONE DELIVERY CONCEPT OVERVIEW

CONCEPT OVERVIEW

Our concept involves the development of a drone delivery service which tackles the frustrating delivery experiences of apartment residents. Our research revealed that residents wanted a delivery service that is flexible, convenient, and secure. Our solution will be the design of a mobile application.



APARTMENT DELIVERY FINDINGS

PROBLEM STATEMENT

HOW MIGHT WE create an apartment delivery experience that is reassuring and convenient for apartment residents?

USER NEEDS

- I need to know that my parcel is securely delivered
- I need to know accurate, real-time status of my parcel/delivery
- I need options to fit my schedule
- I need my parcel delivered directly to my apartment



IDEATION

IDEA ONE

CONCEPT OVERVIEW - BALCONY IDEA

The first idea that was developed involved a drone delivery service to apartment complexes with the drones landing and dropping parcels off on balconies where possible. Alternative locations on the apartment complex could also be chosen for the drone to land. As autonomous drones can be deployed anytime this service can offer precise delivery times with the option to arrive outside of business hours to give customers flexibility.

This concept assumes autonomous drones operating with existing apartment infrastructure

PROS

-This delivery service gives the user flexible options to fit around their schedules. The drone is capable of arriving outside 9am-5pm working times and can arrive within a small time window (~15-20min)

-The drone delivers straight to the apartment, where possible straight to the customers balcony.

-Via the phone App it provides real-time tracking of the drone as it flies to deliver your parcel.

-Since customers can have the option to scan the drone in order to receive their parcel, it provides a good degree of security.

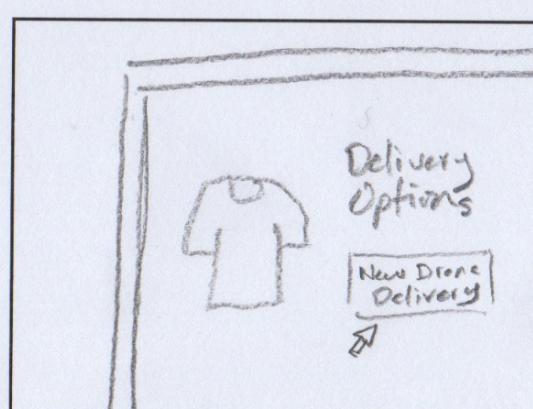
CONS

-Potentially an issue with cross platform performance. i.e. if a user does their online shopping on a desktop will they also need a phone App in order to complete the delivery when the drone arrives i.e. scan the parcel?

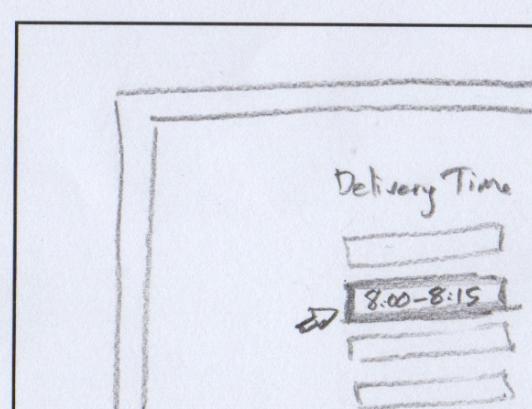
IDEATION - IDEA ONE



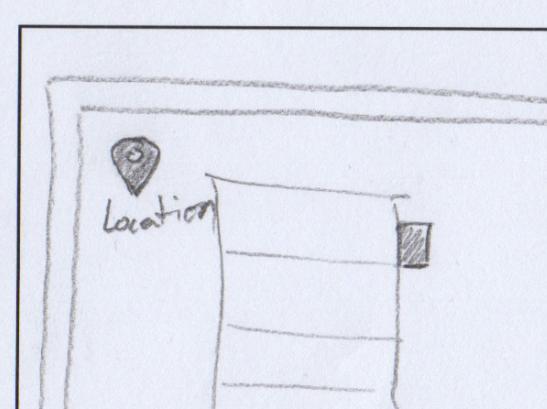
Bob, 31, decides to do some online shopping during his lunch break. He finds this really nice jumper that he likes is on special and decides to buy it.



As he works a 9am-5pm he is never home at his apartment to receive the delivery so he decides to try the new autonomous drone delivery option.



Bob selects the 'same day delivery' option and decides to select the 8:00-8:15pm delivery timeslot as he knows he will definitely be home at this time.



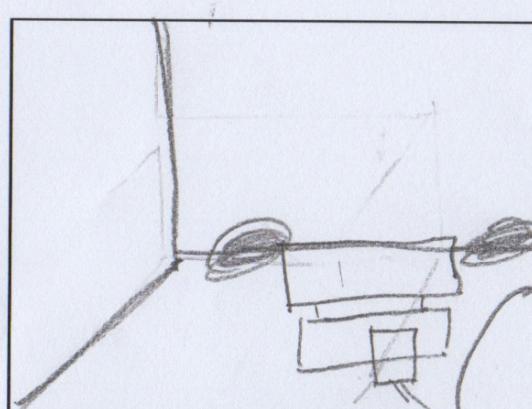
After this he selects the delivery drop off location at his apartment complex to be his balcony for convenience sake.



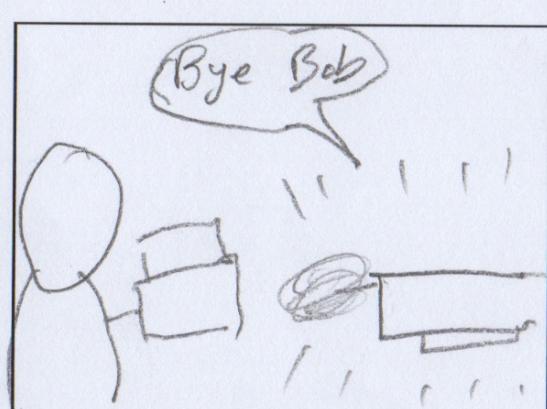
At 7:50pm while Bob is relaxing at his apartment he gets a notification on his phone that the drone has been dispatched and is scheduled to arrive at his apartment at 8:05pm. In the delivery App he can track it's movement in real-time and see the estimated time of arrival.



At 8:04 his phone receives a notification stating that the drone is preparing to land. He looks out his balcony window and sees the drone landing. The drone has caution lights on as it lands and the App and Drone cautions Bob to stay clear.



Once landed the drone's voice activated system asks Bob to use his Phone App to scan the drone for it to unlock his parcel. The phone App also provides the instructions. Bob does so happily and the package is unclipped from the drone.



The drone waits 90 sec for Bob to pick up the parcel and move away from the perimeter of the Drone before it begins its takeoff sequence. Here it notifies Bob that it is leaving and hopes he enjoys his package. The App encourages Bob to stand clear as well.

IDEATION

IDEA TWO

CONCEPT OVERVIEW - KIOSK IDEA

This concept envisions that apartments now have a delivery bay that drones can delivery parcels to. Once the parcel has been dropped off it is stored in a central location at the apartment and accessed via a kiosk. A user would be notified and pick up there parcel at any time from the kiosk after it has arrived.

