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Fly with Me:
A Digital Wayfinding Guide for Personalised and Inclusive Traveller Experience in Airports

How might the use of digital signage and mobile apps complement physical airport signage to create a seamless, accessible, personalised, and interactive wayfinding experience for travellers in airports?

Master of Art & Design 2025
Auckland University of Technology

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ABSTRACT

Navigating airports can be challenging due to complex signage systems, information overload, and diverse traveller needs. This research explores how digital signage and mobile apps can complement physical airport signage to create a seamless, personalised, and accessible wayfinding experience for travellers.

The study employs visual site mapping, space mapping, and user journey mapping to analyse existing airport signage systems, identify inconsistencies, and develop a user-centred digital prototype for a wayfinding solution. Using the metaphor of the guide, the project reimagines the wayfinding experience as a supportive, context-aware assistant that helps users throughout their journey.

It highlights the effectiveness of integrating real-time data, user-centred design, and international wayfinding standards to streamline airport navigation and reduce cognitive load. This study provides insights into improving airport wayfinding by linking physical and digital navigation tools, enhancing accessibility, and informing future smart wayfinding developments.

Keywords: Signage, personalised wayfinding, airport digital navigation, user-centred design, mobile application, travel

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ATTESTATION OF AUTHORSHIP

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the Acknowledgements), nor material which, to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

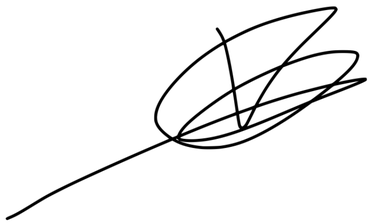

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Figure 1. Marin Virieux, 2024, Frankfurt Airport Terminal Z (FRA), Germany.

I. INTRODUCTION

This project focuses on improving wayfinding in airports by developing a digital application (app) that personalises signage and centralises key travel information. The research asks: how might a mobile app offer a seamless, accessible, personalised navigation experience with interactive wayfinding by integrating real-time flight updates, interactive maps, and essential travel details in a user-friendly interface to enhance traveller navigation and reduce airport stress? While some of this information is already available, it is often difficult to gather and coordinate. Other information, such as real-time interior navigation data, is only partly available, but this project aims to demonstrate how it could be integrated. The aim is a proof-of-concept demo of a working app prior to user-testing.

Having travelled through over 75 airports in my life, I have found that some are very intuitive to navigate, while others can be confusing and stressful. Navigation difficulty can be impacted by time constraints (short layovers or delays), often unfamiliar environments, and an overload of fragmented information across different supports, such as airline websites, airport services, and local transport platforms. During my travels, I have been left lost and alone in Ankara Airport without any clear signage to help me navigate; I have had to run in Frankfort Airport during a short layover shortened by delays combined with an eventually cancelled flight, having to check gates information while running; missed a flight in Birmingham due to long security lines; and been on a flight to Lisbon that was diverted to Faro (Portugal) due to weather perturbation. In all these situations, navigational and information support to help me find my way through airports in unforeseen situations would have been very helpful in reducing stress and saving time.

Airports operate on a 24/7 schedule, where time is redefined, and passengers' routines are dictated by flight schedules rather than conventional daily patterns. Besides that, even today, airports can be confusing, stressful, and frustrating for travellers. The navigation can be challenging due to inconsistent signage and scattered information sources that will destabilise the traveller's orientation. With the continuing growth of global air traffic, which is supposed to reach 12 billion passengers by 2030, the demand for a personalised and digital wayfinding solution will continue to grow. The project goal is to address these issues by providing a working solution to improve the experience of travellers in airports.

This project is practice-based research, meaning that knowledge is generated through the practical planning and making of the design artefact.[1] In this case, I will be making a prototype of the app to support the traveller in their journey. In addition to the practice-based approach, this research also incorporates elements from user-centred and action research methodologies to focus on identifying user needs and improving the design through iterations of the following cycles of reflection, testing and feedback. This exegesis records and reflects on the process, including a literature review, mapping and reporting of airport navigation flow and signage, and the prototyping of an interactive digital solution. The development of the app in my practice integrates both the design outcome and research process to deliver a solution aimed at improving the traveller experience.

The target audience of my project is all travellers with some adapted features for the different user profiles in the airport environment. The app will be developed to a prototype stage. Therefore, the main pages will be interactive, but it will not be a fully functional product. Direct user testing was limited due to ethical restrictions, so feedback was gathered through personal observational methods and using imaginary personas rather than user trials. Also, the app is designed to be universally adapted for travellers, but certain accessibility features would require further development beyond this project.

[1] Linda Candy, "Practice Based Research: A Guide," November 2006, 2, https://www.researchgate.net/publication/257944497_Practice_Based_Research_A_Guide.

Figure 2. Marin Virieux, 2021, Paris Charles-de-Gaule Airport Terminal F (CDG), France.

II. WAYFINDING IN THE AIRPORT

Theoretical, Historical, and Critical Context

According to Farr et al., 2017, "Wayfinding is the process of identifying a current location and knowing how to get to a desired destination as quickly and effortlessly as possible."[2] The American architect Kevin Lynch introduced the concept of wayfinding in 1960 in his book *The Image of the City*. He explains that the ability and difficulty of establishing a relationship between someone and the outside world requires spatial orientation, and this can be

[2] Anna Charisse Farr et al., "Wayfinding: A Simple Concept, a Complex Process," *Transport Reviews 32*, no. 6 (November 2012): 715.

supported by wayfinding tools such as maps, signs, numbers, and information.[3] Going further, he explains that people do not necessarily need words and signs to navigate in an environment but can use efficient spatial cues such as intersections, landmarks, and buildings.[4] Airport signage is a tool to support the traveller navigating in a space with few spatial cues.

Airport travellers are often confused and disoriented by the non-standardised layout of different airports and wayfinding systems[5] (Figure 3). Navigational signages can vary significantly with entirely different designs in various colours, sizes and fonts, making them inconsistent across airports, as can be seen in the following pictures (Figures 4, 5, 6, & 7).

In the wish to create a universal design to help the users, the Airport Cooperative Research Program gathered graphics recommendations in their report, number 52, "Wayfinding and Signing Guidelines for Airport Terminals and Landside," to "provide an up-to-date single resource for airport operators to consult as they review, update, enhance, or develop their airport wayfinding and signing plan."[6] However, as this document is only a recommendation of practice, there is still a lack of uniformity in the wayfinding systems across airports. This leads to confusion and inefficiency for travellers.

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[3] Kevin Lynch, *The Image of the City* (London: The MIT Press, 1960), 195.
[4] Lynch, *The Image of the City*, 195.
[5] Arthur Paul and Romedi Passini, *Wayfinding: People, Signs, and Architecture.* (NewYork: McGraw-Hill, Inc, 1992), 77.
[6] James R Harding et al., "Wayfinding and Signing Guidelines for Airport Terminals and Landside" (Washington, D.C. Transportation Research Board, 2011).

Figure 3. Bhupesh Kumar, Different airport terminal sketches. "Airport terminals" *Instagram @07sketches*, June 27 2023, https://www.instagram.com/p/Ct-vkfxxjWz/?img_index=1.

Figure 4. Marin Virieux, 2024, Signage at Christchurch Airport (CHC), New Zealand.

Figure 5. Marin Virieux, 2024, Signage at Nadi Airport (NAN), Fiji.

Figure 6. Marin Virieux, 2024, Signage at Hong Kong Airport, (HKG) Hong Kong.

Figure 7. Marin Virieux, 2024, Signage at Munich Airport (MUC), Germany.

Thus, to help travellers find their way among spaces that are inconsistent between airports but similar and repetitive inside each, the support of signage is essential, as the user can easily get lost due to the lack of landmarks.

In 1959, Jane Davis Doggett introduced the "use of colour-coding and letters — A, B, C, etc. — to identify and index airport terminals" and the concept of thematic graphics to represent the complex geography of the airports[7] (Figures 8 & 9). Her work is the origin of today's airport signage system. In 1967, for Schiphol Airport in Amsterdam, Kho Liang Le and Benno Wissing designed the airport wayfinding and signage system using visual signs with straightforward typography in Akzidenz-Grotesk and memorable colours (orange and green), which they believed expressed "simplicity, readability and directness"[8] (Figure 10 & 11).

Based on these models, today's signage systems have frequently remained unchanged. However, they now face new challenges and opportunities with the advent of digital technologies such as digital displays, augmented reality, and artificial intelligence.

[7] Society for Experiential Graphic Design, "Jane Davis Doggett," SEGD: Designers of Experiences, accessed April 2, 2025, https://segd.org/members/jane-davis-doggett/.
[8] Adrian Mascena, "Benno Wissing and the Modernization of de Stijl," Art Journal 2012, no. 1 (January 1, 2012): 59.

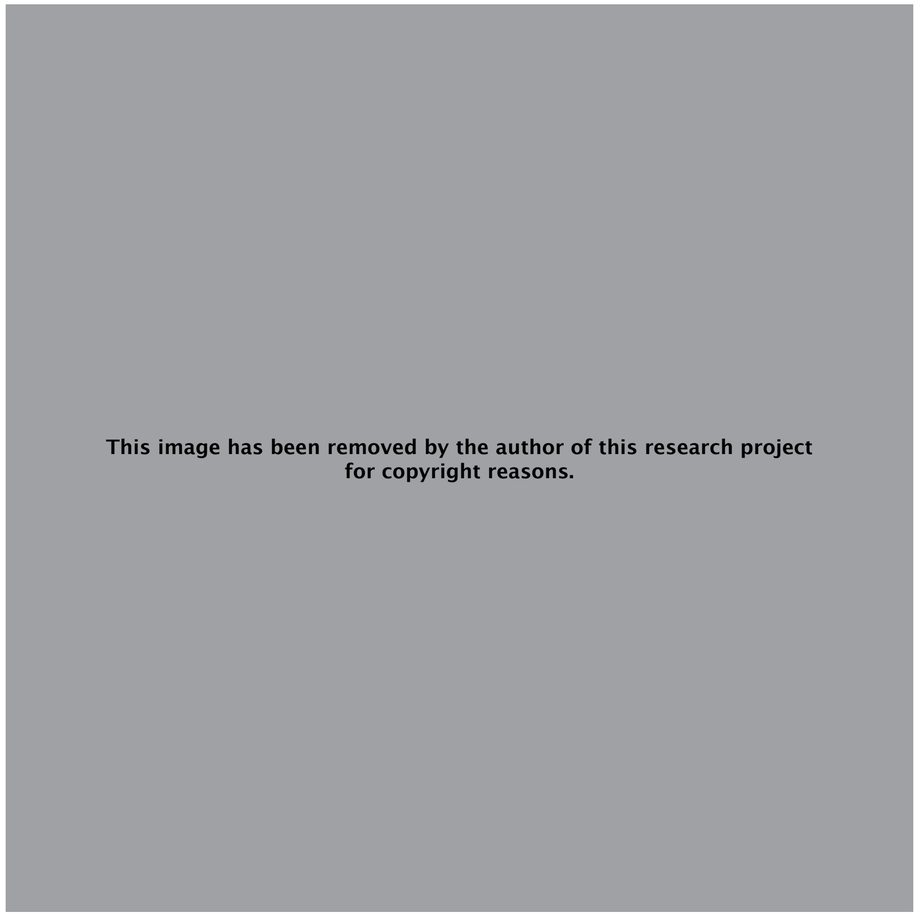

Figure 8. Colour-coded and letter Terminal signage for airport road entrance. Reproduced from, "Jane Davis Doggett, 93, Dies; Graphic Designer Helped People Find Their Way" *The New York Times*, April 27, 2023, https://www.nytimes.com/2023/04/27/arts/design/jane-davis-doggett-dead.html.

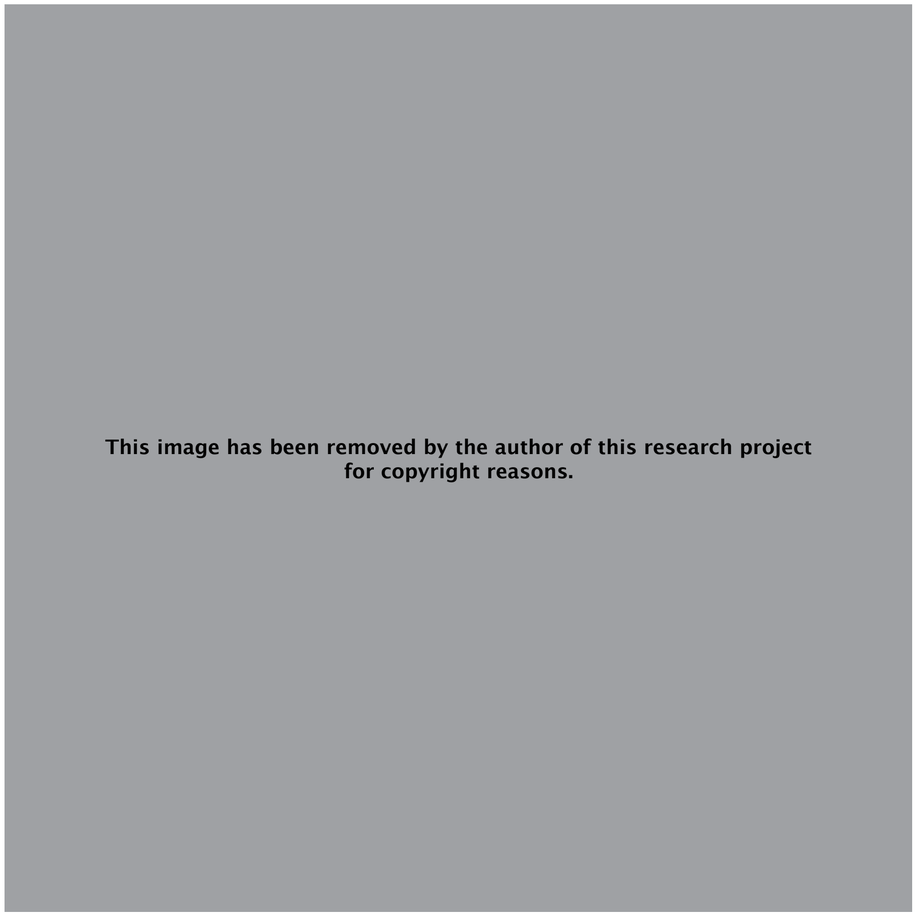

Figure 9. The uniform font for the airline's counters and terminal's colour index at Baltimore-Washington International Airport (BWI). Reproduced from, "Jane Davis Doggett, 93, Dies; Graphic Designer Helped People Find Their Way", *The New York Times*, April 27, 2023, https://www.nytimes.com/2023/04/27/arts/design/jane-davis-doggett-dead.html.

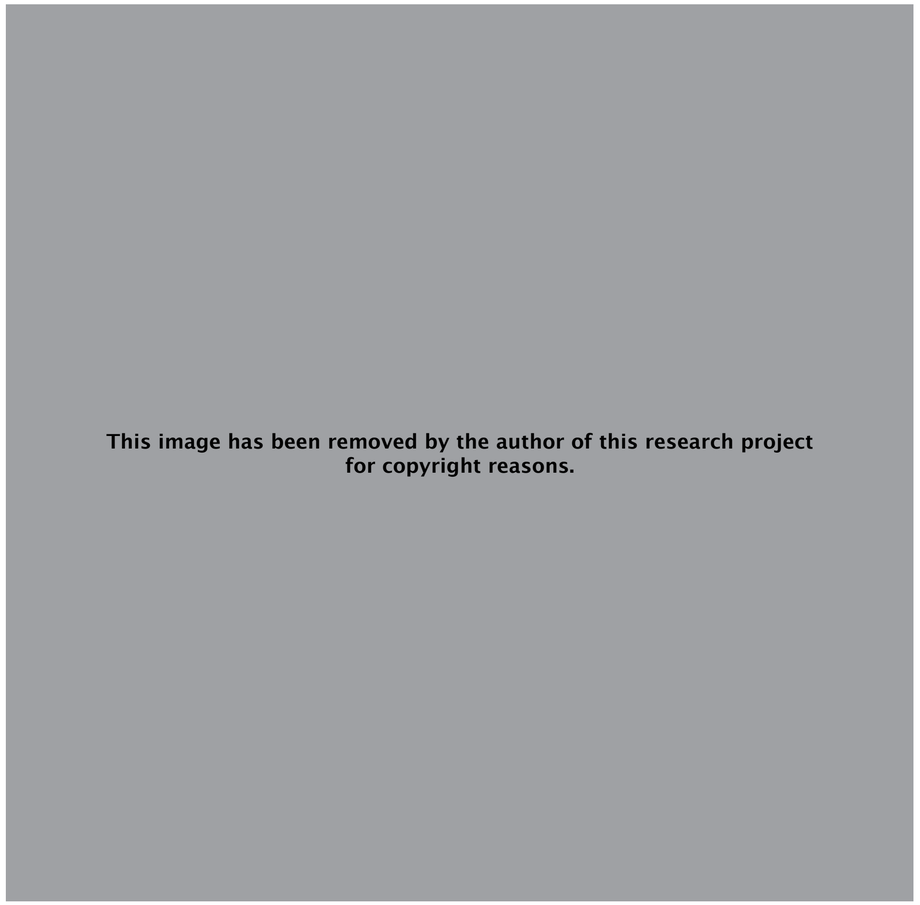

Figure 10. Signage at Schiphol Airport (AMS), Netherlands, by Benno Wissing and with Kho Liang Le Associates. Reproduced from Ben Bos, "Benno Wissing: Dutch Graphic Roots," ed. Hans van Dijk, *Dutch Graphic Roots*, May 2006, https://www.dutchgraphicroots.nl/en/benno-wissing/.

Figure 11. Schiphol Airport (AMS), Netherlands, 1967. Signage with Akzidenz Grotesk font and specially chosen colours, yellow and green. Reproduced from Total Design, Online, *Total Design*, 2025, https://www.totaldesign.com/en/td60-icon-schiphol/.

Figure 12. Marin Virieux, 2022, Departure Information at Frankfurt Airport (FRA) on split-flat board display.

Split-flat boards, as it can still be seen in Frankfurt Airport (Figure 12), "were designed to be predominantly permanent installations."[9] Such signs could not keep up with the volume of information needed in modern airports. Colette Jeffrey writes that "developments in digital technology have created new ways to access and use information and have led to new wayfinding strategies."[10] This project explores how digital technologies can improve the wayfinding experience.

[9] James R Harding et al., "Wayfinding and Signing Guidelines for Airport Terminals and Landside" (Washington, D.C. Transportation Research Board, 2011), 2.
[10] Colette Jeffrey, "Wayfinding Perspectives: Static and Digital Wayfinding Systems – Can a Wayfinding Symbiosis Be Achieved?" in *Information Design: Research and Practice*, ed. Alison Black, Paul Luna, and Ole Lund (New York: Routledge, 2017), 509.

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Observations of Airport Signage

Early in my research, I compiled a collection of signage I saw in more than 20 airports from four different continents between 2022 and today. This dataset helped provide insights into how culture influences signage design. I noticed more than 80 different icons (Figure 13). Some were present across all airports, such as those for toilets, check-in, and departures. However, their designs often vary. In some cases, minor details change such as Auckland Airport's departure icon, which features a small fern symbol representing New Zealand's cultural heritage (Figure 14).

Figure 13. Marin Virieux, 2025, Table of icons gathered in airports around the world.

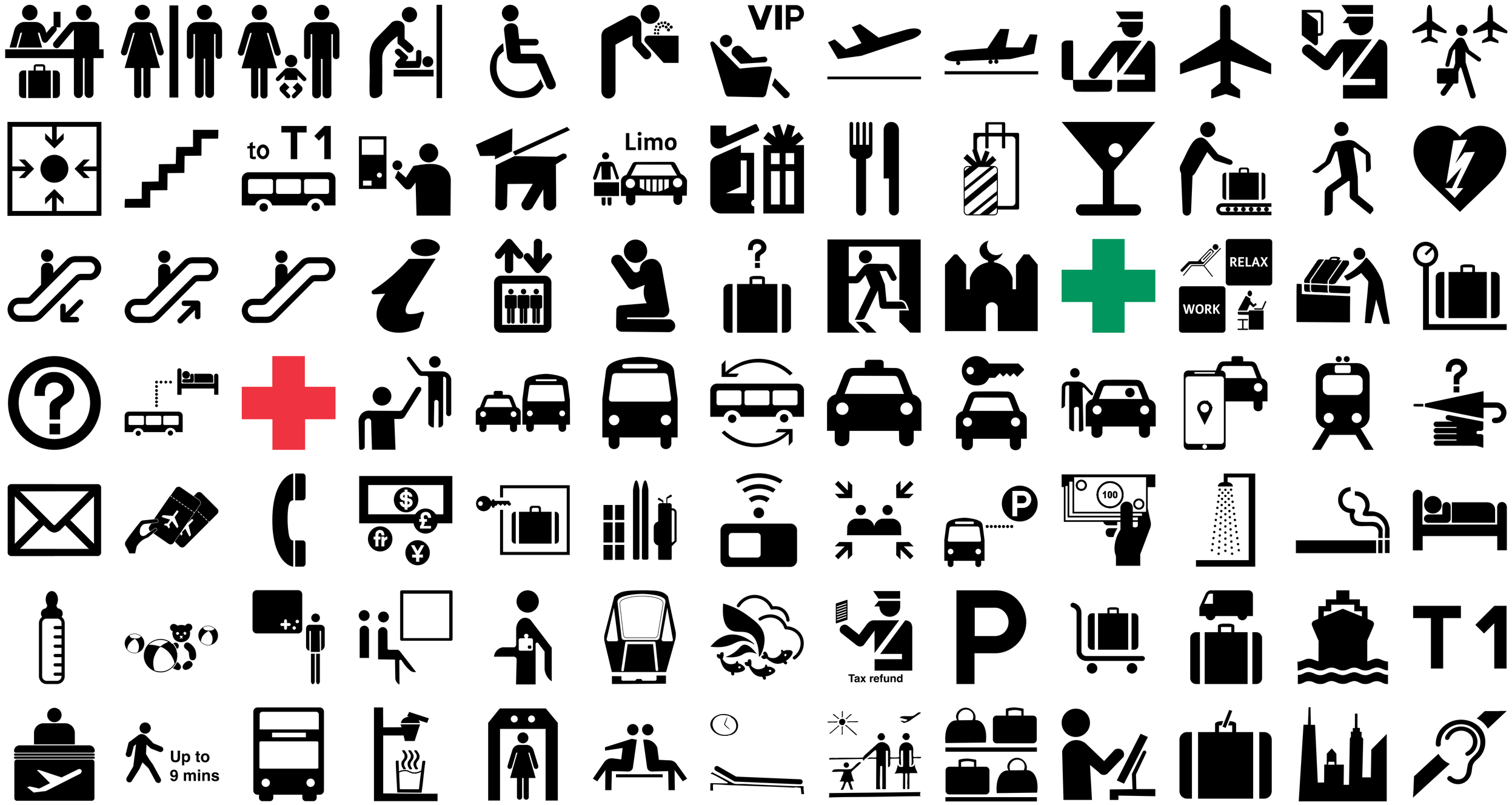

VIP
to T1
Limo
RELAX
WORK
Tax refund
T1
Up to
9 mins

Figure 14. Marin Virieux, 2024, Departure icon with the fern symbol at Auckland Airport (AKL), New Zealand.

Similarly, customs signs often represent different hat styles depending on the country (Figure 15). In other cases, cultural influences lead to entirely different icons, such as the health icon, which is represented as a crescent moon in mainly Islamic Turkey (Figure 16) but a red cross in countries with a Christian-influenced culture (Figure 17).

PARIS (CDG), FRANCE | MADRID (MAD), SPAIN | FRANKFURT (FRA), GERMANY | SAN FRANCISCO (SFO), UNITED-STATES | HONG KONG (HKG), HONG KONG

Figure 15. Marin Virieux, 2024, Three different security and border icons with hats of different styles: Paris, Charles de Gaulle Airport (CDG), France; Madrid, Barajas Airport (MAD), Spain; Frankfurt Airport (FRA), Germany; San Francisco (SFO), United States – Hong Kong (HKG), Hong Kong.

This image has been removed by the author of this research project for copyright reasons.

Figure 16. Design Work Plan, Health icon signage represented by a crescent moon at the former Istanbul Atatürk Airport (ISL), Türkiye. Reproduced from "Atatürk Airport, Online," *Design Work Plan*, accessed April 6, 2025, https://www.designworkplan.com/read/airport-signage-photo-inspiration.

Figure 17. Marin Virieux, 2024, Health icon represented as a red cross with the colour of Auckland signage at Auckland Airport (AKL), New Zealand.

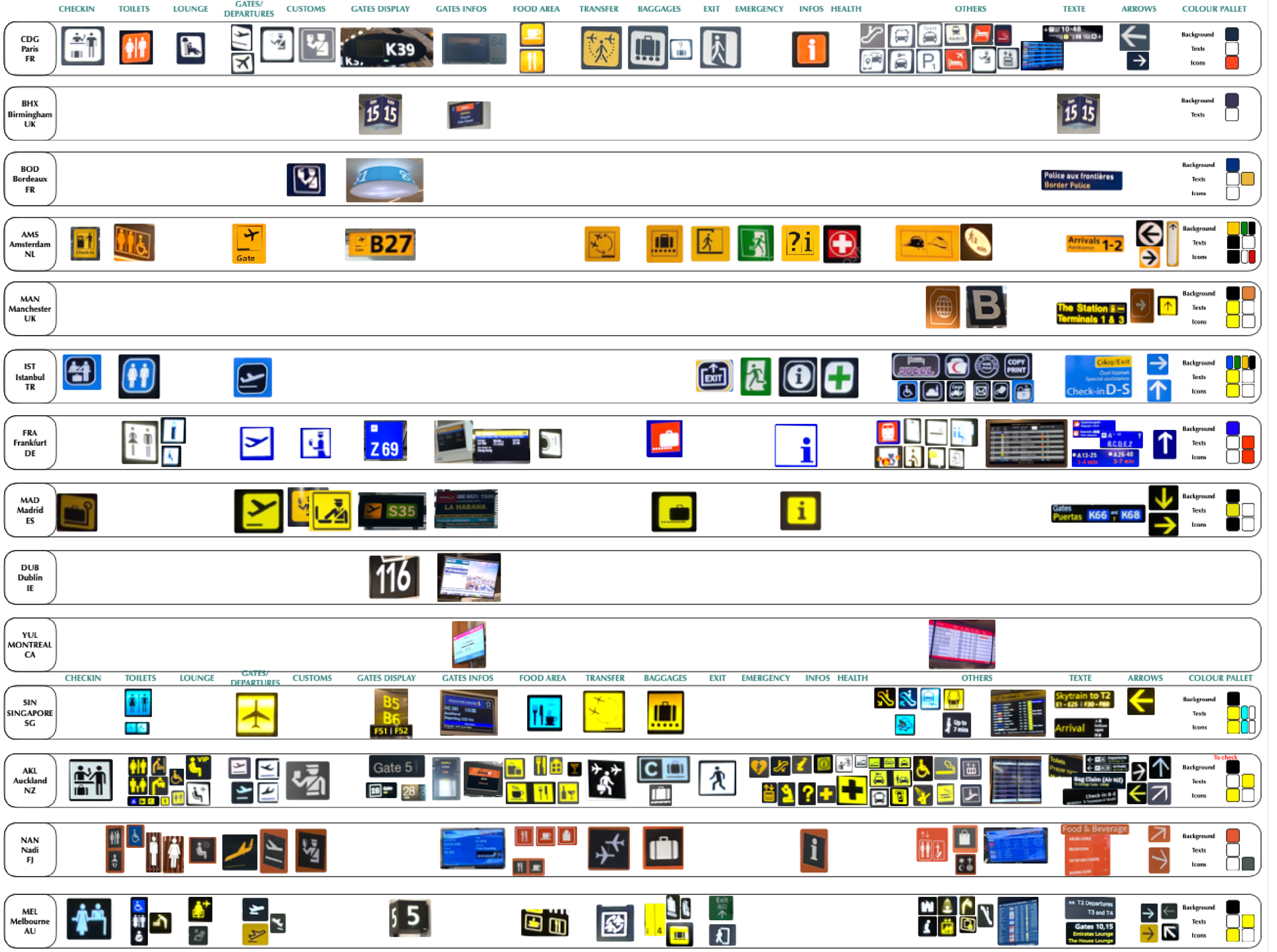
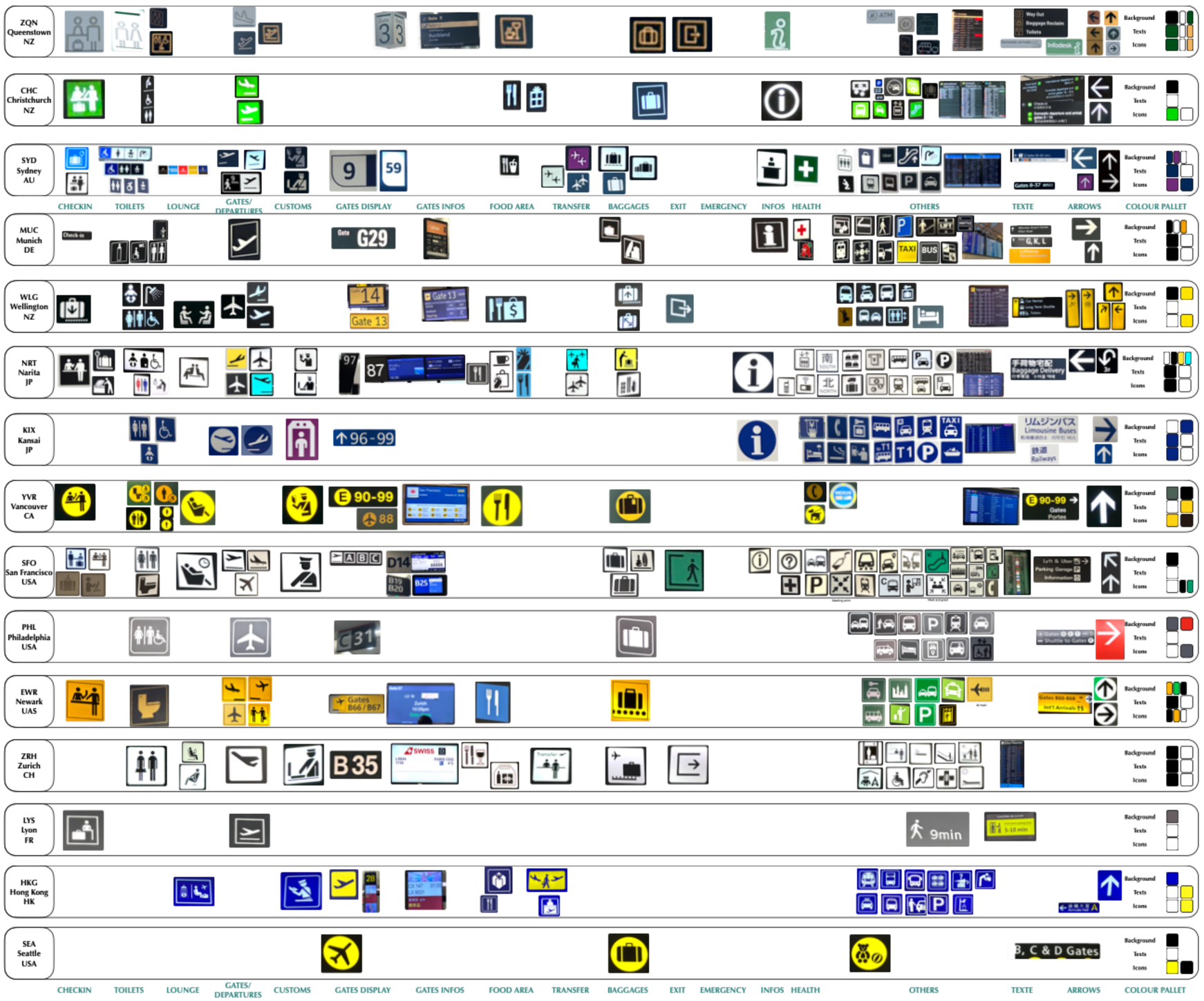


Figure 18. Marin Virieux, 2025, Table with all the signage collected in airports through my reporting sessions and personal pictures. The signs are sorted by the airport and follow the chronology of the traveller's journey.


ZQN Queenstown NZ
CHC Christchurch NZ
SYD Sydney AU
MUC Munich DE
WLG Wellington NZ
NRT Narita JP
KIX Kansai JP
YVR Vancouver CA
SFO San Francisco USA
PHL Philadelphia USA
EWR Newark UAS
ZRH Zurich CH
LYS Lyon FR
HKG Hong Kong HK
SEA Seattle USA
CHECKIN
TOILETS
LOUNGE
GATES/ DEPARTURES
CUSTOMS
GATES DISPLAY
GATES INFOS
FOOD AREA
TRANSFER
BAGGAGES
EXIT
EMERGENCY
INFOS
HEALTH
OTHERS
TEXTE
ARROWS
COLOUR PALLET
Background
Texts
Icons

Colour is also used to establish a hierarchy of information: in Singapore, departure and gate-related signs as primary information have a yellow background, while blue is used for the secondary information of restrooms and leisure areas such as food courts, gardens, and cinemas (Figure 19). Sans serif fonts like those chosen by Doggett, Le and Wissing are standard (Figures 20).

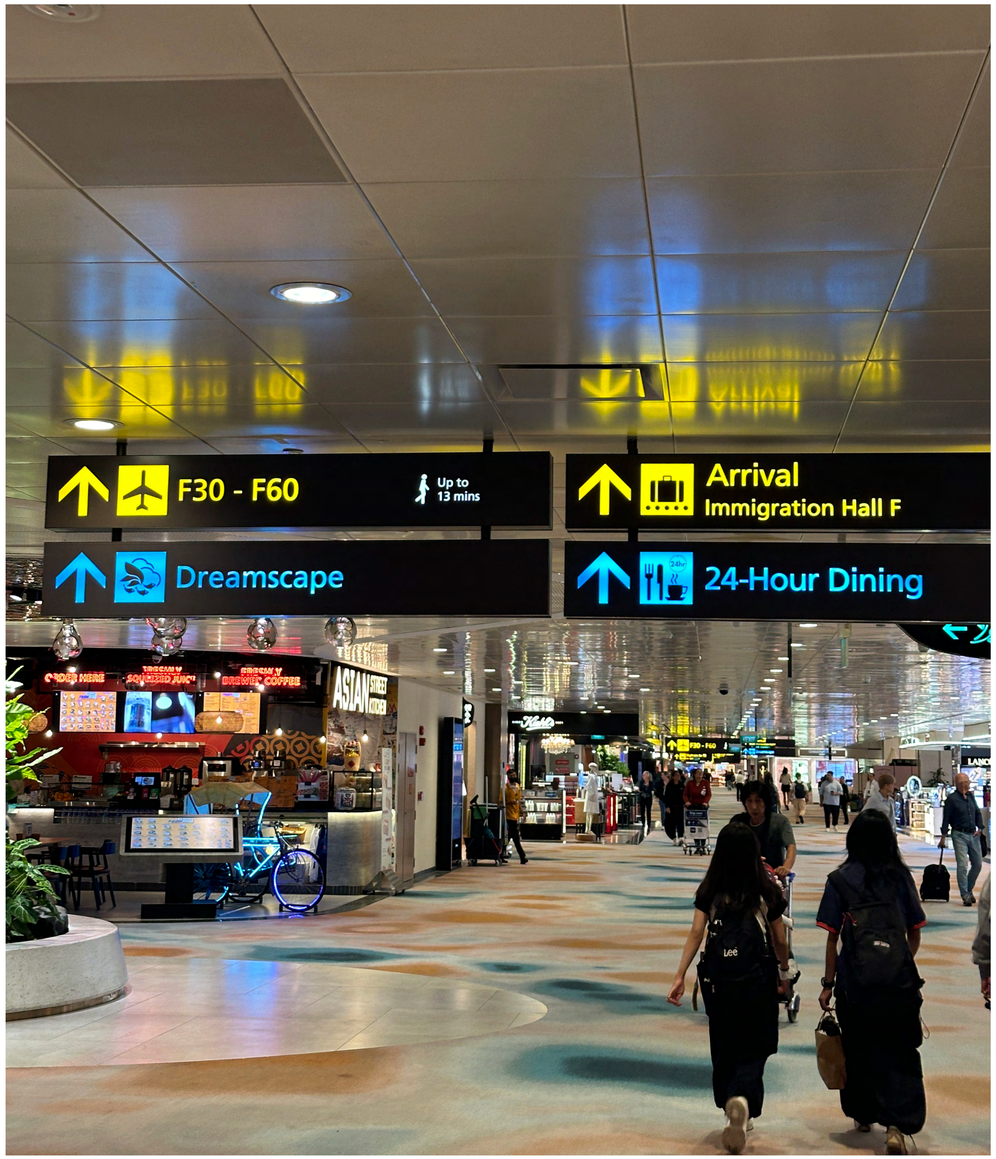


Figure 19. Marin Virieux, 2024, Signage at Singapore Airport (SIN) with the primary information in yellow and secondary in blue.

Figure 20. Marin Virieux, 2024, Signage with sans serif font at Tokyo Narita Airport (NRT), Japan.

Figure 21. Marin Virieux, 2024, The only signage with serif font I encountered in my reporting was at Suva Nausori Airport (SUV) in Fiji.

AUCKLAND INTERNATIONAL TERMINAL

Arrow not proportional to text

Same font size between languages

Different icons design

Colours:

Languages: English Chinese

AUCKLAND DOMESTIC TERMINAL

Icon size similar to text

Different font size and colour between languages

Hierarchy of information with different colours and size

Arrow shape in reference to NZ ferns

Same colour icon as at Sydney Airport

Colours:

Languages: English Chinese Maori

Figure 22. Marin Virieux, 2025, Comparison of signage design details at Auckland Airport (AKL), New Zealand.

Figure 23. Marin Virieux, 2025, Comparison of signage design details at Sydney Kingsford Smith Airport (SYD), Australia.

Figures 22 and 23 show analysis of the signage at Auckland International Airport (AKL) and Sydney Kingsford Smith Airport (SYD) with a comparison of their compositions. For Auckland Airport's new signage, the airport wanted to reflect and represent Aotearoa's unique culture and natural heritage.[11] In Don Normann's opinion, cultural mapping varies with cultural norms: "What is natural depends upon point of view, the choice of metaphor and therefore the culture … design difficulties occur when there is a switch in metaphor."[12]

[11] "Maynard: Auckland Airport Wayfinding Guidelines," *Designers Institute of New Zealand: Best Design Awards*, 2023, https://bestawards.co.nz/graphic/environmental-graphics/maynard/auckland-airport-wayfinding-guidelines/.
[12] Donald A. Norman, *The Design of Everyday Things* [originally published 1988], (New York: Basic Books, 2013), 122.

There is no single correct interpretation of wayfinding systems, especially in international environments like airports, where there is a cultural diversity of travellers who will not interpret signs and navigation in the same way. Choosing a cross-cultural metaphor is important.