This concept assumes autonomous drones operating in the future with apartment infrastructure adapting for drone technology

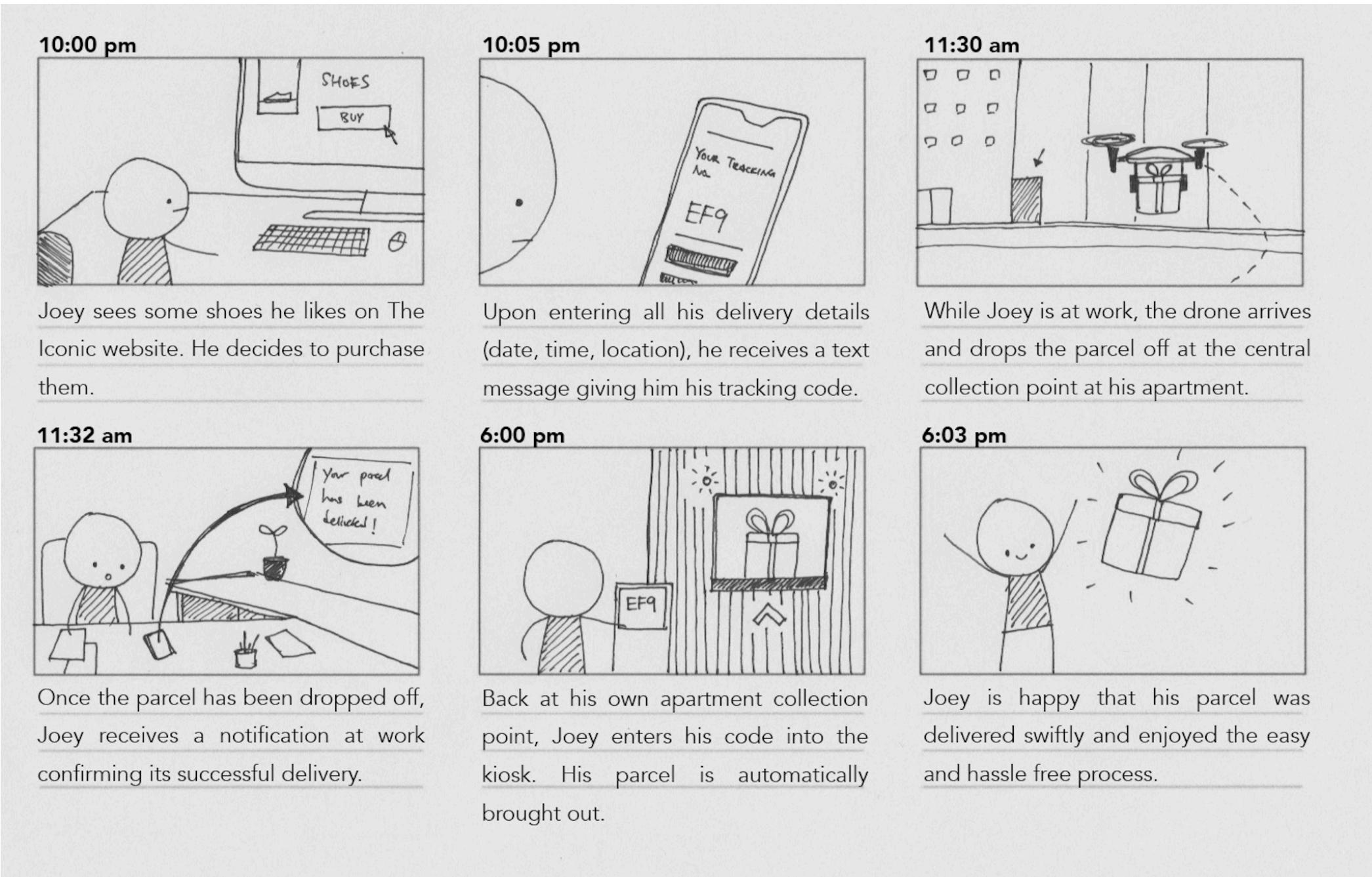
PROS

- Convenient delivery time (no need to be there in person)
- Small number of steps (easy use)
- Potentially easy for returns as well
- Unique tracking code and verification procedure - sense of security

CONS

- Requires changing building infrastructure across multiple apartments to use service

IDEATION - IDEA TWO



IDEATION

IDEA THREE

CONCEPT OVERVIEW - CHUTE IDEA

This idea imagines that due to drone technology apartments have chutes built into each individual apartment much like personal letterboxes. A drone is able to fly to the appropriate chute and drop the parcel off which is accessed on the inside by those living in the apartment.

This concept assumes autonomous drones operating in the future with apartment infrastructure adapting for drone technology

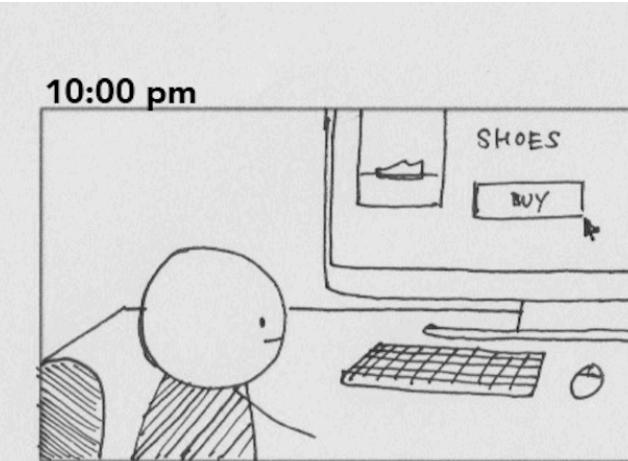
PROS

- Convenient delivery time (no need to be there in person)
- Small number of steps (easy use)
- Convenient - delivered straight into house

CONS

- Requires changing building infrastructure across multiple apartments to use service
- Security concerns in the event of mistakes (e.g. delivered to wrong house, tampered packages)
- Unable to use service for returns

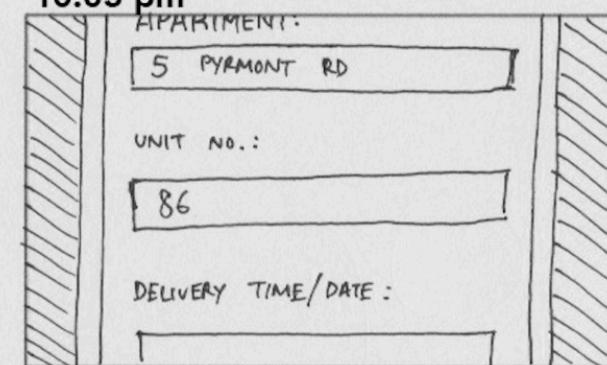
IDEATION - IDEA THREE



10:00 pm

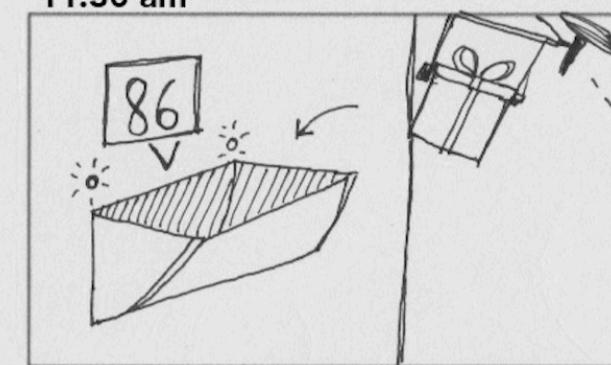
Joey sees some shoes he likes on The Iconic website. He decides to purchase them.

10:05 pm

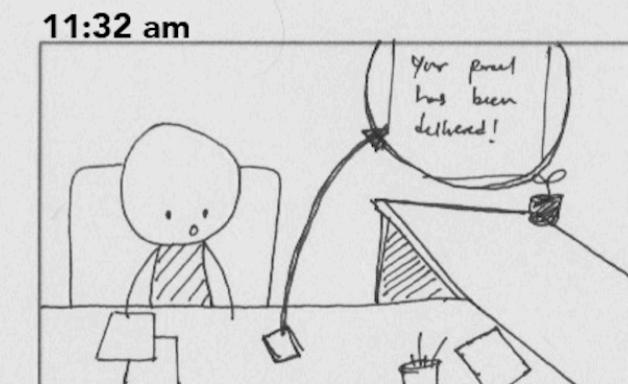


Joey enters his delivery details and specific unit number in his option for "drone delivery".