Digital signage is used when information changes so constantly that it is impossible to have static signage. This is the case, for instance, for indications of flight number, destination, and boarding stages at each gate (Figure 24). Departure screens in most parts of the world display the same information, ordered chronologically by departure time (Figure 25). In North America, however, the screen follows a different system: flights are ordered alphabetically and then according to the departure time when multiple flights are to the same destination (Figure 26). Despite efforts towards universal signage, variations in symbols and language can still confuse travellers. At the domestic terminal of Lyon-Saint Exupéry Airport (LYS) in France, live security wait times are displayed and updated in real-time using indoor positioning technology based on the number of travellers in line (Figure 27).[13] These systems use live data inputs from the airport's flux, modular signage, and new technologies such as Augmented Reality and WIFI to provide targeted information to passengers, but they are not yet widespread.

[13] Bonnie Powell, Stanley Young, and Andrew Duvall, "The Evolution of Wayfinding within Airports," *Golden, CO: National Renewable Energy Laboratory*, December 20, 2023, https://doi.org/10.2172/2274823.

Figure 24. Marin Virieux, 2025, Digital signage at the gate in Hong Kong Airport (HKG).

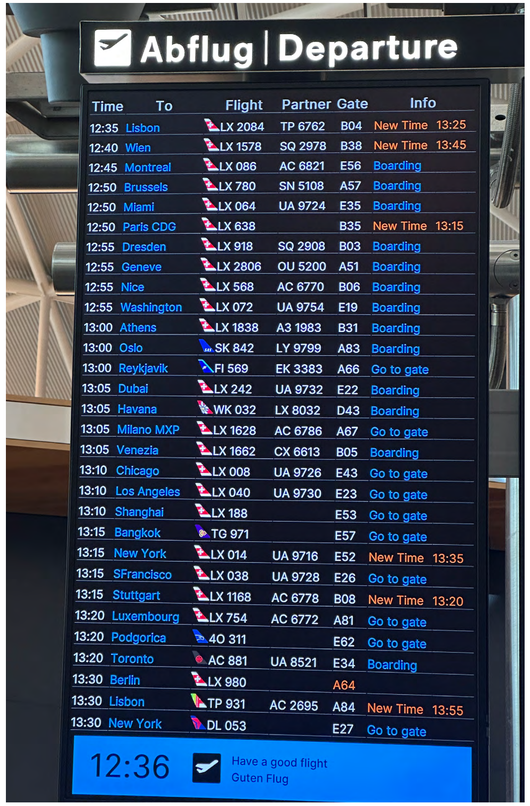


Figure 25. Marin Virieux, 2024, Departure Screen ordered chronologically at Zurich Airport (ZHR), Switzerland.

Figure 26. Marin Virieux, 2025, Departure Screen ordered alphabetically at San Francisco Airport (SFO), USA.

Figure 27. Marin Virieux, 2025, Live waiting time at security at Lyon Saint-Exupéry Airport (LYS), France.

From my experience in airports, I have often required help from the airport's app and website to navigate or find information (Figures 28 & 29). However, the issues were the same every time: the need to download and learn a separate app for each airport to obtain the information. Flight tracking apps such as FlightAware (Figure 30) allow me to have live information without relying on departure screens. My research envisions an integrated app with live data, navigation aids, and other information in one app.

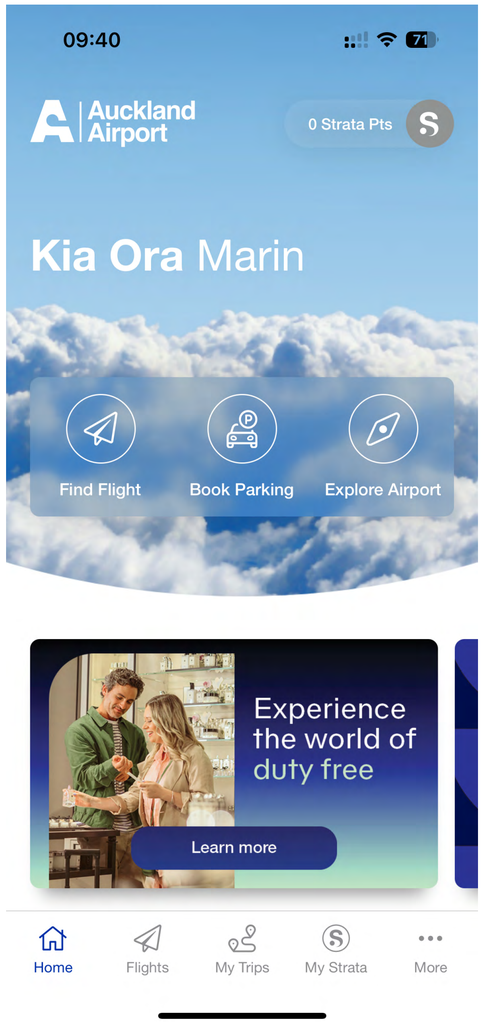


Figure 28. Marin Virieux, 2025, Screenshot of Auckland Airport mobile app illustrating their different services.

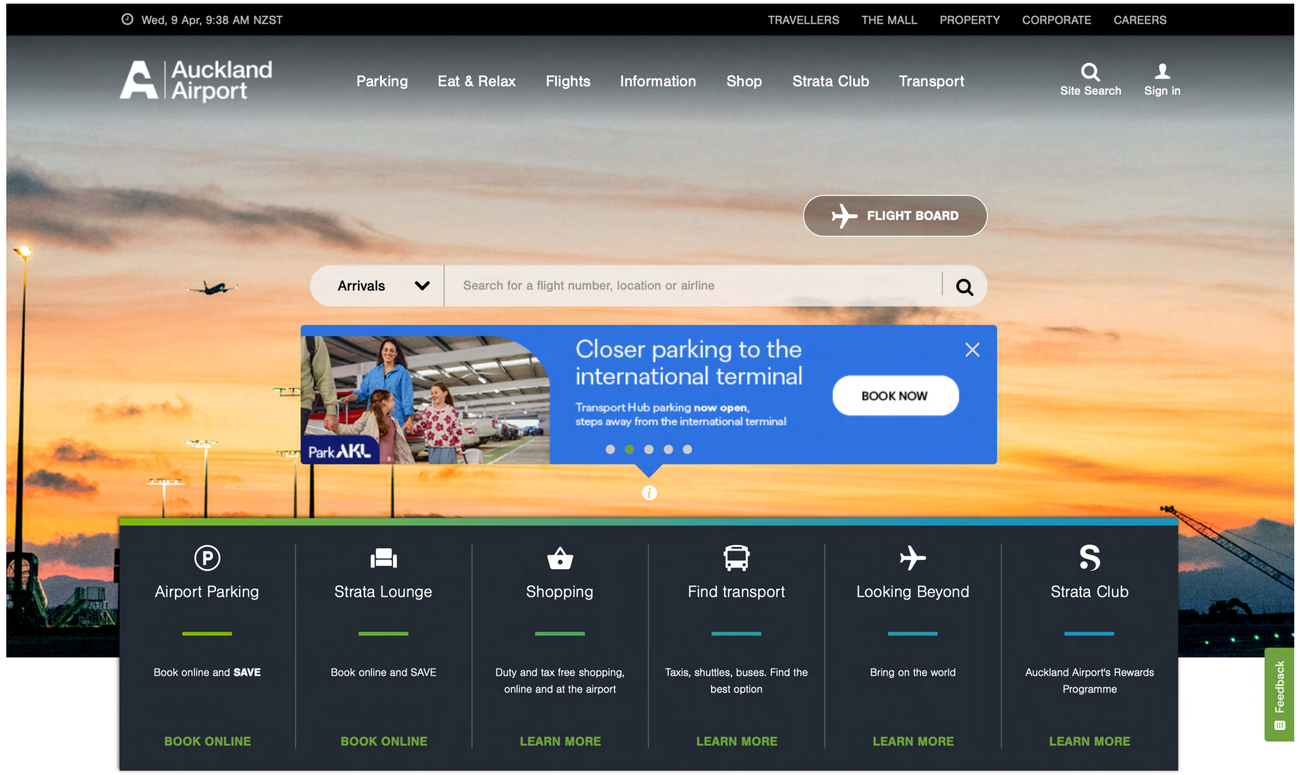


Figure 29. A screenshot of the Auckland Airport website illustrates the different services they offer. Reproduced from "Auckland Airport," *Auckland Airport*, accessed April 9, 2025, https://www.aucklandairport.co.nz.

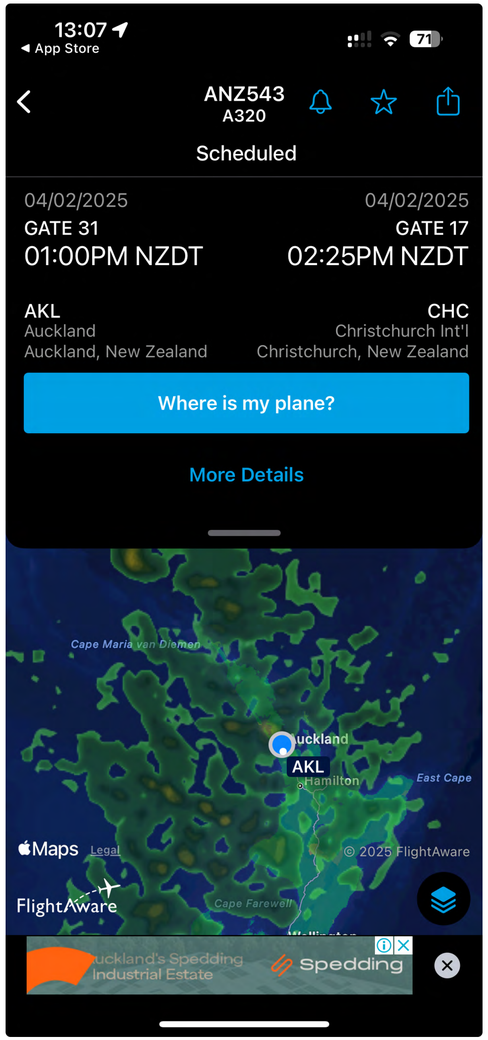


Figure 30. "Screenshot of FlightAware app with live departure time and gate information," *FlightAware App*, 2025.

Wayfinding Apps

Early mobile app designs were often skeuomorphic, with textures, 3D designs, shades, and shadows to resemble real-world materials and objects.[14] However, "skeuomorph interfaces grew increasingly complex and cluttered," and a simpler, flatter design language emerged.[15] In *The Design of Everyday Things*, Norman writes about how good metaphors can reduce the cognitive load to help the user focus on key information.[16]

A flat design without textures, lighting, and shadows, however, may make it harder for the user to understand and use the software.[17] Google's Material Design (2014) aimed for a balance between flat design and skeuomorphism (which they call "neomorphism," combining the benefits of both).[18]

Apple's interface design evolution provides a clear example of the use of these three main User Interface (UI) trends through the evolution of the iOS message app icon designed under these different design styles: first skeuomorphism with iOS 6 (Figure 31), then with a flat design for iOS 7 (Figure 32), and a neomorphism style with iOS 11 (Figure 33).

[14] L Bollini, "From Skeuomorphism to Material Design and Back. The Language of Colours in the 2nd Generation of Mobile Interface Design.," January 1, 2016, 309–20.
[15] Inês Cunha Vaz Pereira Urbano, João Pedro Vieira Guerreiro, and Hugo Miguel Aleixo Albuquerque Nicolau, "From Skeuomorphism to Flat Design: Age-Related Differences in Performance and Aesthetic Perceptions," *Behaviour and Information Technology* 41, no. 3 (September 2, 2020): 454, https://doi.org/10.1080/0144929x.2020.1814867.
[16] Norman, *The Design of Everyday Things*, 122.
[17] Ivan Burmistrov et al., "Flat Design vs Traditional Design: Comparative Experimental Study," *Human-Computer Interaction – INTERACT 2015*, 2015, 106–14, https://doi.org/10.1007/978-3-319-22668-2_10; James H. Creager and Douglas J. Gillan, "Toward Understanding the Findability and Discoverability of Shading Gradients in Almost-Flat Design," *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* 60, no. 1 (September 2016): 339–43, https://doi.org/10.1177/1541931213601077.
[18] "Celebrating Ten Years of Material Design," Google Design, accessed April 6, 2025, https://design.google/m10.

The app “Flighty” was launched in 2019 by a former Apple employee and two others during a long flight delay.[19] The concept is to add your flights to the app, where you can then access information such as the gates, terminals, average delays, and plane details, as well as flight statistics and data from past travels (Figure 34).

[19] “Press — Flighty,” Flighty.com, accessed April 6, 2025, https://flighty.com/press; “Ryan Jones - Flighty” LinkedIn profile, Linkedin.com, accessed April 6, 2025, https://www.linkedin.com/in/linkedinryan/; “Behind the Design: Flighty - Discover - Apple Developer,” Apple Developer, June 5, 2023, https://developer.apple.com/news/?id=970ncww4.

Figure 31. iOS 6 message app in skeuomorphism style. Reproduced from *PNG EGG*, accessed April 8, 2025, https://www.pngegg.com/en/png-owgic#goog_rewarded.

Figure 32. iOS 7 message app in flat design style. Reproduced from *PNG EGG*, accessed April 8, 2025, https://www.pngegg.com/en/png-fbnxt/download.

Figure 33. iOS 11 message app in neomorphic style. Reproduced from “Apple, Messages, Bubble Icon,” *Icon Finder*, accessed April 8, 2025, https://www.iconfinder.com/icons/2697657/apple_messages_bubble_communication_conversation_imessage_message_icon.

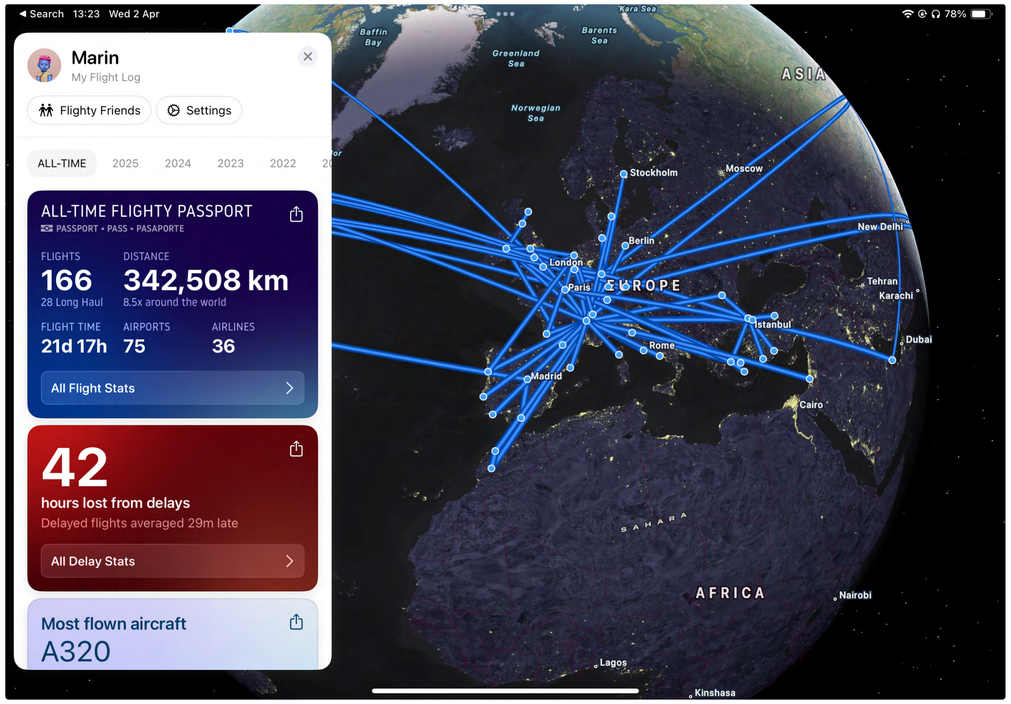


Figure 34. "Screenshot of the Flighty app on the past-flight window, with statistics and data based on previous travels," *FlightAware App*, 2025.

The limitations of this app are that it is focussed mainly on the flight aspect of the trip and has no personalised way-finding support, no integration of airport signage and standards, and no pre-travel features (information before the airport and how to get to the airport) (Figures 35 to 39). It is these navigational features that will be a value brought in by my project.

This app inspired me through its architecture, with the home page having a structured overview of the different flight information, easy access to settings, and easy access to each respective flight. I found this structure very functional and user-friendly (Figure 40). From a visual design perspective, Flighty is a good example of a Neomorphic design, using a flat design with some shadings and transparency to bring depth (Figure 41). Furthermore, predefined colours and font

Figure 35. "Screenshot of Flighty app with live flight updated data and departure gate," *FlightAware App*, 2025.

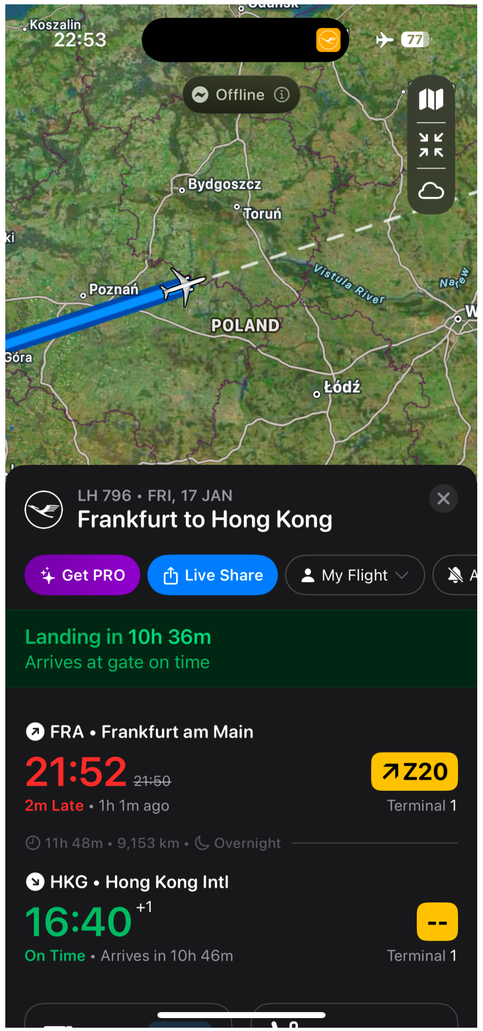


Figure 36. "Screenshot of Flighty app with the features and information available for the flights," *FlightAware App*, 2025. Part 1.

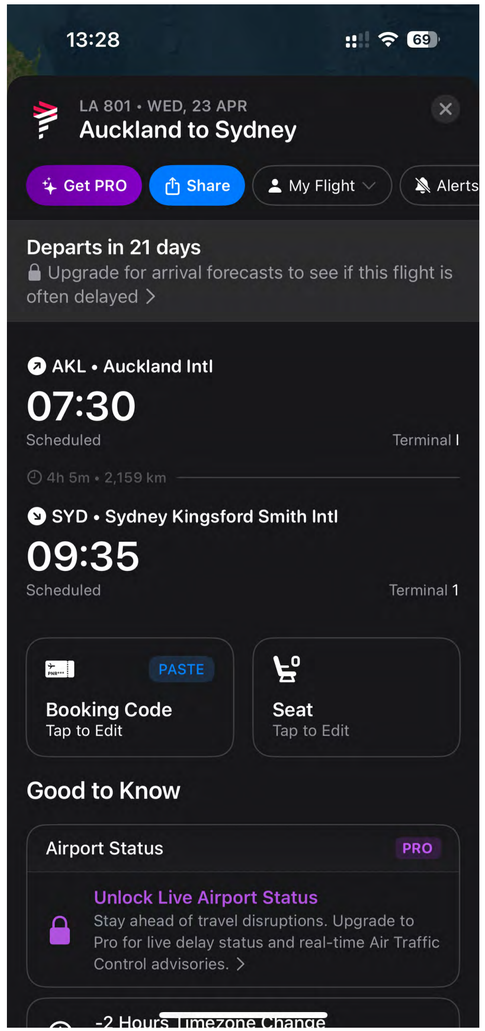


Figure 37. "Screenshot of Flighty app with the features and information available for the flights," *FlightAware App*, 2025. Part 2.

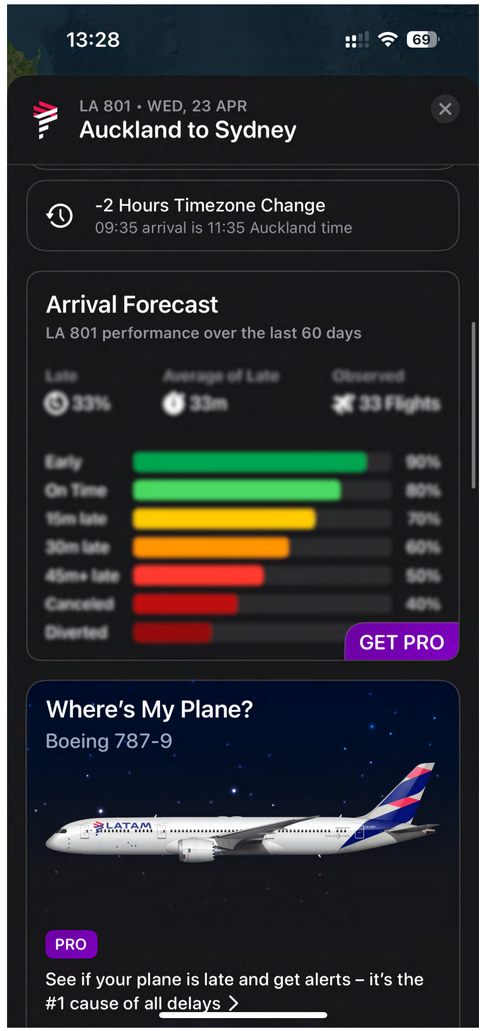


Figure 38. "Screenshot of Flighty app with the features and information available for the flights," *FlightAware App*, 2025. Part 3.

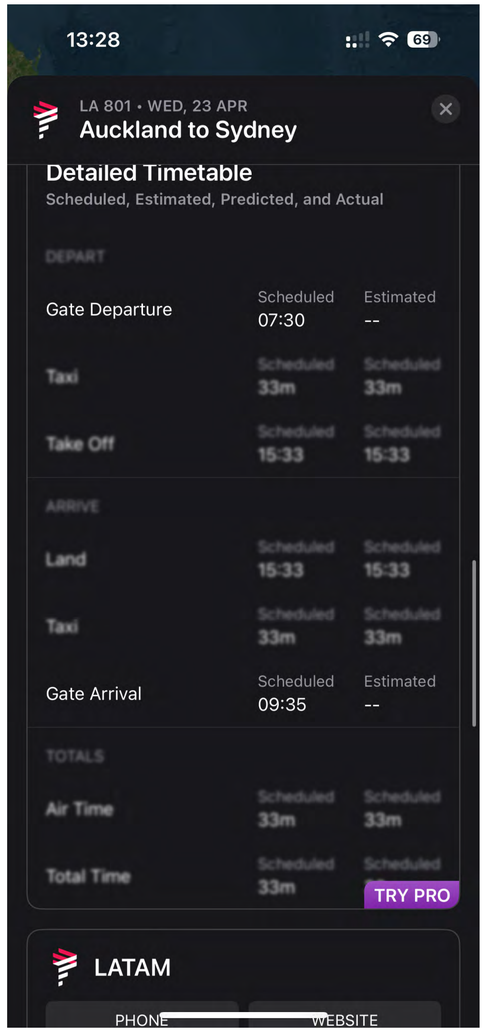
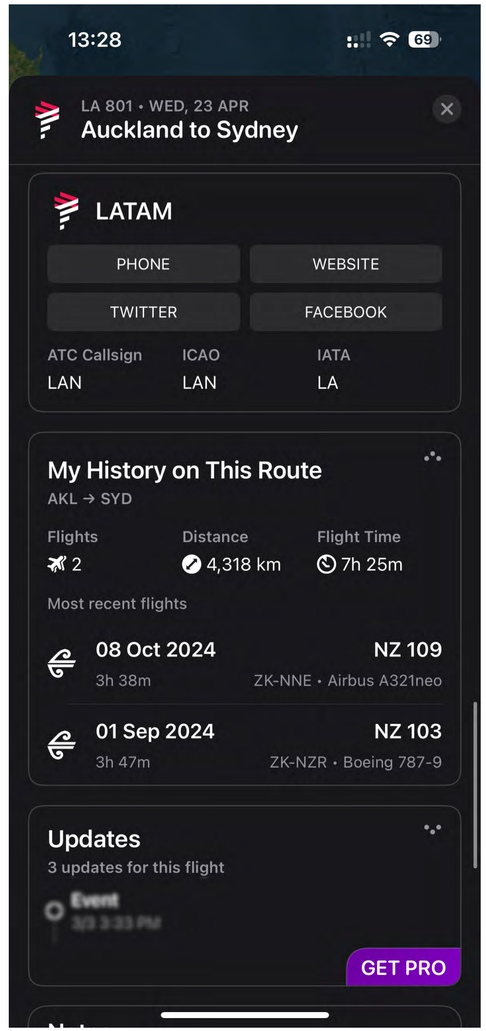


Figure 39. "Screenshot of Flighty app with the features and information available for the flights," *FlightAware App*, 2025. Part 4.



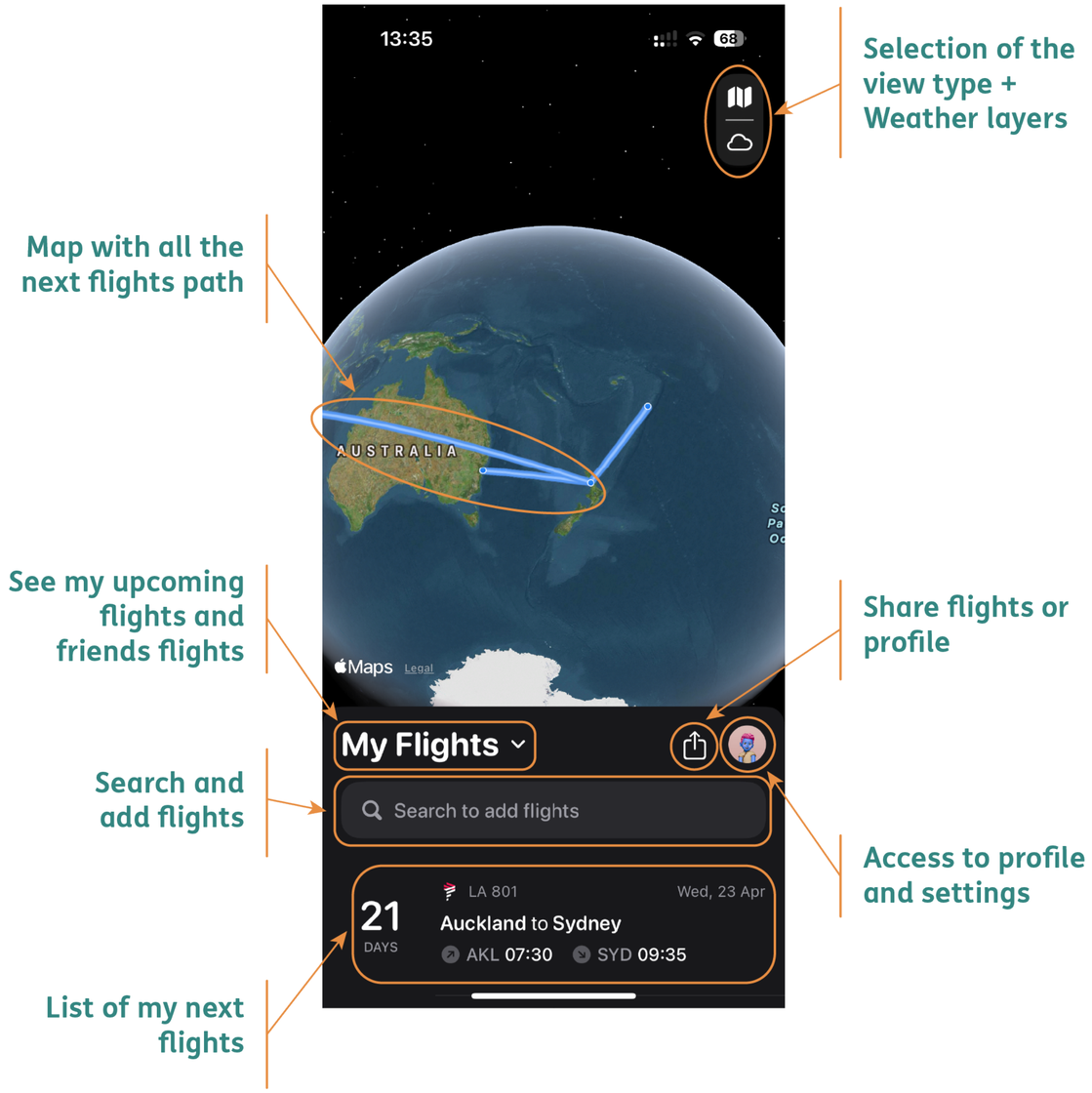


Figure 40. Marin Virieux, 2025, Analyses of Flighty app design elements on the Home Screen.

sizes across the app contributes to a clean and unified de–sign. This inspired me to use different horizontal and vertical scrolling to display more information and features without having to open various windows, simplifying the user flow. The following figure provides an analysis of the different design aspects of Flighty and how they influenced some of my UI decisions (Figure 42).

Figure 41. “Screenshot of Flighty app to illustrate the use of transparency and shading to bring depth to the design,” *Flighty–Aware App*, 2025.

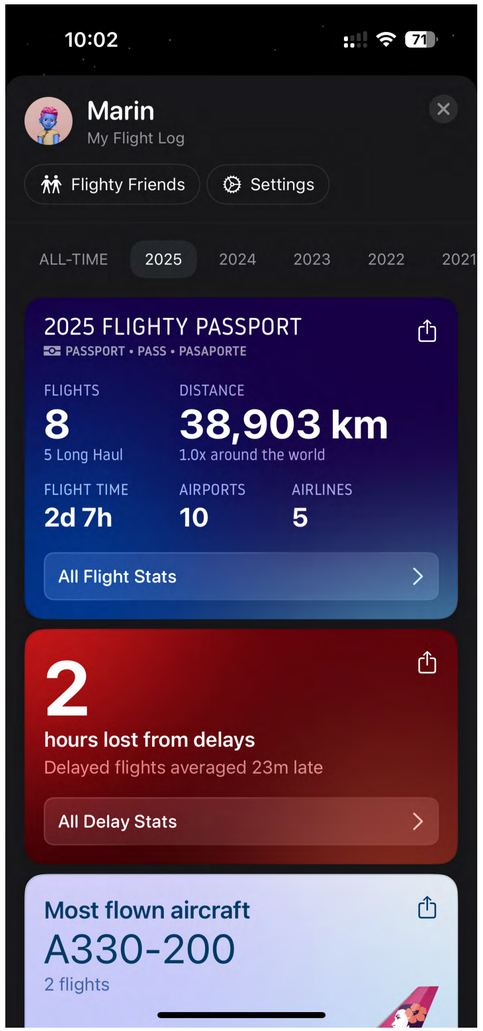
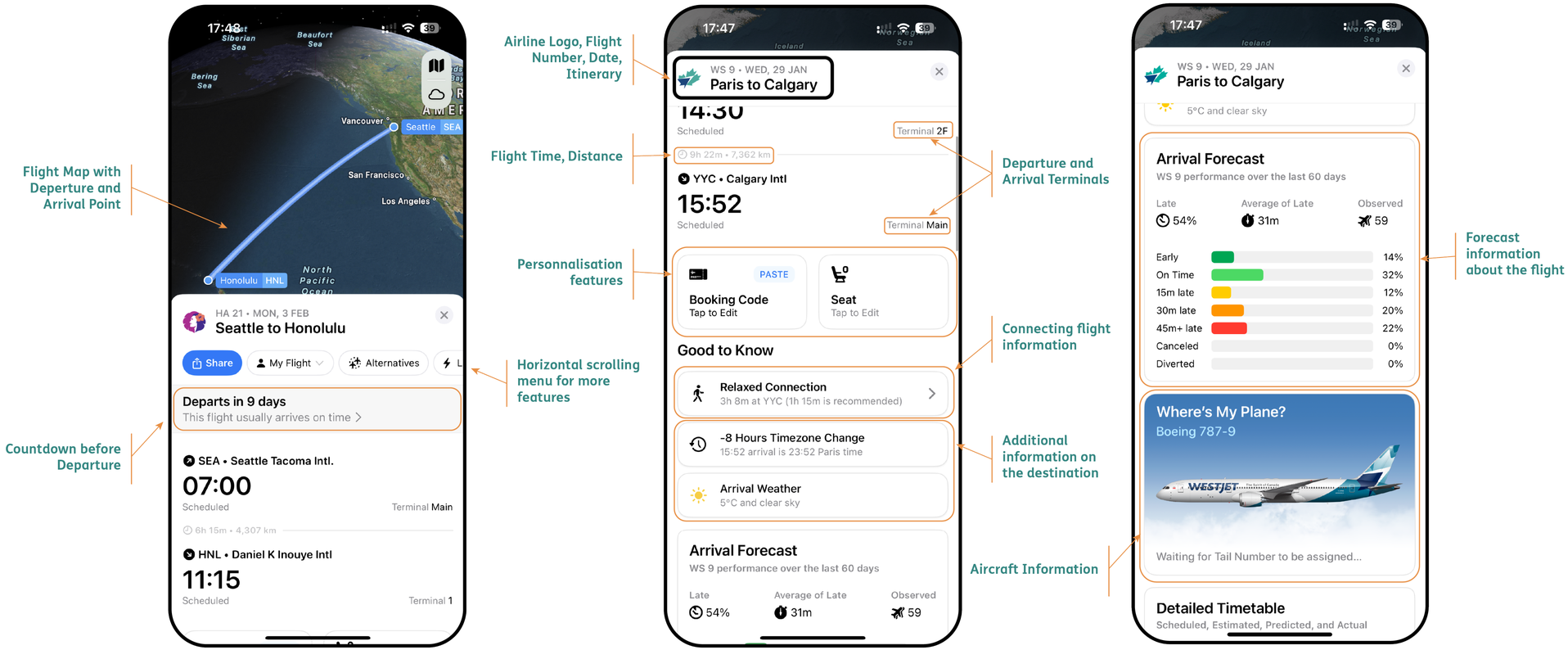


Figure 42. Marin Virieux, 2025, Analysis of some elements in the travel section of Flighty app.



Another app studied was Orcon, a broadband and Internet supplier in New Zealand, founded in 1994 and now part of 2degrees.[20] The app is a "smart assistant that can monitor internet usage, diagnose Wi-fi issues, track billing and connect with the support team."[21] Using strong branding elements from the company graphics and vibrant energy lines in various shapes representing the exchange of information and creativity with the world, the app obtains a strong and easily recognisable visual identity (Figure 43). Different features are integrated in an easy-to-use and intuitive design: data usage is displayed clearly using charts and distinct information on the same pages, and information-overload is avoided by playing with different background colours, scrolling, and expandable sections (Figures 44 & 45). In my app, likewise, onboarding phases will explain how to use key features in the app (Figure 46).

[20] "Orcon App | Best Awards," Designers Institute of New Zealand: Best Design Awards, 2022, https://bestawards.co.nz/digital/digital-products/gladeye/orcon-app/; Wikipedia Contributors, "Orcon Limited," Wikipedia (Wikipedia Foundation, January 7, 2025), https://en.wikipedia.org/wiki/Orcon_Limited; "Commission Grants Clearance for Vocus/2degrees Merger," Commerce Commission New Zealand, March 15, 2022, https://comcom.govt.nz/news-and-media/media-releases/2022/commission-grants-clearance-for-vocus2degrees-merger.

[21] "Orcon App | Best Awards," Designers Institute of New Zealand: Best Design Awards, 2022, https://bestawards.co.nz/digital/digital-products/gladeye/orcon-app/

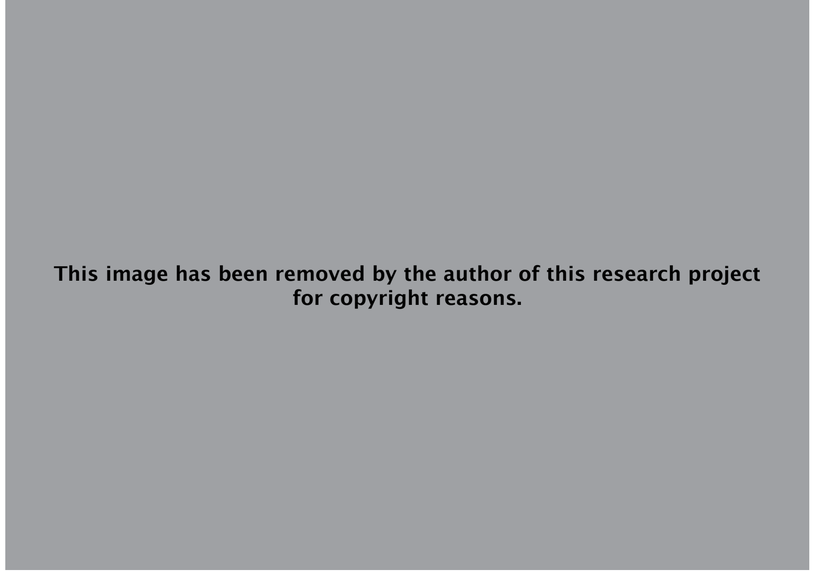


Figure 43. Presentation mock-up of Orcon App. Reproduced from, "Orcon App: Best Awards," *Designers Institute of New Zealand: Best Design Awards*, 2022, https://bestawards.co.nz/digital/digital-products/gladeye/orcon-app/, (accessed April 10, 2025).

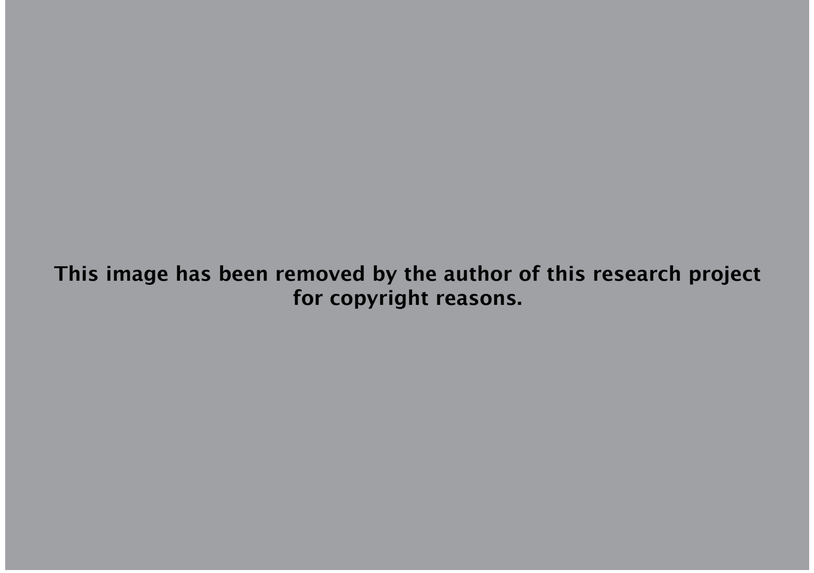


Figure 45. Page of the app with usage data charts with colour codes and straightforward design. Reproduced from, "Orcon App: Best Awards," *Designers Institute of New Zealand: Best Design Awards*, 2022, https://bestawards.co.nz/digital/digital-products/gladeye/orcon-app/, (accessed April 10, 2025).