11:30 am

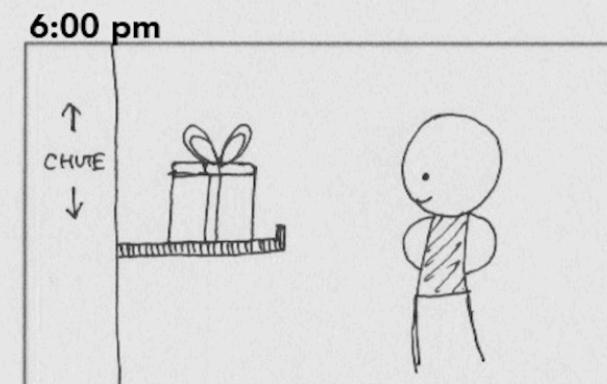


While Joey is at work, the drone arrives and drops the parcel off into his specific chute connected to his unit.



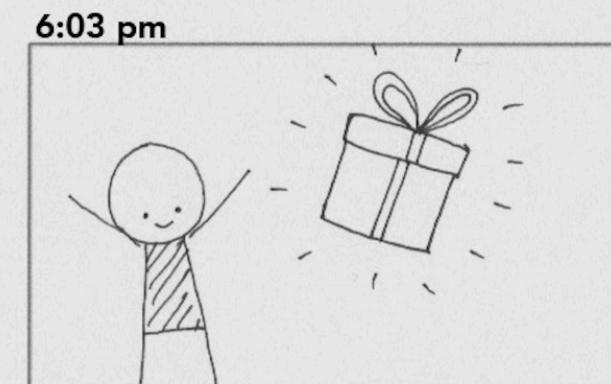
Once the parcel has been dropped off, Joey receives a notification at work confirming its successful delivery.

6:00 pm



Back at his own unit, Joey opens his chute door (like a high-tech mailbox), to find his parcel where it should be.

6:03 pm



Joey is happy that his parcel was delivered swiftly and enjoyed the easy and hassle free process.

IDEATION

CHOSEN IDEA

IDEATION EVALUATION

After evaluating our concepts it became apparent that there were too many hypothetical variables associated with the ideas that involved altering the infrastructure of apartments.

For example if apartment infrastructure had changed to accomodate drone technology is it possible to image that all apartments would be capable of this? What about previously built apartments that were not designed for drones, would our solution have to accomodate for traditional apartments as well?

To avoid the various array of escalating hypotheticals we chose Idea One as it assumed autonomous drones operating and existing with apartment infrastructure as we know it.

CHOSEN IDEA

Idea One - Balcony Idea

IDEA ONE RECAP

Idea one envisioned customers having the ability to have drones land on their apartment balconies and drop off parcels. As drones do not require to work strictly between 9am-5pm it would provide people with more flexibility and mean they don't have to leave their apartment to receive a delivery similar to how people in houses receive deliveries today.

INFORMATION ARCHITECTURE

In light of storyboarding Idea One we realised that the customers experience could be broken down into four distinct stages. Through affinity diagramming we were able to develop the Information Architecture model by developing all the information the user would need at each step of their journey.

Delivery Options

Firstly the user would be purchasing a product on an ecommerce platform and would be required to enter their delivery options. Our service would integrate into ecommerce sites as a third party, much like Paypal, Afterpay etc.

Ordering
Item/s

Selecting
Delivery
Options

Selecting
day

Selecting
time

Selecting
location

Tracking Delivery

The second stage occurred once they had paid for their product but before it had arrived. During this waiting period the user would want to be updated on the tracking status of their delivery.

Tracking
Delivery

Delivery
Reminder

Reschedule
Delivery

Track
location

Delay
notification

Change
day

ETA

Change
time

Drone
dispatch
notification

Change
location

Tracking
no.

Drone
identification
no.?

Receiving Delivery

The third stage was when the delivery drone has arrived at the apartment and the interaction that takes place between the drone and customer in order for them to receive their parcel successfully.

Receive
Delivery

Arrival
alert

Parcel
Sign off

User is
present

User is away,
request
reschedule

Notification
for drone to
leave

User is away
but ok for
drop off

User not
responding

Post Delivery

The fourth and final stage is after the delivery has occurred.

Rating

Returns

Ordering
Issues

CONCEPT DEVELOPMENT

DELIVERY LOCATION

A unique issue that arose due to the autonomous nature of our drone delivery service was that a simple residential or postal address was no longer good enough in order to set the delivery location. With drones there are exciting new possibilities such as being able to have parcels delivered straight to your balcony. However we needed to drastically rethink how and when a user could do this. As we were creating our sitemaps and figuring out the user flow we had two different ideas about when the user should be required to go through the slightly longer process of selecting the exact location of their delivery. This formed the basis of our two different concept ideas.



CONCEPT 1 & 2

CONCEPT 1

Selecting “specific” location before confirmation of purchase



CONCEPT 2

Selecting “rough” location before confirmation of purchase and “specific” location just before arrival



LOW-FIDELITY SKETCHES

DELIVERY LOCATION

As there was no design precedent for selecting the precise delivery location for an apartment complex and apartment balconies we developed a number of initial ideas through sketches and evaluated them.

Chosen

IDEA ONE - APARTMENT VISUAL

Pros

- Highly visual interface
- Simple interactions
- Limits user freedom to select valid options only

Cons

- Perhaps too many screens, address results not needed
- No map to show geographical location

IDEA TWO - GOOGLE MAPS PIN LOCATION

Pros

- Connects delivery location to a map interface

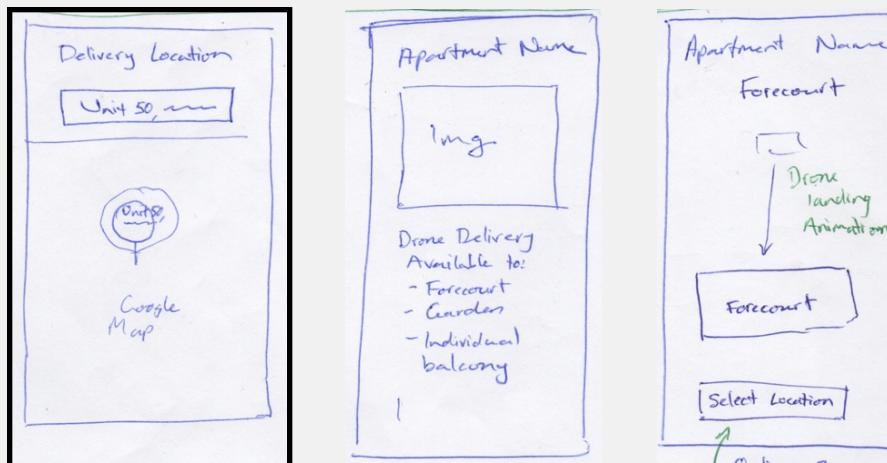
Cons

- Apartment balconies are often on top of each other i.e. level 1, 2, 3 etc. and thus have the same pin location
- A pin can be moved anywhere and this gives user too many options