Figure 46. Onboarding windows to explain how to use the app. Reproduced from, "Orcon App: Best Awards," *Designers Institute of New Zealand: Best Design Awards*, 2022, https://bestawards.co.nz/digital/digital-products/gladeye/orcon-app/, (accessed April 10, 2025).

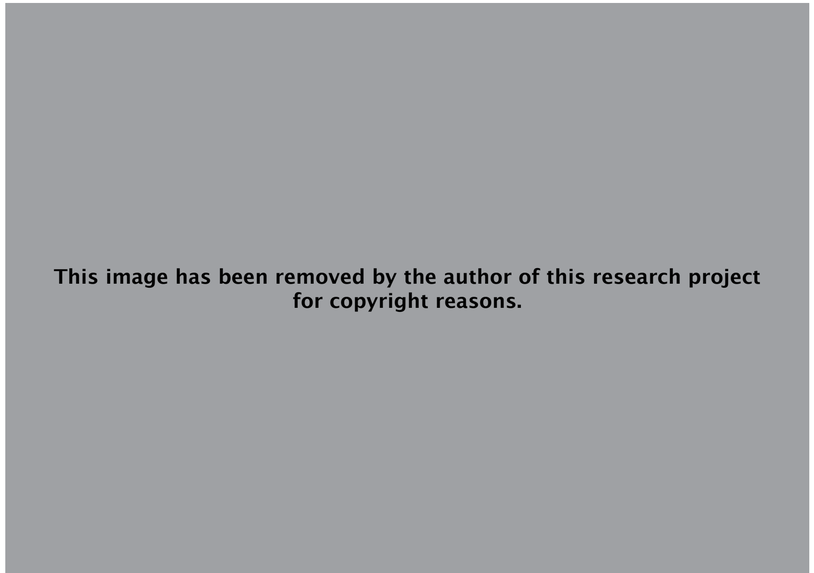
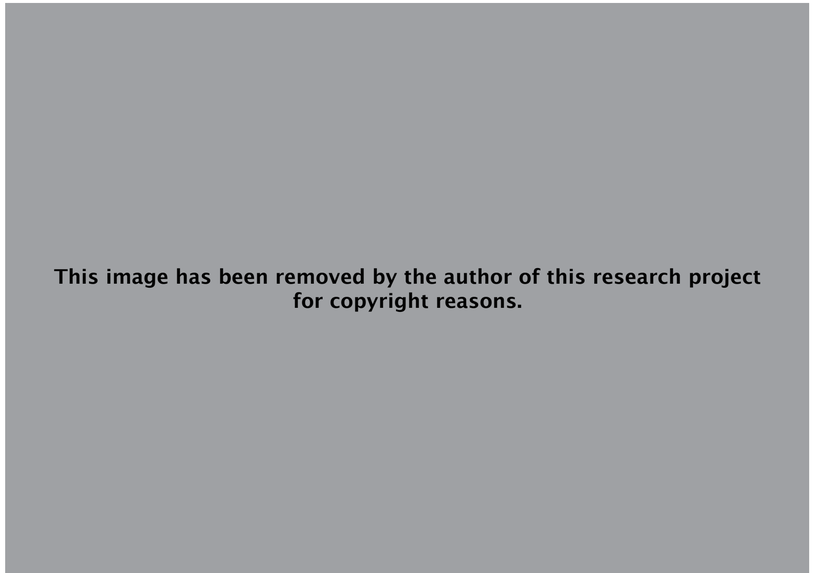


Figure 44. Icons specially designed for the app and logo of the app. Reproduced from, "Orcon App: Best Awards," *Designers Institute of New Zealand: Best Design Awards*, 2022, https://bestawards.co.nz/digital/digital-products/gladeye/orcon-app/, (accessed April 10, 2025).



In researching inspiration for how to represent the metaphor of the guide in my app, I came upon one concept that has not yet been developed. Sajon designed the *Bill Splitter App* for Orix Creative (2021) (Figure 47); the idea of this app is to solve the problem of splitting a bill between friends, and it effortlessly tracks the different expenses in a group.[22] The design of this app stands out as it has a strong identity with specific colours and shapes. It also uses the metaphor of the receipt ticket as the bill for the expenses, and it has different stages for various statuses. The bill gets cut when it is split between the other participants (Figure 48). This is, for me, a strong example of how the metaphor can be used in both the interface and the user experience (UX) of the app. This helped me think about how to visually and functionally support the guide concept in the app.

My research highlights the challenges of airport wayfinding due to the difficulties of navigating in non-standardised layouts and wayfinding systems, even with actual efforts and progress. From my observation of cultural variations in signage, I learned about the importance of having signage designs that represent the cultural heritage of each country

[22] Sajon, "Bill Splitter App," *Dribbble*, accessed April 8, 2025, https://dribbble.com/shots/15212927-Bill-Splitter-App.

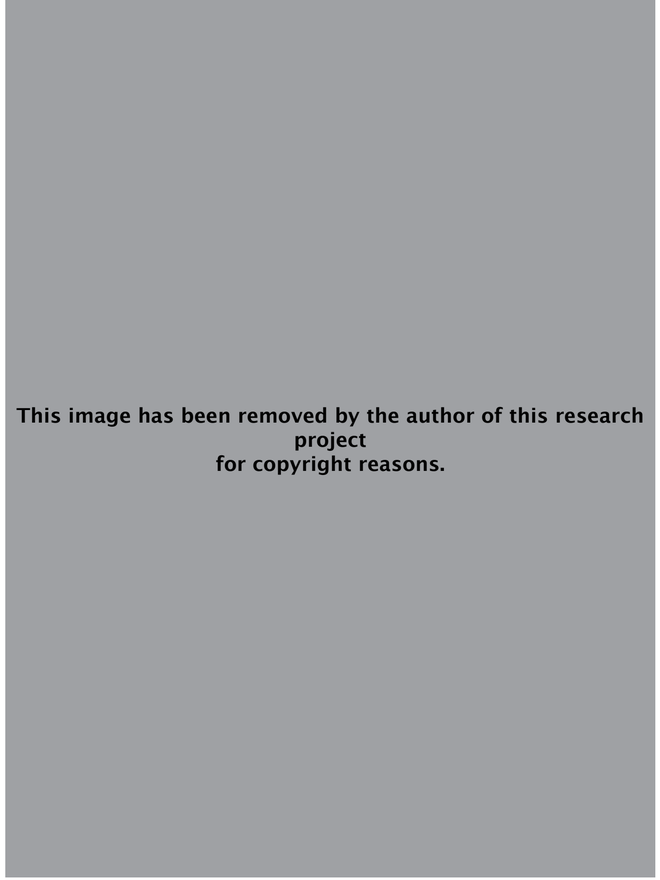
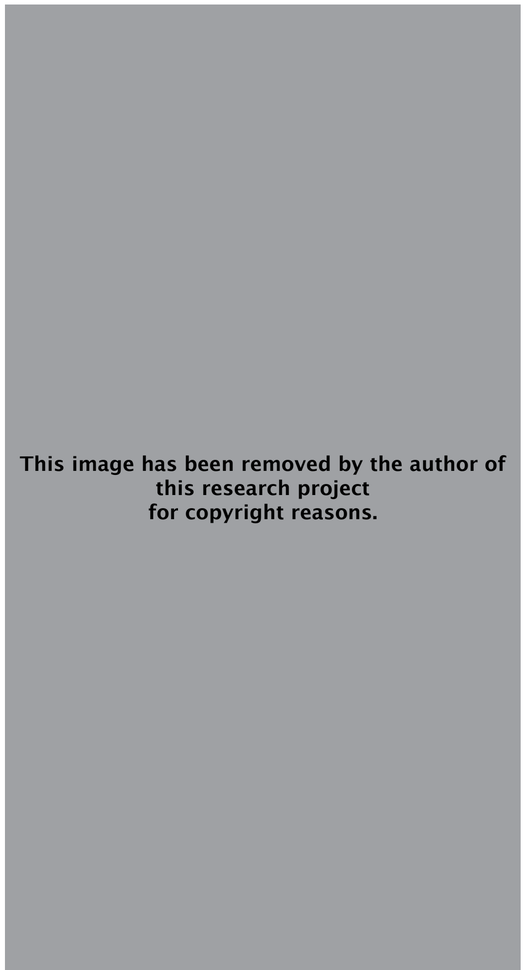


Figure 47. Bill Splitter App mock-up. Reproduced from Sajon, "Bill Splitter App," *Dribbble*, https://dribbble.com/shots/15212927-Bill-Splitter-App. (accessed April 10, 2025).

Figure 48. Bill Splitter App Mock-up. Reproduced from Sajon, "Bill Splitter App," *Dribbble*, https://dribbble.com/shots/15212927-Bill-Splitter-App. (accessed April 10, 2025).



while being universally understandable. The insights collected about the evolution of signage to the digital approach laid the intention of my project: to create a wayfinding solution using mobile digital support while considering other digital solutions and analysing them to enhance usability. These insights and examples will benefit the development of my design approach, which will be explored in the following chapter, as well as the various research methods employed.

Figure 49. Marin Virieux, 2024, Singapore Changi Airport (SIN), Singapore.

III. MAPPING AND PROTOTYPING

Research Design

According to the International Organisation for Standards (ISO), User-Centred Design is a design solution that incorporates technology with the user's active involvement, and the task requirements and functions needed by the user.[23] It is known as a method guiding the creation of goods, services, and systems, with a particular focus on end-user requirements.[24]

The User-Centred Design methodology focuses on the user's needs and abilities during the whole process, from the

[23] International Organization of Standardization, "Ergonomics of Human-System Interaction — Part 210: Human-Centred Design for Interactive Systems," (International Organization of Standardization, 2019), https://www.iso.org/obp/ui/#iso:std:iso:9241:-210:ed-2:v1:en.
[24] John D. Gould and Clayton Lewis, "Designing for Usability: Key Principles and What Designers Think," *Communications of the ACM* 28, no. 3 (March 1, 1985): 300-311, https://doi.org/10.1145/3166.3170.

first prototype of the software, to the user scenarios, to the end product. The project is tested to modify or enhance functionality to make it more effective and then adapted to the user.[25] In 2010, the ISO published technical standards regulation for User-Centred Design methodology.[26]

In this project, the development of the practice will revolve around user needs; this will be done by understanding and defining user needs in the airport's context and the different profiles of users through a survey and the use of personas. I will use autoethnography and imaginary personas to test my designs since direct user testing was not possible within this project's scope.

The User-Centered Design method of process is linked to the Action Research method. Action Research is a process of knowledge-generation through practice; it focuses on improving socially complex problems by understanding the user and context using circular approaches and user-centred research.[27] It includes participatory research, action learning, and participatory and collaborative works (Figure 50 & 51).[28]

[25] Karen L. Spencer, "The Wisdom of Teams: Creating the High-Performance Organization by Katzenbach Jon R. And Smith Douglas K. Boston," *Academy of Management Perspectives* 7, no. 3 (August 1993): 100–102, https://doi.org/10.5465/ame.1993.9411302368.
[26] International Organization of Standardization, "Ergonomics of Human-System Interaction."
[27] Clem Adelman, "Kurt Lewin and the Origins of Action Research," *Educational Action Research* 1, no. 1 (1993): 14, https://doi.org/10.1080/0965079930010102; Michael Peters and Viviane Robinson, "The Origins and Status of Action Research." *The Journal of Applied Behavioral Science* 20, no. 2 (April 1984): 113–24, https://doi.org/10.1177/002188638402000203; Dongjin Song and Yongqi Lou, "Design Activism: Action Research as an Approach When Design Meets Social Innovation," (paper presented at The 10th Conference of the International Committee for Design History & Design Studies *Blucher Design Proceeding* 1, no. 1, October 1, 2016): 285, https://doi.org/10.5151/despro-icdhs2016-03_018.
[28] Davydd J. Greenwood, William Foote Whyte, and Ira Harkavy, "Participatory Action Research as a Process and as a Goal," *Human Relations* 46, no. 2 (February 1993): 175–92, https://doi.org/10.1177/001872679304600203.

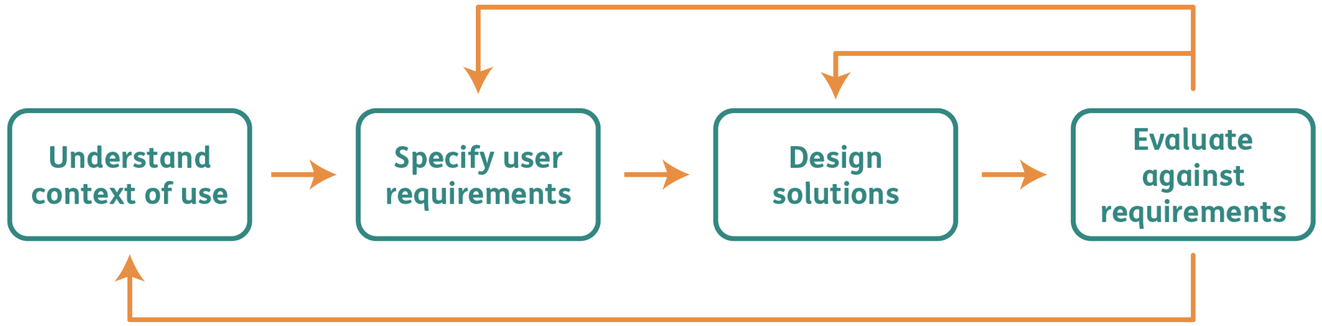


Figure 50. Graph representing user-centre method data. Reproduced from "Four Phases in User-Centered Design," Interaction Design Foundation, June 5, 2016, https://www.interaction-design.org/literature/topics/user-centered-design.

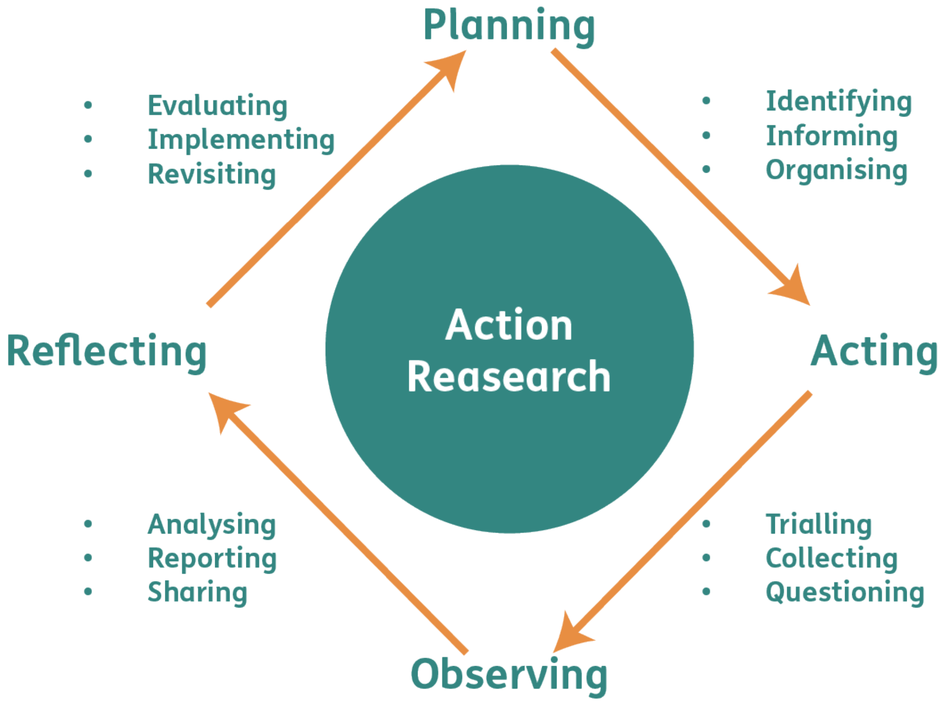


Figure 51. Graph representing action research method. Reproduced from "What Is Action Research?" Interaction Design Foundation, September 13, 2016, https://www.interaction-design.org/literature/topics/action-research.

Mapping

Mapping is a key method in this project, as wayfinding is linked to spatial orientation and user movement. This research uses three complementary mapping approaches: visual site mapping, space mapping, and user journey mapping.

Visual site mapping is selected to better understand the context's impact on signage and the different designs in wayfinding systems.[29] This method involves observing and documenting visual observations through notes, arrows, keywords, and photography to make a report on several selected airports and think through wayfinding design decisions for the project. My process analysed and reported on actual signage in airports from different contexts and locations from my personal travels (Figure 52) in addition to online materials that were used to obtain more data. I then compared the results to emphasise context and cultural/historical background influences, and to identify patterns.

Wayfinding is about the orientation of a user in space and through time. From the finding of site mapping, the space mapping process gathers the essential steps and stages of the user related to their position in space. By mapping the different spaces while navigating, as M. Liu and S. Nijhuis did in their paper, the user's position can be known, and the app can adapt the information and features depending on

[29] Dunn and Tamara, "Visual Mapping | EBSCO," *EBSCO Information Services*, Inc. | www.ebsco.com, 2025, https://www.ebsco.com/research-starters/mathematics/visual-mapping.

Figure 52. Marin Virieux, 2025, World map with the pins of all the airports where I collected some data.

its location and time.[30] This can only be done by having all the information for each position mapped on a map of the space, with each space linked to an action and a point in the app. For the space mapping, the information was collected through my visit to Auckland Airport, where I gathered information about the space supporting the airport plans available on site (Figure 53 & 54).

The creation of an app skeleton/architecture is necessary to map the experience and scenarios of the user journey depending on their profile and needs. Thus, it is essential to be able to situate them in the software and always have different options at every step and not a dead-end page. This

[30] Mei Liu and Steffen Nijhuis, "Mapping Landscape Spaces: Methods for Understanding Spatial-Visual Characteristics in Landscape Design," *Environmental Impact Assessment Review 82* (May 2020): 106376, https://doi.org/10.1016/j.eiar.2020.106376.

Figure 53. Marin Virieux, 2025, Map of Auckland Airport made from the collected information and online materials to situate the different locations of the user in space for the prototype. Part 1.

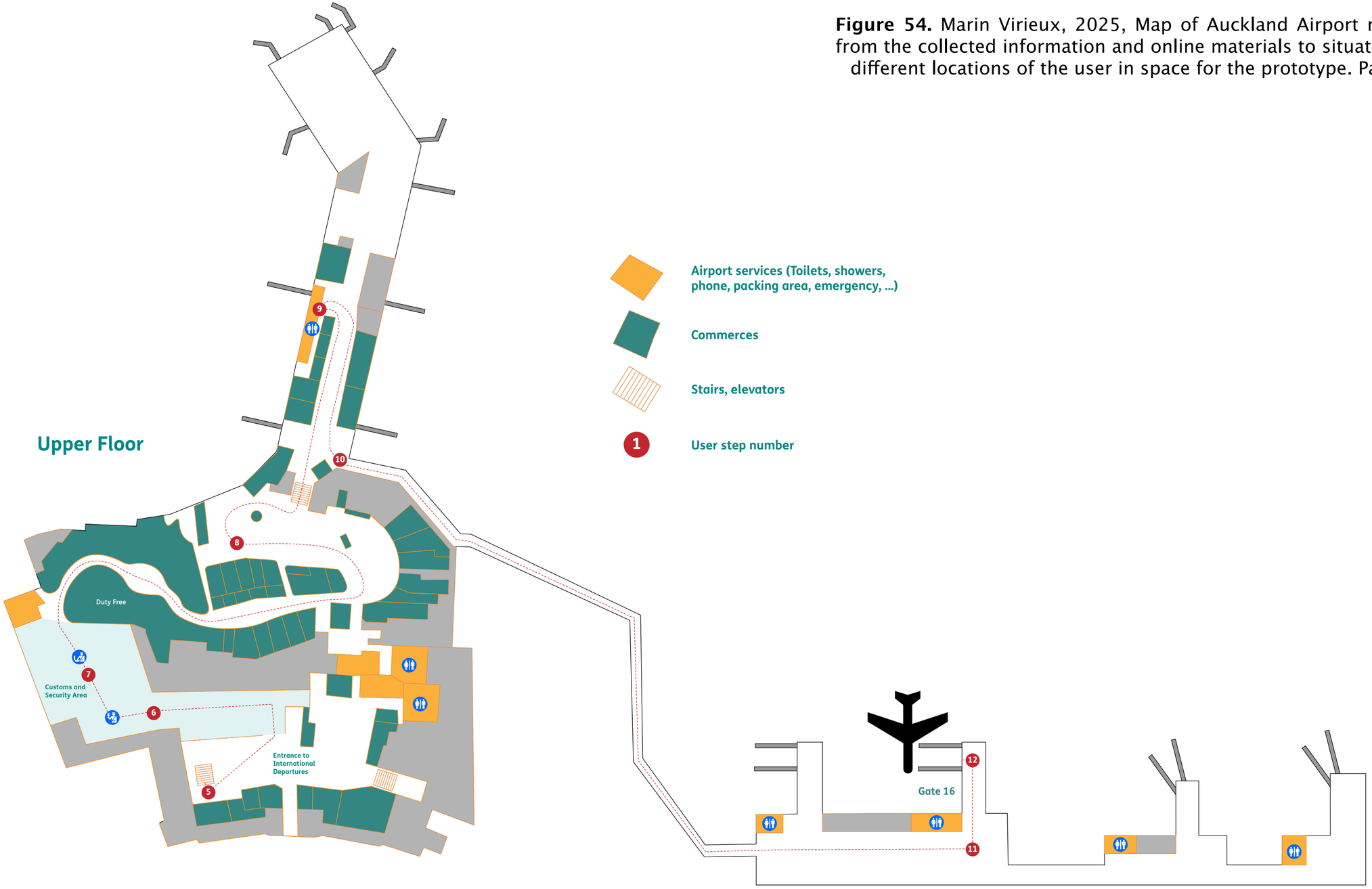


Figure 54. Marin Virieux, 2025, Map of Auckland Airport made from the collected information and online materials to situate the different locations of the user in space for the prototype. Part 2.

will be a different style of mapping: the “user journey map.” This method was successfully used by A. Endmann and D. Keßner in their research. They state that the user journey map illustrates a user’s process by highlighting their trigger and goal, determining the activities to be executed, and the involved personas (prototypical user and user groups), as well as highlighting the requirements and problems (Figure 55).[31]

[31] Anja Endmann and Daniela Keßner, “User Journey Mapping – a Method in User Experience Design,” *I-Com* 15, no. 1 (January 1, 2016), https://doi.org/10.1515/icom-2016-0010.

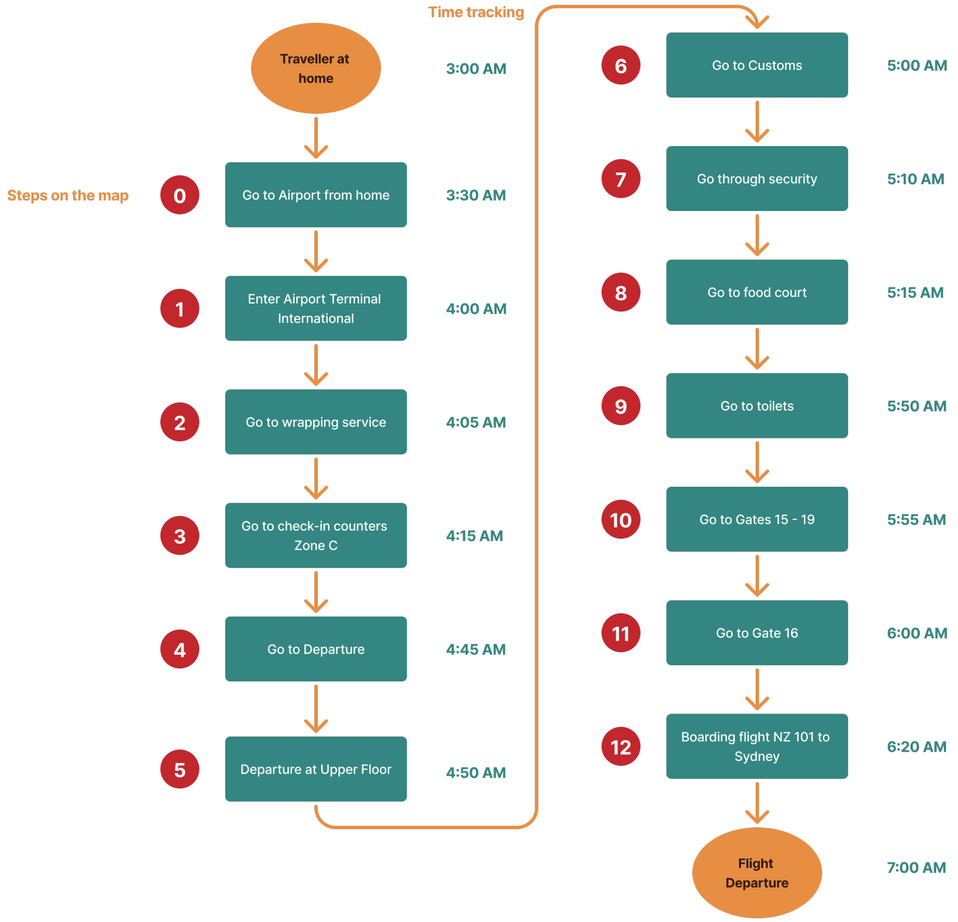


Figure 55. Marin Virieux, 2025, Journey graph at the airport so it can be linked to the map of the airport with the different stages.

The visual site mapping method will provide information about the design, the impact of context, and an understanding of the signage's possible interpretation and cultural representation, which will help develop the final artefacts of this project.[32] In contrast, spatial and user journey mapping will be incorporated together to situate the traveller into the space and to know the actions and interactions of the app related to each position of the user.

[32] Alisha Kamran, "The Power of Pictograms: A Study and Guide on How to Create Inclusive Navigational Signage Using Pictograms to Address Low Situational Literacy" (Master of Design Thesis, OCAD University, Toronto, Ontario, Canada 2021), p16.

Figure 56. Marin Virieux, 2022, Signage display of gates in all directions at Bucharest Henri Coanda Airport (OTP), Romania.

Understanding the Users

In the user-research process, a particular focus is on the different needs of the users and on defining profiles that will reflect their different requirements. I employed the "user persona" technique to better understand the target audience and help design interfaces and processes that would meet the needs of different user types (Figure 57).[33]

[33] Mario Pérez-Montoro and Lluís Codina, "Designing User Experience," *Navigation Design and SEO for Content-Intensive Websites*, January 1, 2017, 65–84, https://doi.org/10.1016/b978-0-08-100676-4.00003-1.

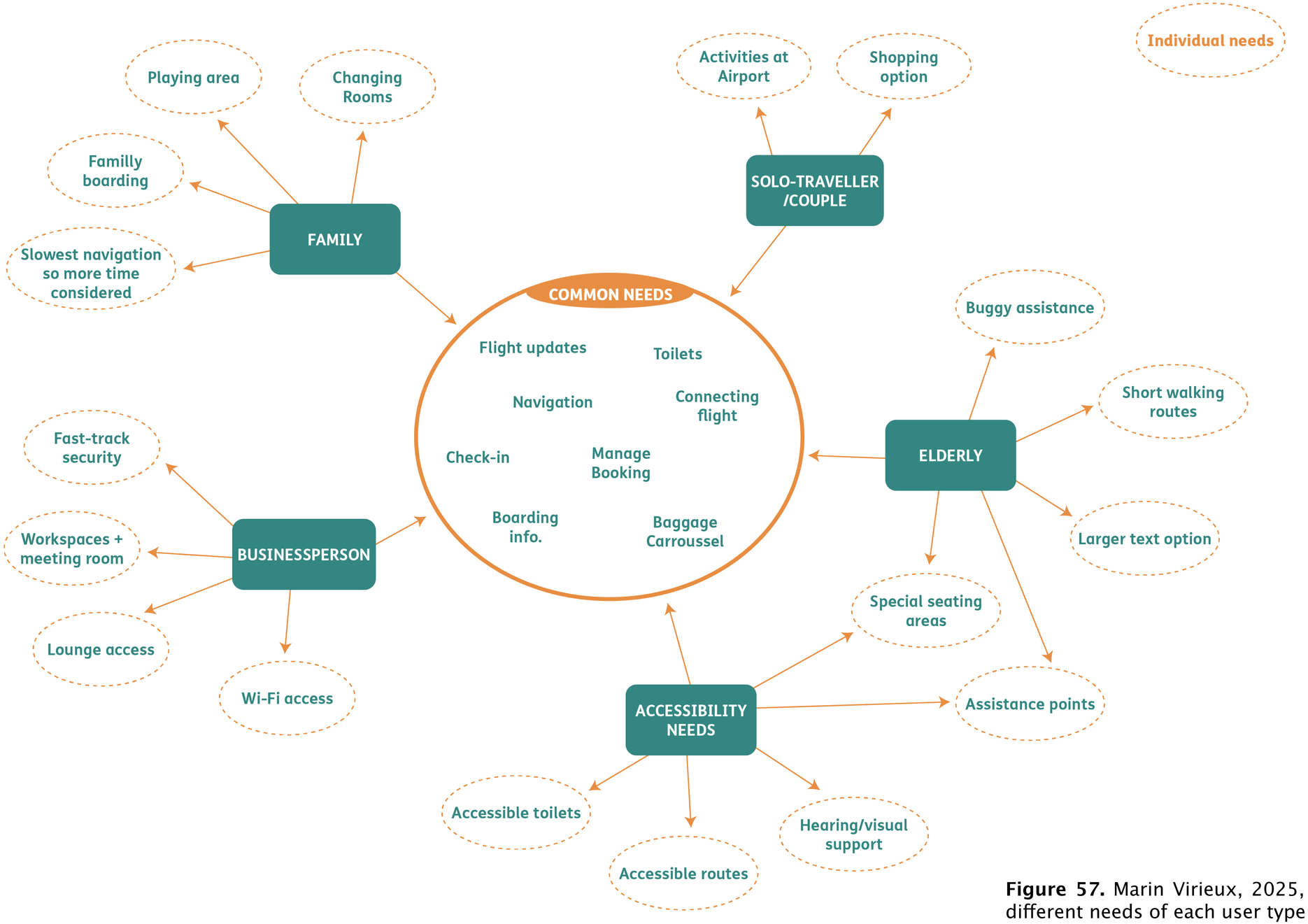


Figure 57. Marin Virieux, 2025, Mind map illustrating the different needs of each user type and their common needs.

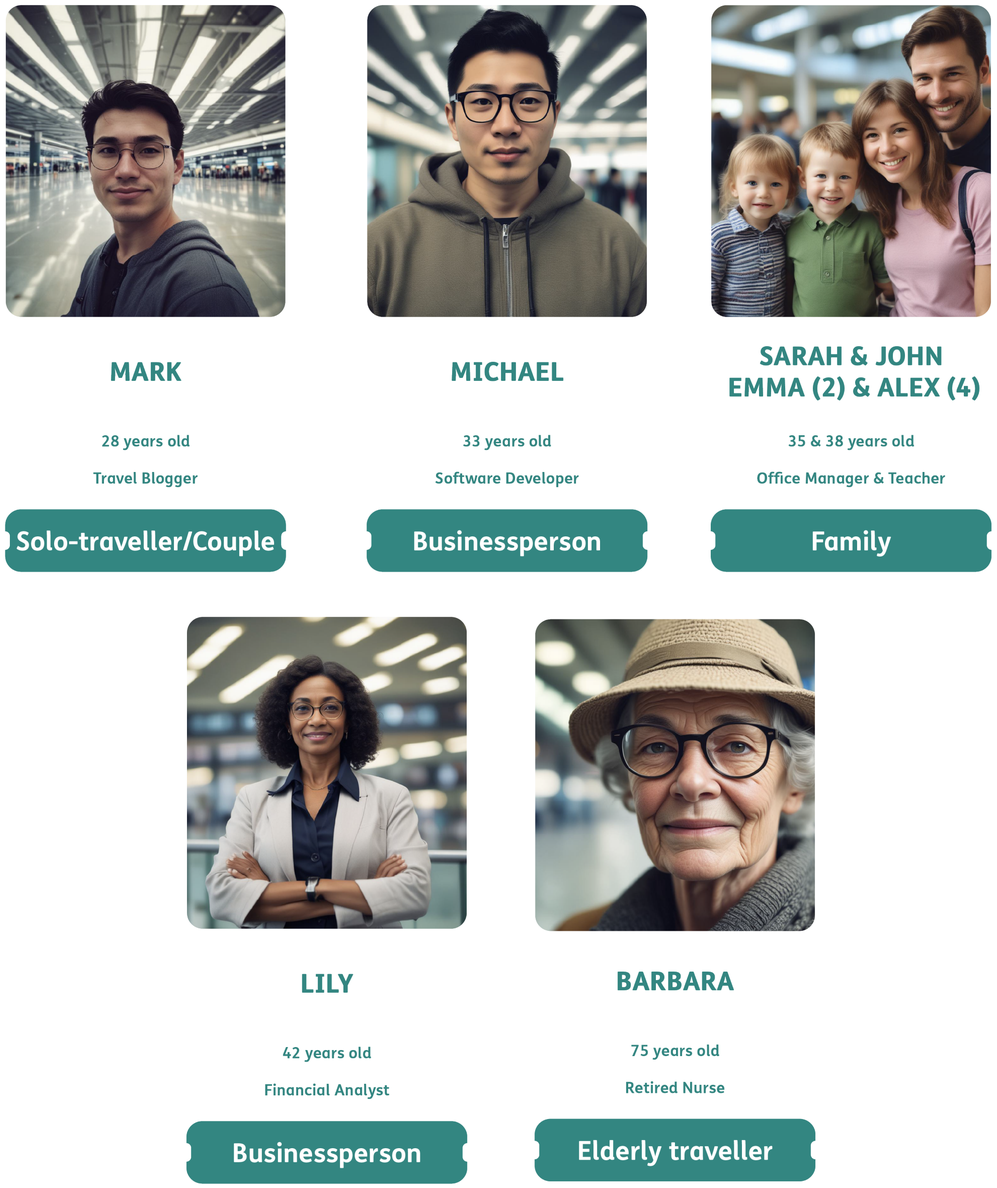


Figure 58. Marin Virieux, 2025, Picture of the different personas briefly explained. Portrait AI generated using Artlist.

I used personas to characterise five different groups of travellers with different needs:

- A person travelling with their family
- Businessperson on a business trip
- Solo-traveller/Couple
- Elderly traveller
- Wheelchair-using traveller

Using personas helps focus on a user-centred design, foregrounding different user groups' behaviours and goals to highlight their various needs and perspectives. The complete persona analysis is accessible in the appendix (Figure 58).

These personas were used in the testing process to simulate a user's specific journeys or tasks to test the app and make changes and refinements if needed, as different users will have different actions. To do so, I relied on a role-playing approach. I positioned myself as a particular user with some needs and used the app to navigate the airport, anticipating their possible needs at each step.

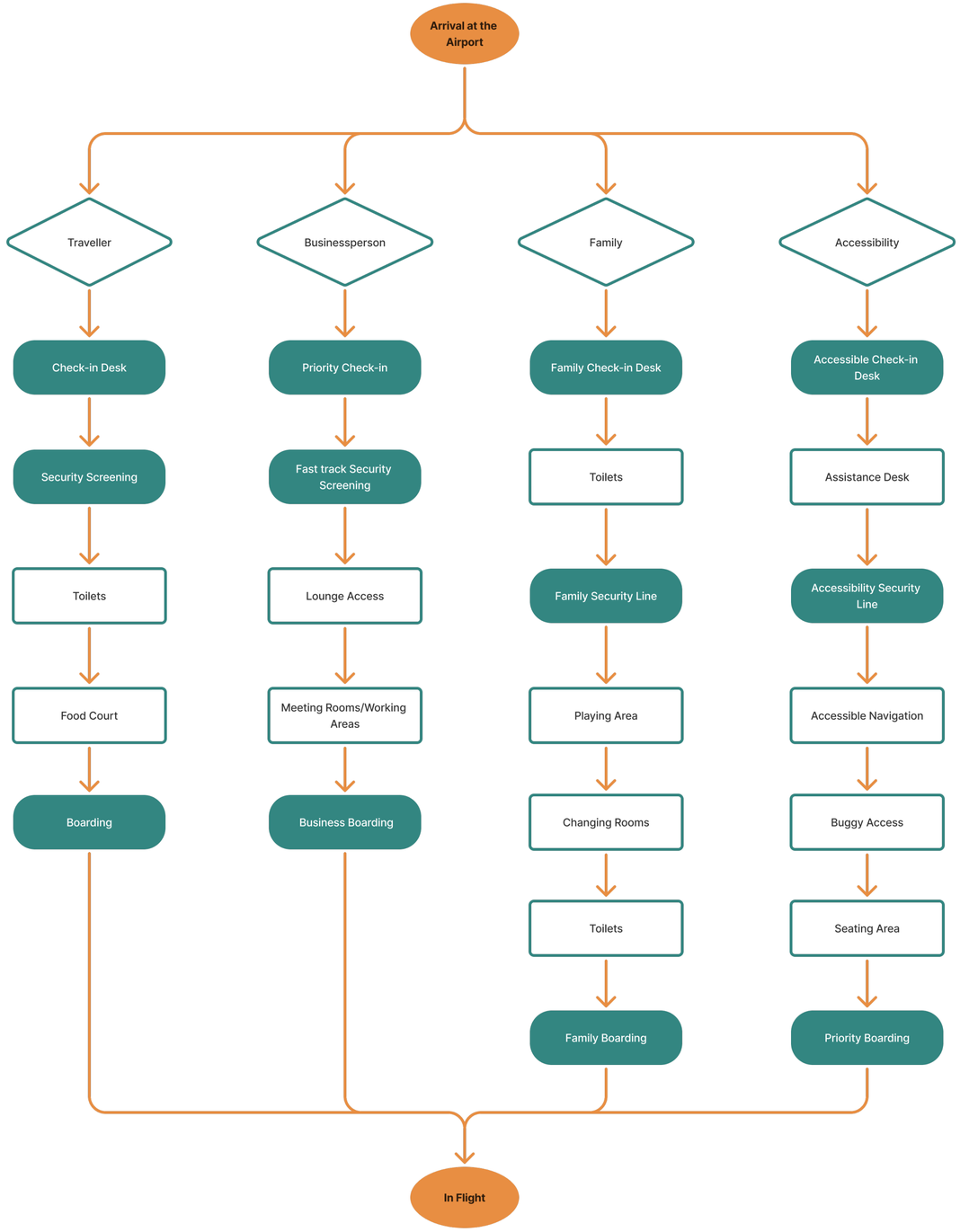


Figure 59. Marin Virieux, 2025, Graphs representing the same list of actions in the navigation in the travelling journey at the airport but with different needs for each respective user group.