LOW-FIDELITY SKETCHES

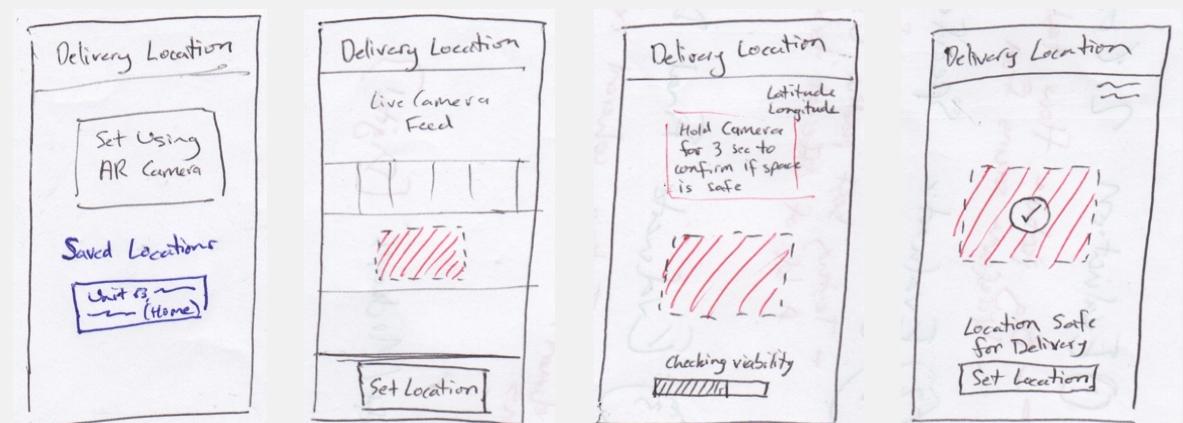
DELIVERY LOCATION Continued

IDEA THREE - VARIANT GOOGLE MAPS PIN



Chosen

IDEA FOUR - AUGMENTED REALITY



Pros

- Connects delivery location to a map interface which provides geographical context

Cons

- Apartment page not as visually clear as Idea One

Pros

- This felt like an easy and intuitive way to scan a location and see if there was space for the drone to land

Cons

- User would need to be present in their apartment when selecting the delivery location
- Can only work on smartphone not on responsive web application

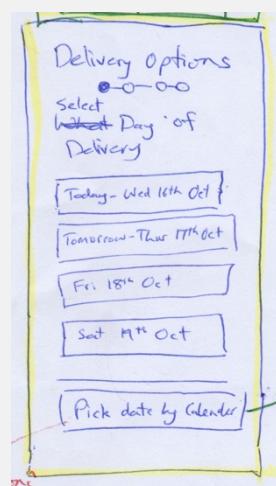
Conclusion - We decided to use a combination of Idea One and Idea Three. We took the geographical map from the first screen of Idea Three as it communicated more than a stand alone form input and combined it with screen 3 & 4 from Idea One which provided a clear mental model of selecting your apartment.

LOW-FIDELITY SKETCHES

SELECTING DAY

Autonomous delivery drones provide far more options in regards to the time of your delivery especially in comparison to the traditional message that “your parcel will arrive within 3-5 business days.” We had to rethink how this would work for the user in terms of selecting the day of delivery.

IDEA ONE - APARTMENT VISUAL



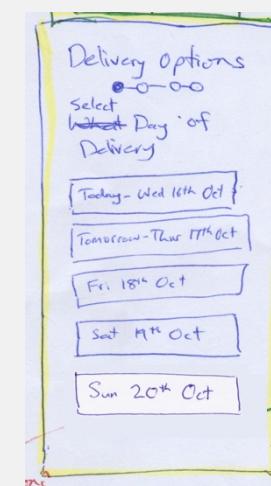
Pros

- Button options for the next few days easy for the user to conceptualise and select

Cons

- The secondary calendar has drawbacks as it allows user too many options

IDEA TWO - GOOGLE MAPS PIN LOCATION



Chosen

Pros

- Button options for the next few days easy for the user to conceptualise and select
- Provides more options than the next 4 days

Cons

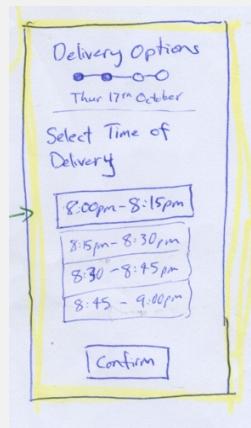
- Can only order to get something delivered within the next week, most people ordering however want it to arrive asap

LOW-FIDELITY SKETCHES

SELECTING TIME

As stated before due to the nature of drone delivery and the fact that they are transporting individual deliveries the time you want something delivered becomes a bigger factor. Since autonomous drones are not restricted to working between traditional business hours there a lot of time options and selecting this needs to be intuitive for the user.

IDEA ONE - INPUT FORM



Pros

- Quickly gives user freedom to select any time

Cons

- User has to type time using keyboard

IDEA TWO - iOS CLOCK



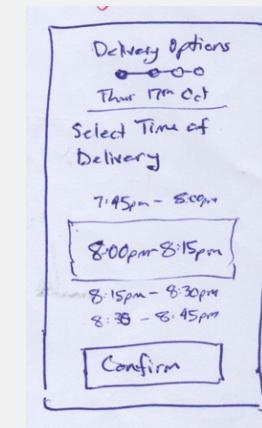
Pros

- User familiar with UI pattern

Cons

- Delivery time is between time interval, say 10:15-10:45, and UI is unable to communicate this

IDEA THREE - SCROLLABLE Chosen



Pros

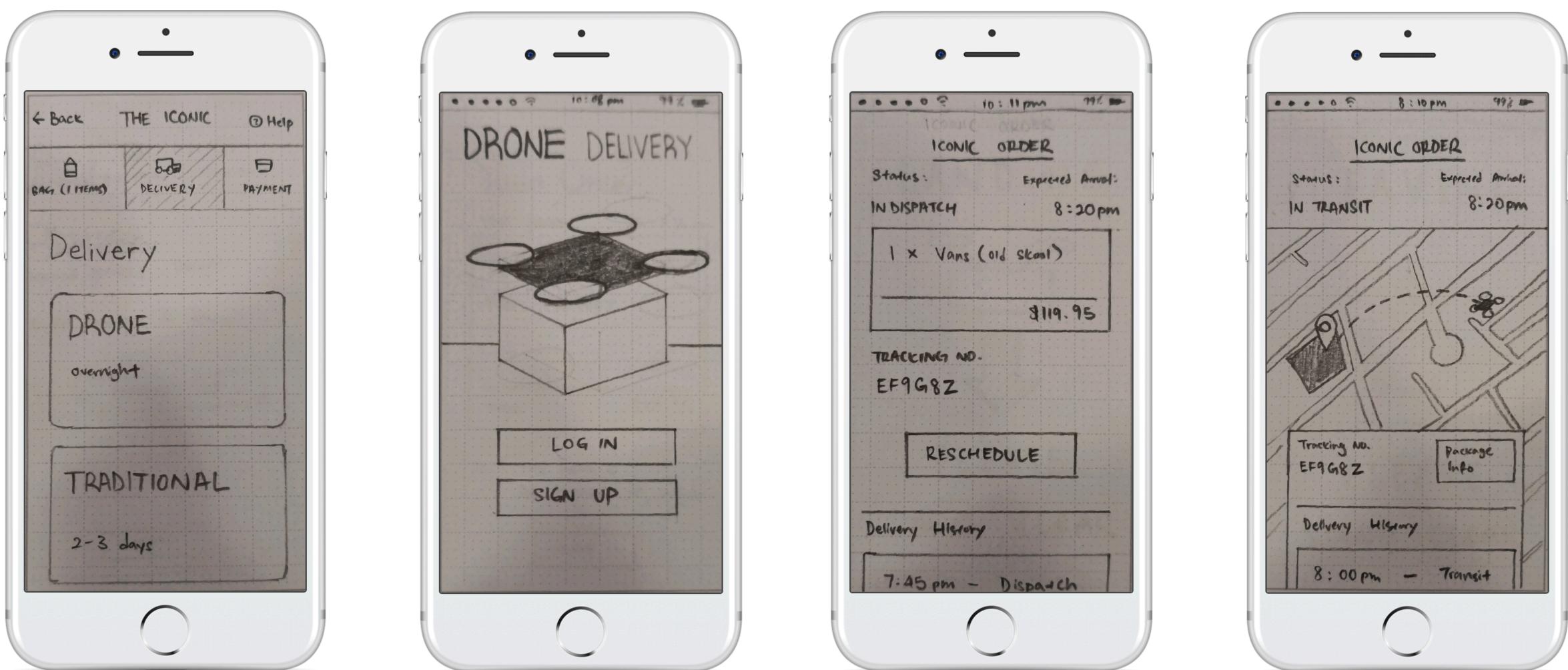
- Easy to read and understand time intervals

Cons

- Due to number of time intervals it could take a while to scroll to all options

PAPER PROTOTYPES

After doing low fidelity sketches for all screens of our app and doing some preliminary evaluations to choose what UI elements we felt worked best we created paper prototypes. These were done for all the main screens for both Concept 1 & Concept 2. We took photos of the paper prototypes and put them in the Marvel/Pop app thus adding clickable hotspot links so that the user could click through to gauge the difference between Concept 1 & Concept 2. This was done as it would be our prototype for the first round of user testing.



USER TESTING 1

GOAL OF TEST 1

To discover at what point it is better to place the in depth delivery location selection. Should it be earlier on during the purchasing stage [Concept 1] which is common in today's ecommerce platforms? Or should it be during the set up of the App itself [Concept 2], as a means to 1) make purchasing quicker and 2) give more reason to onboard the user to the App?

METHOD - USABILITY TEST with THINK ALOUD & OBSERVATION

How

We set the users a number of tasks to perform with the paper prototypes we had put on the Marvel app based on the expected functionality of the drone delivery app. One set of users tested Concept 1 first and then performed the same set of tasks with Concept 2. The second lot of users started with Concept 2 and then went on to use Concept 1. As they were performing these tasks we encouraged them to use the Think Aloud protocol and verbalise their thoughts, feelings and frustrations. On top of this we observed how well they were completing these tasks and whether they had any difficulties or if their actions were contradicting their verbalised thoughts. Once they had completed the tasks we asked a few semi-structured interview questions aimed at getting the user to reflect on their experience.

Why

We created this test as it is important to see that the mental model that the users develop when looking at the user interface is in fact the same as the one that we perceived when designing the interface. If this is not the case the UI will be confusing, unintuitive and ultimately unsuccessful. This can be determined by how successfully the users are able to complete the tasks that we set them.

Tasks Set

- Place an order for a drone delivery to an apartment
- Track your order when it is dispatched
- Receive your parcel as it is delivered by drone

(Tomitsch et al., 2018)

PARTICIPANTS

-5 participants

-Age range from 18-26

-Experience varied in terms of delivery apps, some had no experience, others a lot

-3 participants used Concept 1 paper prototypes first and then used Concept 2 prototypes

-2 participants used Concept 2 prototypes first and then used Concept 1

How we sourced Participants

Participants ranged from friends to mutual community group members. They were contacted via social media and phone.

Testing Venue

A room within the same community hall was used for all of the tests.

USER TESTING 1

TEST RESULTS

CONCEPT 1 vs. CONCEPT 2 - aka where to put the in-depth Delivery Location Set up

The loudest message was that the in-depth delivery location set up should occur earlier when the user is still purchasing the product (so Concept 1 was preferred).

There were some mixed messages about this. 2 of the users were very vocal about selecting the exact delivery location earlier whereas the other 3 users did not seem to mind either option.

"I don't like the fact that setting up [delivery location] was so late, maybe it is better with the sign up being earlier so it's easier to go through it."

"Wait but that means I've purchased [my product] without selecting my apartment address. I'm not sure if I'm comfortable with that."

Cut out some repetitive and unnecessary steps

Users felt that at points there were some unnecessary screens making certain functions take too long. These included too many confirmation and summary screens.

"I care about if the delivery will actually arrive [in relation to summary page]. But there were too many steps."

Too many 'Confirmation Buttons', need to streamline screen interactions

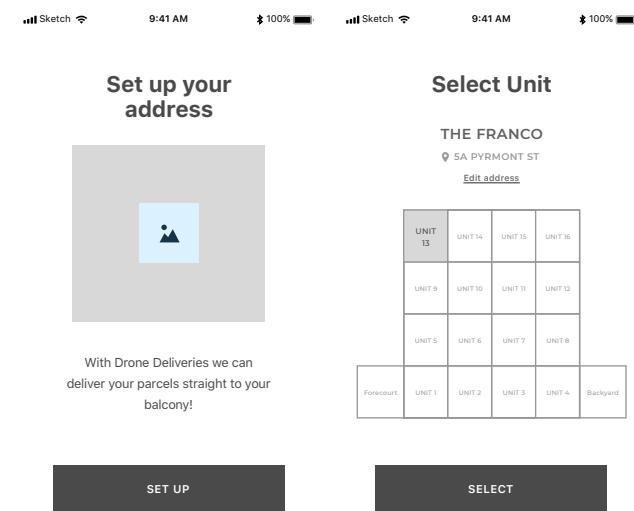
Users felt that the need to often have to press the Confirmation button to get from one screen to the next was overdone and often cumbersome. They wanted quicker and more intuitive interactions between screens were possible.

"It takes too long... I shouldn't need to press confirm every time. Why can't I just press on the apartment and that is what selects it?"

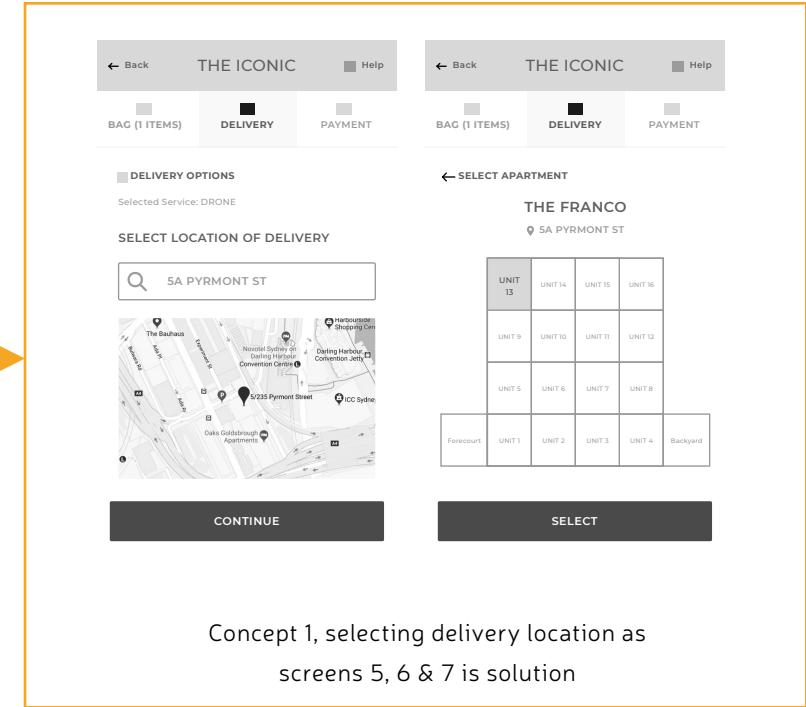
ITERATIONS // BASED ON USER TESTING 1

Selecting Delivery Location placed early on before purchasing product

This was the big take away from our first round of testing and we were glad that this issue had been resolved and we were now able to focus on other potential improvements within the UI.