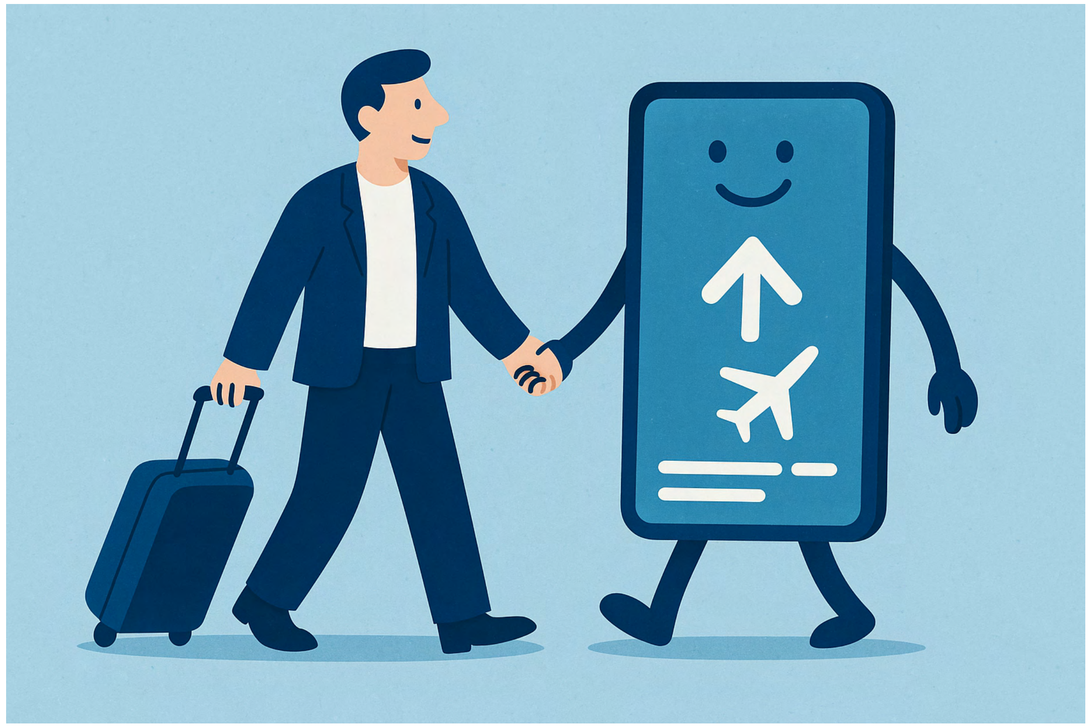


Figure 60. Image of the concept “hand-in-hand” realised by ChatGPT. Image generated by ChatGPT, prompt “Create an image illustrating the concept of hand in hand for a guiding app supporting the travellers throughout their travelling journey at the airport,” April 1, 2025, OpenAI.

The initial step in prototyping is the development of low-fidelity prototypes and wireframes (using Figma) to enable these imagined user tests. In this way, I arrived at the metaphor of an experienced travel guide, aware of personal circumstances and needs. This consisted of visualising the app as a travel guide, companion, and assistant who will help the user throughout their journey and enhance user engagement through storytelling by visualising the journey in time. This could be seen as a guide supporting the user “hand-in-hand” in their journey and always assisting them (Figure 60).

For me, this guide must be like a reliable friend for the traveller, the kind of friend who takes care of the whole organisation for a smooth journey. It has the role of always being present alongside the traveller without being overwhelming or intrusive with excessive notifications or alerts, as it will communicate with the traveller throughout the journey. It will use a friendly tone to communicate calmly and clearly. It will be concise, so as not to distract the user; for example, “Your departure gate is B9, follow this route” or “Welcome to Madrid, enjoy the sun!”

During high-stress moments and critical times, the guide has to stay composed, and as it is like a friend for the user, it reassures them with helpful reminders without stressing them: “Now is a good time to go through security. It is about a 20-minute walk to your gate; no need to rush.” The guide supports a relaxed and efficient journey by keeping information timely, relevant and empathetic.

Here are examples of alerts that the app could send:

- “Time to leave for the airport. Don’t forget your passport!”
- “Need a ride? Here are some transport options from your location.”
- “Welcome to Auckland Airport! Let’s get you checked in.”
- “Next step, security! Estimated wait time: 10 minutes.”
- “Your gate is B2, so you have time for coffee before boarding!”
- “Welcome onboard. Your flight is ready to depart on time; see you in 8 hours!”
- “Your bags are waiting for you on Carrousel 3!”

Through this focus, I could understand the users and the needs of their different profiles. As the user is at the core of the development of this project, my understanding and inclusion of their needs in the prototype have evolved throughout the development, as well as the growth in the personality of the guide that articulates the whole app design and assists the users in their travelling journeys.

CDG · MEL · JFK · GRU · NBO · PDX · FYN · MUC · LAS · BOG · DOH · ZRH · KUL · YVR · ZAX · SCL · EZE · OSL · AUH · VIE · QNB · SYD · NGO · SFO · HEL · XFP · L
YS · LIM · DXB · LGA · FLL · AMS · ZAM · CPT · BNE · RBO · CHC · HND · TLV · MEX · SIN · JNB · HKG · QLT · BKK · ORY · AKL · RAK · FXD · PEK · LIS · DEL · GVA ·

Evolution of Practice

When I started developing the first iterations of the prototype, I focused mainly on the technical aspect of the app, trying to understand each feature and figure out where and how it would be implemented. This approach results from my past five years of engineering studies, where I was taught to think and process information with a focus on the technical aspect of identifying which variables to optimise. It was the only method of process I knew, so I instinctively focused on the features and functionality. This is where, through the struggle of evolution on the UX of the app, I realised that I was overlooking user experience.

That is why, at this point, I encountered a shift in my practice evolution; from focusing on technical functionalities, I moved to a more user-focused and metaphor-driven approach. By seeing the app not only as a set of features but more as a guide, a travel companion that will accompany the user throughout their travelling journey "hand in hand," I switched to a design closer to the user's emotions and engagement. This shift in the development method laid the groundwork for the development of the design, explained in the following section.

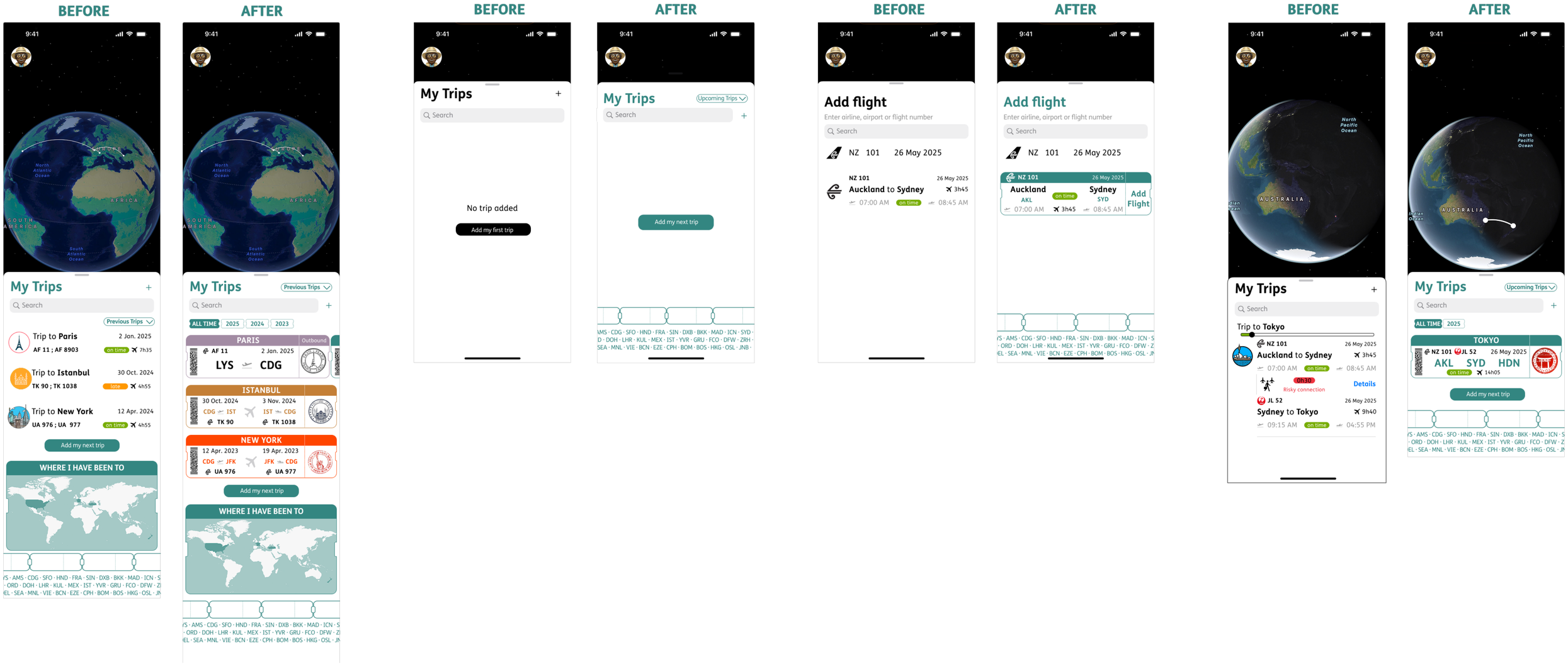


Figure 61. Pictures of the different stages of the prototype.

Figure 62. Marin Virieux, 2023, Madrid Barajas Airport (MAD), Spain.

IV. DOCUMENTATION OF PROCESS

Development of the Prototype

Before starting to design the app, it was essential to understand the users' needs at the airport at each step and at what point they need each piece of information, so these could be implemented smoothly in the app later. The first step, then, is to map the user's journey by reporting all the main stages that will occur at the airport and until their arrival at the destination. I decided that the user will travel from Auckland Airport, New Zealand, to Tokyo, Japan, with a connecting flight in Sydney, Australia. This was done by making a journey map graph as follows (Figure 63).

After mapping all the steps in the user journey, I imagined myself a traveller and considered all the possible needs of the users at each step. Before starting the detailed prototype,

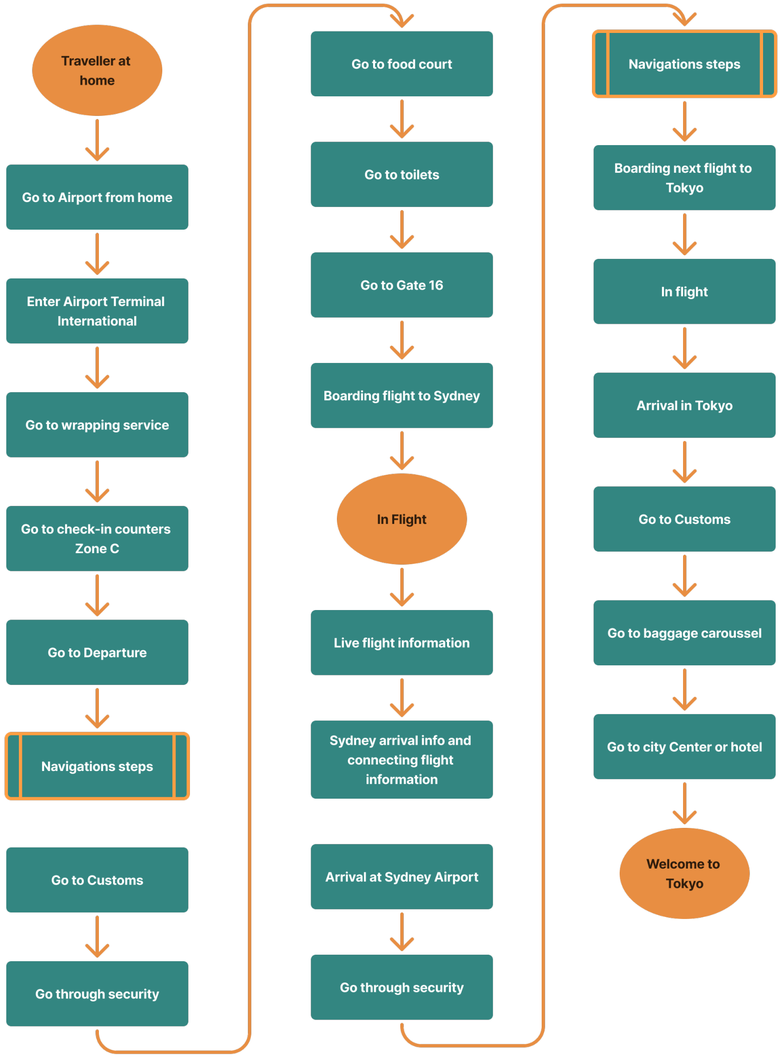
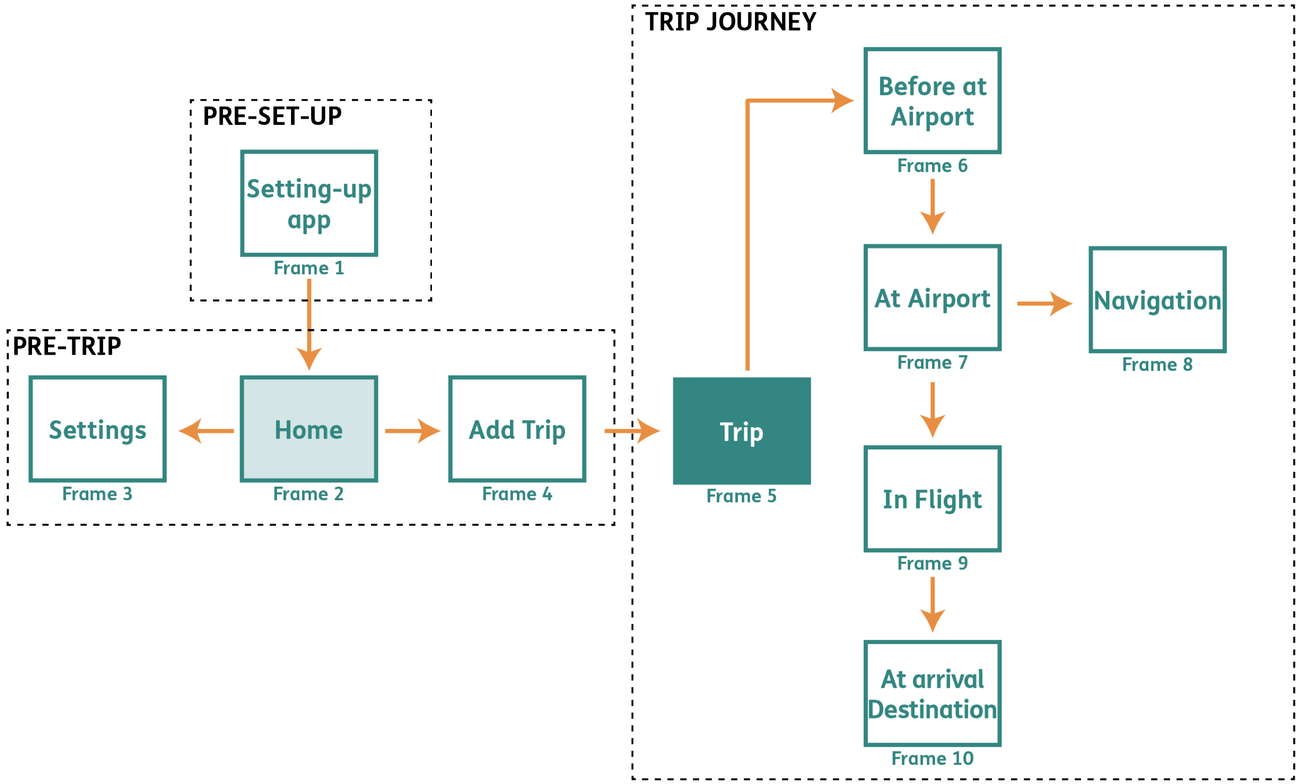


Figure 63. Marin Virieux, 2025, Graph of the journey steps of the traveller at the airport and in their journey until they reach the destination.

I needed to understand and map the primary sequences of user actions in the app and their needs. This helped structure and organise the architecture into different segments and make its development more manageable as the prototype will have many screens due to the numerous features necessary to keep an organised and clear prototype. The following graph is the simplified version of the app's main frames and their explanations (Figure 64). Each frame will be composed of the different prototypes of the screens and the possible actions of the user. The frames in the "Trip Journey" are the most complex as they require the most work to obtain a good and exhaustive flow for the prototype.



PRE–SET–UP:

- **Frame 1:** The first time the user opens the app and sets it up

PRE–TRIP:

- **Frame 2:** This is the main frame when no current trip is in progress. From there, the user will be able to access upcoming and previous trips, add new trips, and access the app settings.
- **Frame 3:** Modification of settings and profile information.
- **Frame 4:** All the steps to add a new trip.

TRIP JOURNEY:

- **Frame 5:** This is the central frame when the user is travelling. From this, the user can access all the trip information

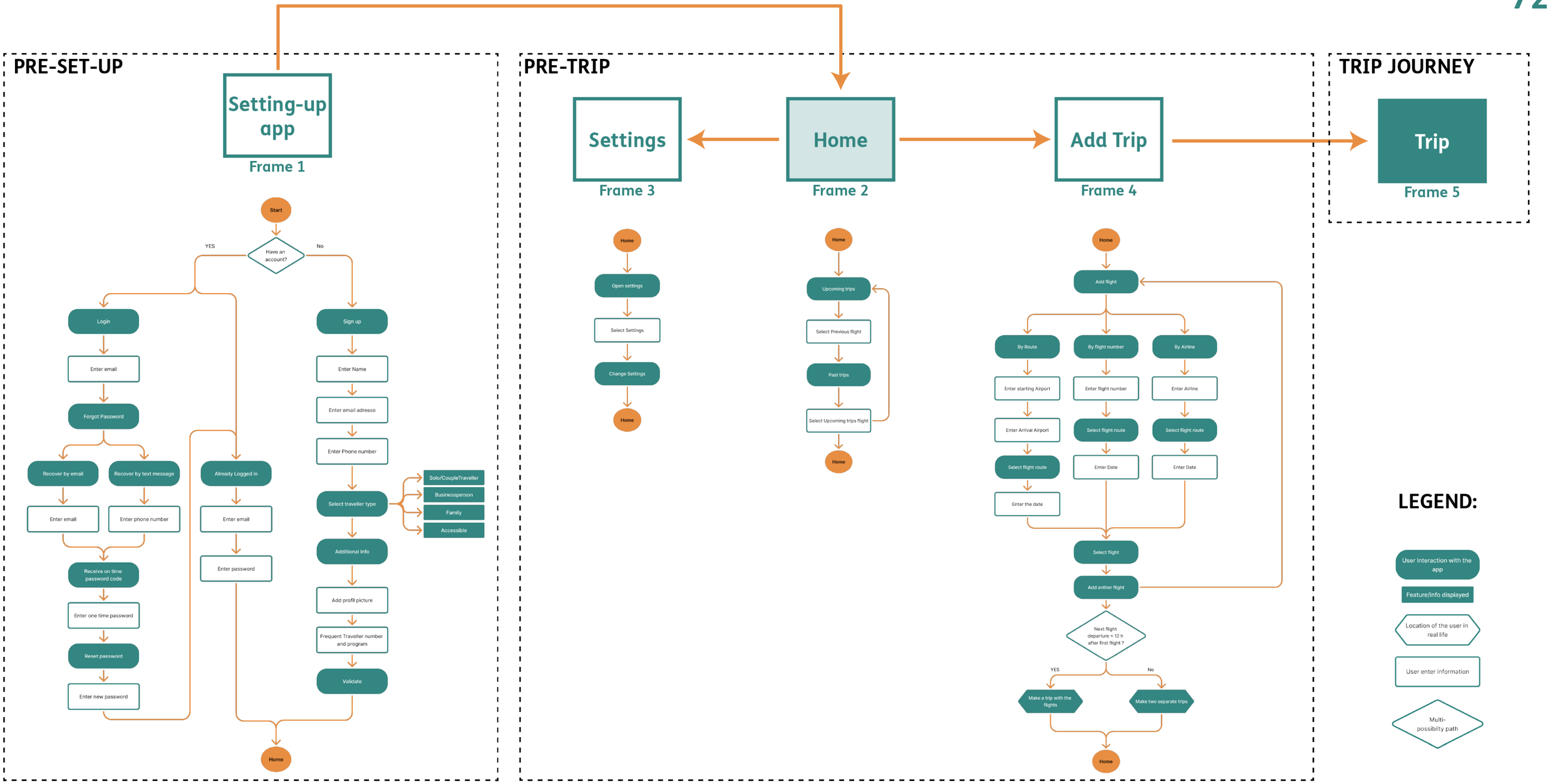
Figure 64. Marin Virieux, 2025, Graph of the simplified version of the mainframes of the app.

and features.