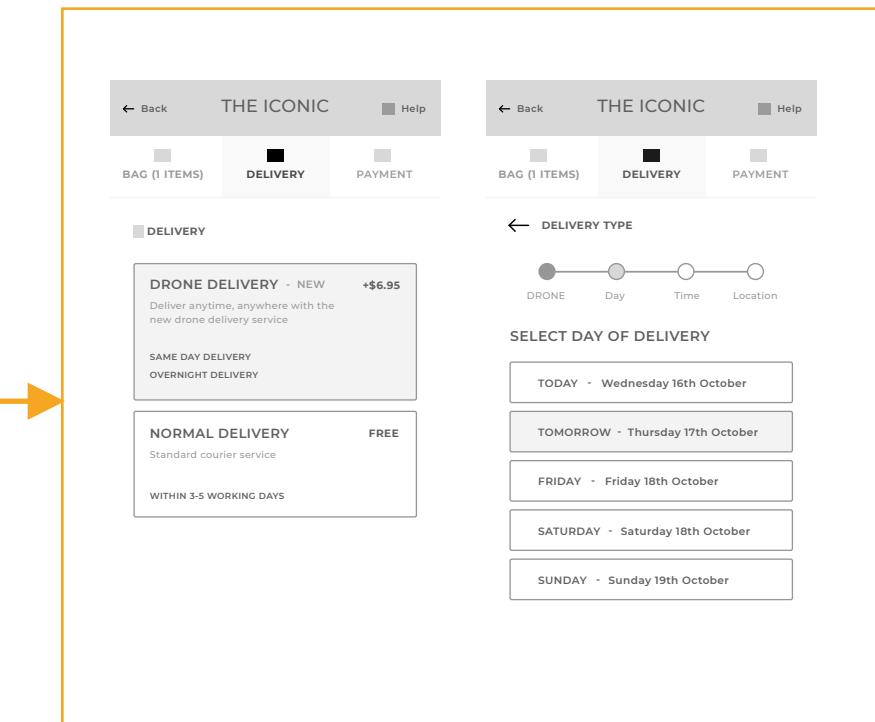
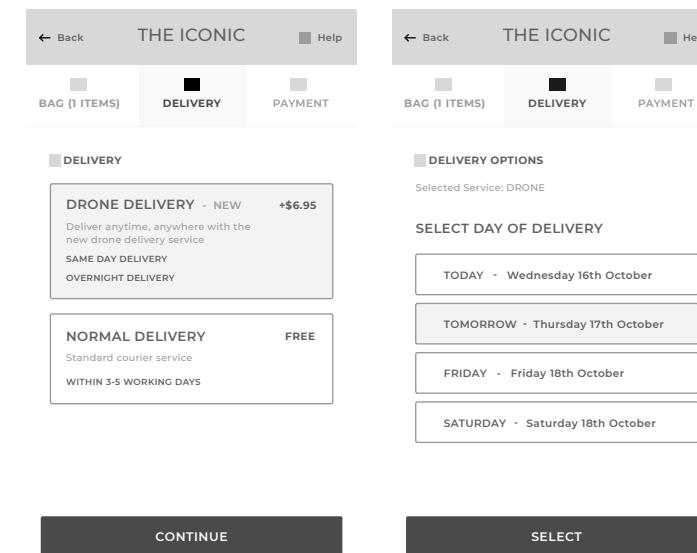
Concept 2, selecting delivery location as screens 18, 19 & 20 no longer using



Concept 1, selecting delivery location as screens 5, 6 & 7 is solution

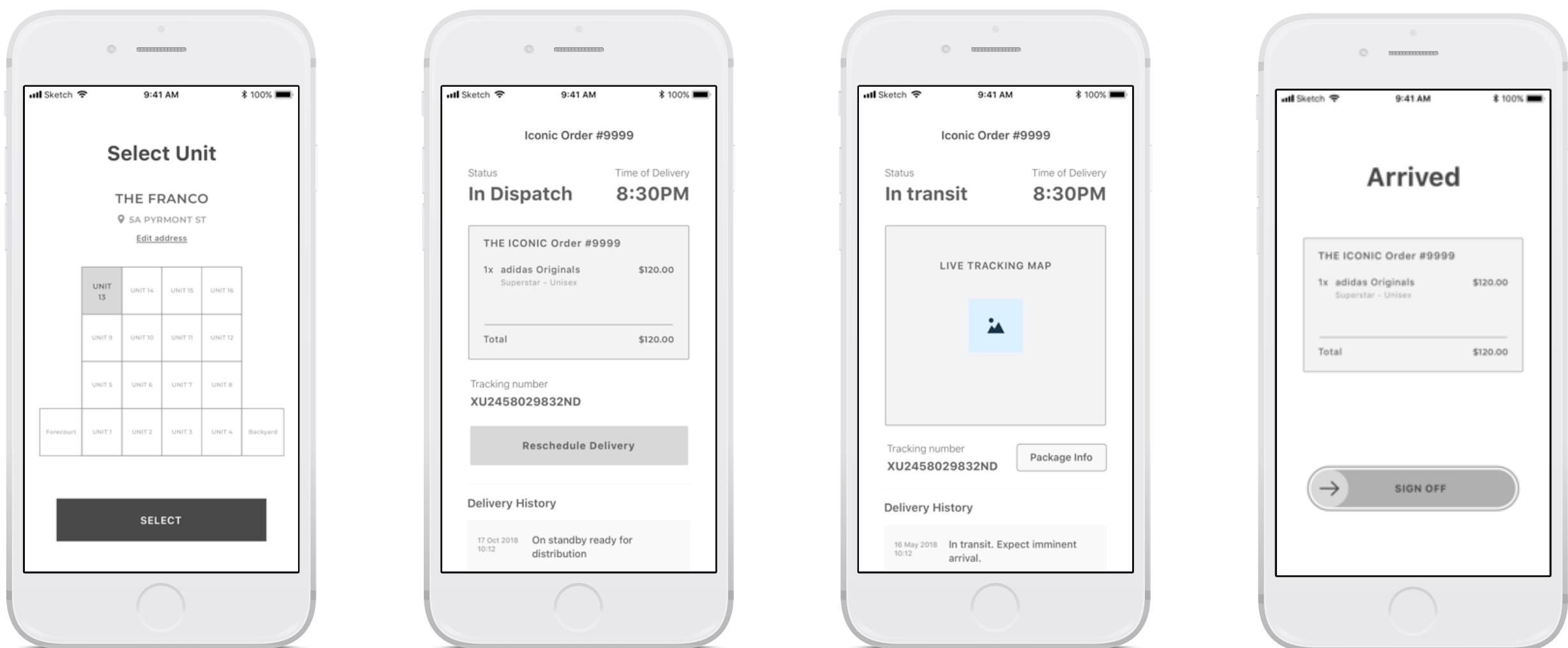
Removed some confirmation buttons

In some locations we removed 'continue' & 'confirmation' buttons and allowed the tiles & buttons to simply transition to the next screen. To compensate for the fail safe that confirmation buttons offered we included back buttons and/or a progress bar in case the user made a mistake or changed their mind.



DIGITAL WIREFRAMES

After receiving feedback from our first round of user testing we iterated on our paper prototypes to make improvements based upon the results we discovered. At this stage we chose to increased the fidelity of our prototype and created digital wireframes using Sketch. These were then added to Invision so we could create clickable hotspot links and connect all the screens. This was done so that we would have a more realistic prototype that we could completely click through for our next stage of user testing.



USER TESTING 2

GOAL OF TEST 2

At this stage we wanted to focus more specifically on the usability and intuitive nature of each screen and the UI elements and patterns that the user encountered. For example in the first test we were concerned especially with the big picture flow and when we should get the user to select the delivery location. Here we wanted to focus on their experience of actually selecting the delivery location for example and make sure this experience was coherent and simple.

METHOD - USABILITY TEST with SEMI-STRUCTURED INTERVIEW

How

We had the user complete a lot of very small functions that create the entire app experience i.e. 'choose the delivery time, choose the delivery location' and then asked them questions straight after they had completed each task. In total we broke the App into 20 different stages and asked a set of questions at each of these stages, so it was quite an in-depth process. These questions were particularly aimed at gauging their thoughts, what they liked, disliked and any concerns they had about each screen and the functions that they performed. We took notes at every point that we asked questions. After we had done this for every stage of the App we asked some brief reflection questions aimed at getting them to reflect on their entire experience and the overall flow of the App.

Iterating on our Method from Test 1

During our first round of user testing we noticed that users were having trouble with the think aloud method and actively verbalising all their thoughts. As a result we probably didn't get quite as many quality insights as we were after. To solve this problem for the second round of testing we decided to run a more structured test and planned to ask the user questions at every screen they encountered. This method was also much more appropriate for our testing goals for this round.

Tasks Set

- We broke the App into 20 different tasks/stages
- Please refer to the Appendix for the full template we created

(Tomitsch et al., 2018)

PARTICIPANTS

- 5 completely different participants from 1st round of user testing
- Age range from 19-27
- Experience varied in terms of delivery apps, some had no experience, others a lot

How we sourced Participants

Participants ranged from friends to mutual community group members. They were contacted via social media and phone.

Testing Venue

A room within the same community hall was used for all of the tests. This was the same venue we used for the 1st round of testing.

USER TESTING 2

TEST RESULTS

Users want to see Delivery Address on the first Tracking Screen

Users pointed out that the delivery location was absent from the first tracking screen (screen when the drone has not been dispatched yet). They would prefer to see this than have the invoice/parcel details.

“I don’t want to see cost of my parcel I’ve already paid for it, I want to see the delivery location like where it’s coming. I should already know that [parcel info].”

Issue with the App not being able to track multiple deliveries

The issue was raised that there is no clear way to track multiple parcels at once. This was a clear error on our part and something we hadn’t properly thought through.

“What if I have multiple deliveries at once, how would that work? How do I check that?”

Selecting delivery time issue

Users felt that there was some uncertainty about how to select the time. The scrollable option that was present was unintuitive and took too long to select a desired time.

“How do I select the time I want? What if I want a really different time? Do I really have to scroll all the way up?

Users want more time related info on the Drone Landing screen

It was mentioned that the screen that is presented when the Drone is landing shows no actual information progression about how long it takes the drone to land.

“This timing has to be precise. If you give me a warning like 3,2,1 countdown in the last 3-5 minutes it should be better.”

USER TESTING 2

TEST RESULTS continued

On the sign off screen users don't want to see the invoice of the product

Users mentioned that since they had already paid for the product they didn't want to see the cost but the focus should be on the product that they are receiving. If they see the cost again it is confusing as it almost makes them feel like they have to pay again.

"I don't want to see cost of my parcel I've already paid for it, I want to see the delivery location like where it's coming. I should already know that [parcel info]."

Certain functions within the app could still be more streamline and quicker

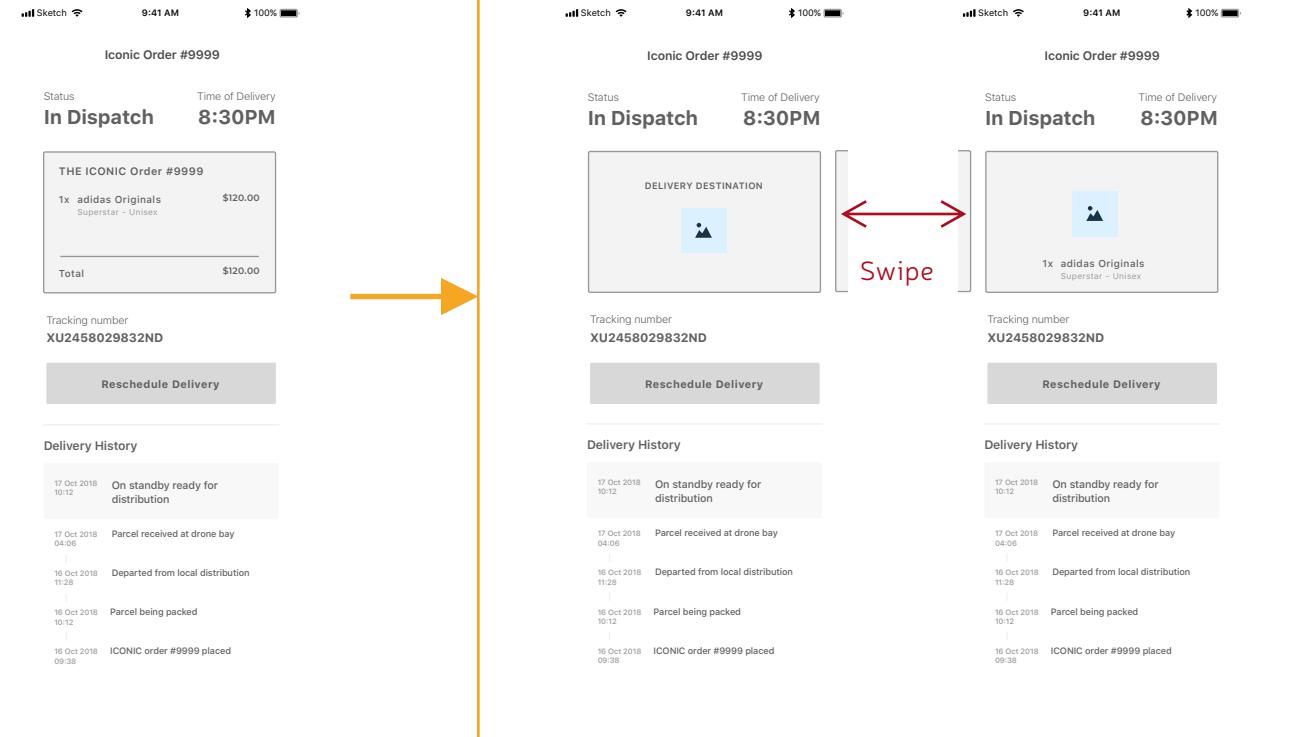
Users felt that there was some uncertainty about how to select the time. The scrollable option that was present was unintuitive and took too long to select a desired time.

"How do I select the time I want? What if I want a really different time? Do I really have to scroll all the way up?"

ITERATIONS // BASED ON USER TESTING 2

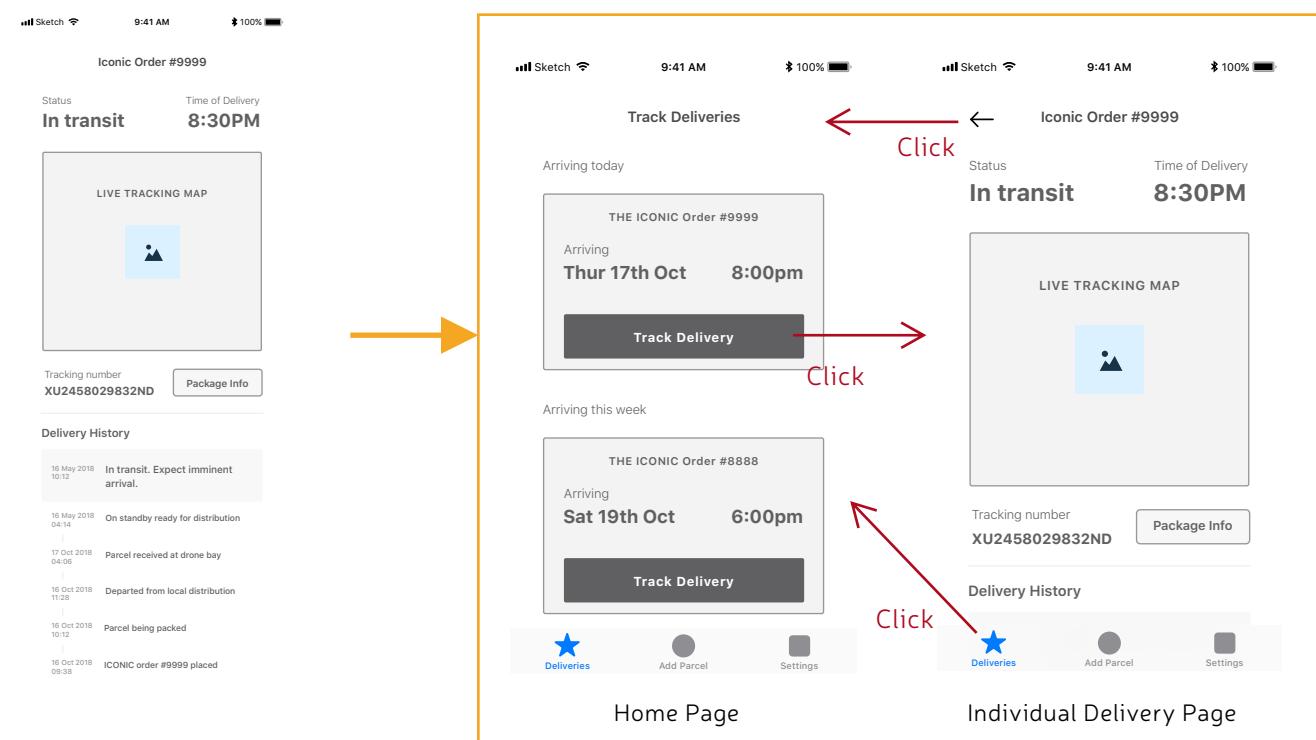
Provide Delivery Address location to first Tracking Page

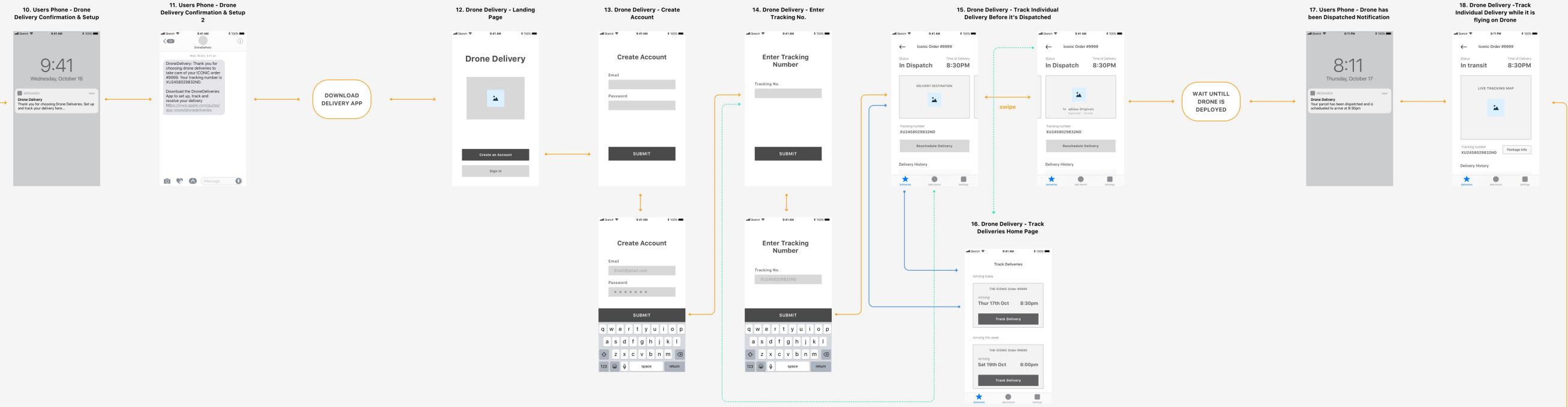
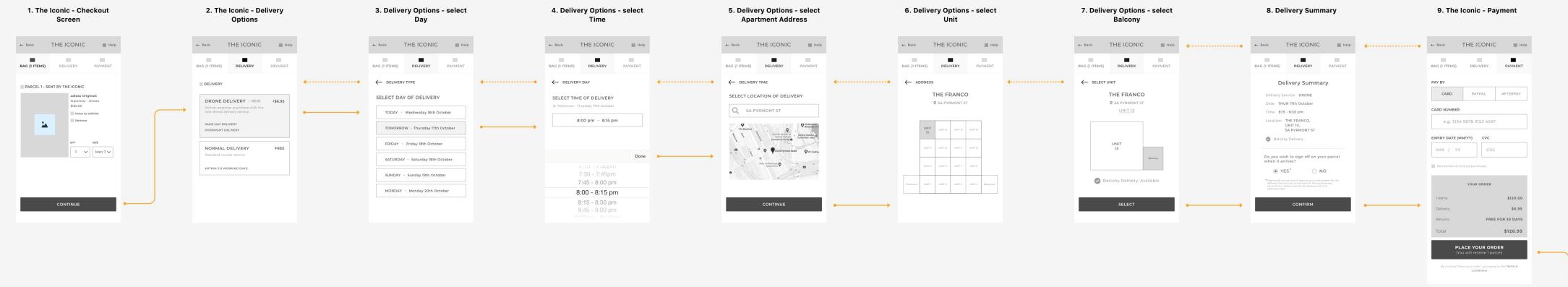
Users wanted to view the delivery address location more so than their package information. We still felt that it was important to have the option to view their package info so we wanted to keep it. We were struggling for screen real estate so decided that the user can swipe their address info back and forth to see the package info.



Tab Nav bar and a Deliveries Home Page added to App

In order to overcome the issue of our app not being able to track multiple deliveries we had to enable the user to have the option to add new deliveries and have a Deliveries home page with tiles which when clicked on contained the detailed information about each delivery.





Use Link to view close up & vectorised version of user flow:
<https://sketch.cloud/s/8p3dq/p/page-1>

FINAL USER FLOW



REFLECTION

-Our process deviated slightly from the given example, but still followed a logical and thorough progression through 3 rounds of user testing and iteration.

-During the process, we reflected and improved our method of conducting usability testing, from first round to second round (e.g. Knowing what to look out for, how we should ask questions, etc.)

-We were able to achieve this by conducting self-review sessions after major stages of the design process, which we will continue to do so in the coming stages.

-The work was delegated evenly, and we played to each others strengths. We made the most out of studio time despite our busy schedules (part-time work)

-We managed to meet the deadlines we set for ourselves at the start of the assessment; we found that having this planning stage was essential in helping setting expectations and having good time management.

-We encountered unexpected results from the second round of testing, but were able to take a step back to consult our tutor, and found a way to utilise these insights moving forward.

-The fact that we were not restricted to a particular way of carrying out the assessment made it a great opportunity to learn from our own choices and mistakes. However, it was also a source of confusion when it came to understanding what deliverables were required for the final presentation and report.



Image from <https://www.pexels.com/photo/apartment-building-apartments-architectural-design-architecture-303059/>

NEXT STEPS

WHAT WE WILL DO NEXT

- To begin Iterating on our wireframes based on feedback given during the presentations
- Creating a high fidelity interactive prototype (explore Framer)
- Begin crafting the entire simulated experience, from ordering to receiving the physical parcel
- Use the insights collected from the full experience test to iterate the prototype to its final stage
- Storyboarding video presentation



REFERENCES

REFERENCES

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IMAGES

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