- **Frame 6:** Here will be the interface with the features before arriving at the airport
- **Frame 7:** This frame will have all the features and information needed at the airport and will start to access the navigation feature
- **Frame 8:** Here are all the steps of the navigation features for the prototype.
- **Frame 9:** This will gather the screens while in flight and with the information in case of a connecting flight.
- **Frame 10:** This is the final frame with all the last information for the end of the trip.

This is followed by the development of a more detailed graph based on the organisation of these different frames. This graph analyses the user action, representing each possible action of the user in each frame so that we can obtain a clear app architecture. This will ensure that all the screens and the interactions of the user are accounted for in the development to minimise missing elements as well as situating the needs of the user at each point and, therefore, the associated features (Figures 65 & 66).

Figure 65. Marin Virieux, 2025, Detailed user journey maps of the mainframes of the navigation. Part 1.


PRE-SET-UP
Setting-up app
Frame 1
Start
Have an account?
YES
No
Login
Enter email
Forgot Password
Recover by email
Recover by text message
Enter email
Enter phone number
Receive on time password code
Enter one time password
Reset password
Enter new password
Already Logged in
Enter email
Enter password
Sign up
Enter Name
Enter email adresse
Enter Phone number
Select traveller type
Solo/CoupleTraveller
Businessperson
Family
Accessible
Additional Info
Add profil picture
Frequent Traveller number and program
Validate
Home
PRE-TRIP
Settings
Frame 3
Home
Frame 2
Add Trip
Frame 4
Home
Open settings
Select Settings
Change Settings
Home
Home
Upcoming trips
Select Previous flight
Past trips
Select Upcoming trips flight
Home
Home
Add flight
By Route
By flight number
By Airline
Enter starting Airport
Enter Arrival Airport
Select flight route
Enter the date
Enter flight number
Select flight route
Enter Date
Enter Airline
Select flight route
Enter Date
Select flight
Add anther flight
Next flight departure < 12 h after first flight ?
YES
No
Make a trip with the flights
Make two separate trips
Home
TRIP JOURNEY
Trip
Frame 5
LEGEND:
User Interaction with the app
Feature/info displayed
Location of the user in real life
User enter information
Multi-possibilty path

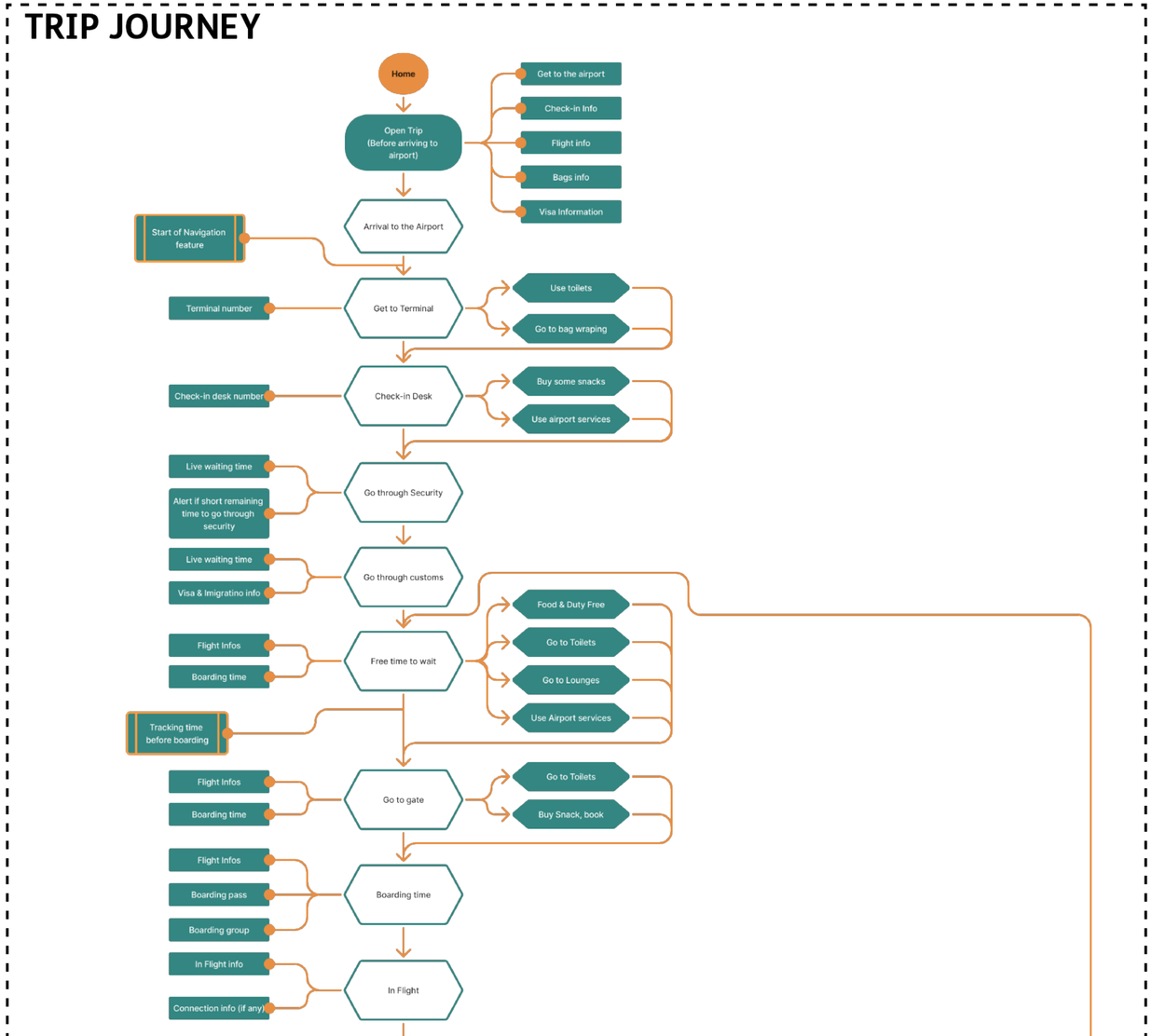


Figure 66. Marin Virieux, 2025, Detailed user journey maps of the mainframes of the navigation. Part 2.

The Metaphor of the Guide

During the prototype development, the use of the metaphor technique was a changing point in my design process. It allowed me to see the app as a travelling guide accompanying the traveller in their journey with personalised help and information at each step of the trip. In real life, a travel guide in anticipates the need to smooth the travel journey (i.e., suggesting the fastest security line based on live data) and give tailored advice (i.e., “Since you are travelling with kids, here is the best family-friendly lounge”), all while keeping informed of real-time updates and information (i.e. “Your gate has changed to B12”). Using this metaphor in the development of the app addresses the challenges of complex and ununified airport navigation. Seeing the app as a guide aims to centralise all the essential

travel information while maintaining a human-centred and intuitive user flow.

Applying this metaphor within the app framework introduces key features that enhance the user experience:

- **Step-by-step journey support:** the trip will be divided into different phases to set a timeline and have various feature options according to each travel phase.
- **Step-by-step directions:** the navigation features will provide detailed navigation assistance in the airport as well as alternative routes or stops to accommodate the various needs of users in the moment of travel.
- **Proactively suggested features:** to accommodate the different needs of users at each stage of their travel and depending on the user profile, the app will be able to track the journey progression and, therefore, enhance adapted features as needed or change them automatically when they are not necessary.
- **Smart push notification:** notifications will communicate and provide information only when needed. It is here to support the user in their journey, such as, "Your check-in counter is now open at Row C;" "Boarding soon! Head to Gate A23 now for an on-time departure."
- **Tips and Facts:** as a guide, you would have some information related to different places to share with a traveller (i.e. the start of construction of one building); the app will also share secondary insight about the destination, such as local currency or time change. Doing this reinforces the engagement with the user while creating the feeling of having a knowledgeable guide rather than just an information tool.
- **Keeping things simple and focused:** the guide gives

relevant information that helps keep the journey clear for the traveller.

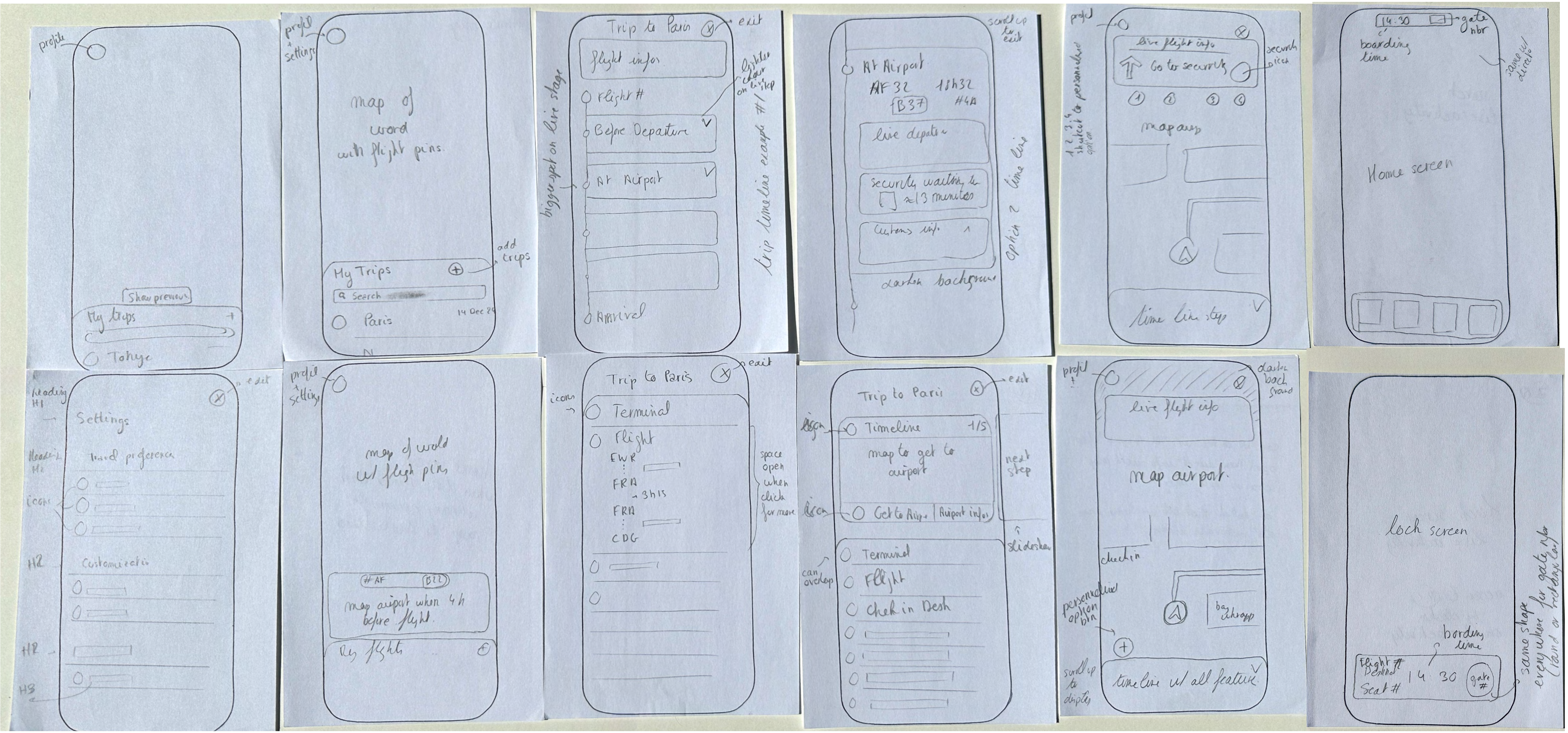
Using this vision to develop the app enhances the concept of “hand-in-hand,” where the app/guide supports and orientates the user in travel. All the information is gathered in one place and personalised based on the journey progression and on the context, so the user is not overwhelmed or searching for critical information, reinforcing the principal value of the personalised wayfinding experience. Also, the concept of time is redefined in the airport’s environments. As airports operate on a 24/7 timeframe, passengers often travel between multiple time zones. Their actions do not follow the regular daily rhythms but are more influenced by flight schedules and global time differences. This is where the guide also helps, assisting the passengers in keeping track of times for them, alerting them if they need to proceed through security quickly, for example, or just informing them that they have time to relax before boarding. In this way, the app plays the role of timekeeper for the passengers, becoming a reliable temporal companion to remove stress, and to support the traveller for a smooth travelling journey.

Prototyping Phases

Paper Wireframing and Early Exploration

As the first step in prototyping development, I started by sketching different possible screens on paper in the shape of an iPhone. I tried doing different functionalities of the app (home page, trip page, settings etc.). These initial sketches are used as low-fidelity wireframes, a simplified representation of the app's structure that focuses on layout and functionality rather than aesthetic details (Figure 67). These various explorations allowed me to quickly explore different layouts to compare multiple design options and the structure of user flow before moving to the digital version of the prototype. At this stage, I focused mainly on the implementation of the features to organise the first principal User Interface (UI) draft of the app. I tried different layouts to obtain a design with all the other elements easily accessible to the user.

Figure 67. Marin Virieux, 2025, Initial sketches used as low-fidelity wireframes for the app development.


profile
Show previous
My trips
Tokyo
profile + settings
map of word with flight pins.
add trips
My Trips
Search
Paris
14 Dec 24
Trip to Paris
edit
flight infos
Flight #
Before Departure
At Airport
Arrival
bigger spot on live stage
trip timeline example #1
At Airport
AF 32
18h32
B37
live depature
security waiting time ≈13 minutes
Customs info
darken background
option 2 time line
scroll up to exit
profile
live flight info
Go to security
security icon
map airp
time line step
boarding time
gate nbr
Home screen
heading H1
Settings
travel preference
icons
Customization
H2
H3
edit
profile + setting
map of world w/ flight pins
#AF
B22
map airport when 4h before flight
icons
Trip to Paris
Terminal
Flight
EWR
FRA
→ 3h15
FRA
CDG
space open when click for more
Trip to Paris
Timeline
1/5
map to get to airport
next step
icon
Terminal
Flight
Check in Desk
slideshow
can overlap
profile
darker back ground
live flight info
map airport.
checkin
personalized option btn
scroll up to display
timeline w/ all feature
lock screen
bording time
Flight #
Seat #
14 30
gate #
same shape everywhere for gate nbr

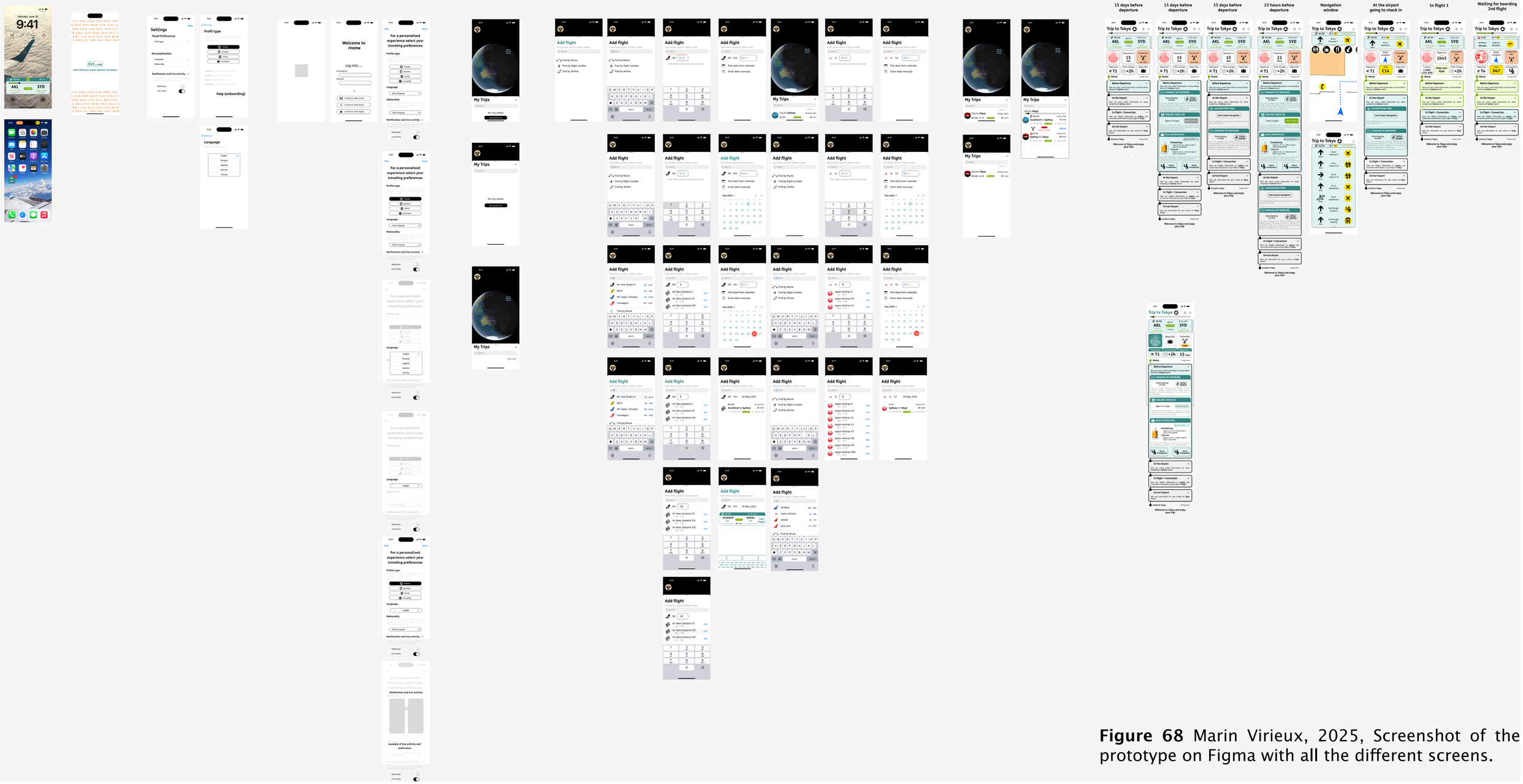


Figure 68 Marin Virieux, 2025, Screenshot of the prototype on Figma with all the different screens.

Digital Prototyping with Figma

After obtaining a simplified UI of the software and a clear structural layout from my paper wireframes, user journey, and flow mapping, I transitioned to Figma, a tool widely used for digital prototyping with an easy interface that does not require coding skills. The shift from physical sketches to digital design was a significant step, allowing for precise proportions, spacing, and interface hierarchy adjustments while ensuring consistency across screens (Figure 68).

Having a digitally simplified prototype allowed me to play with the proportions of the elements, unifying the visual aspect of the app by defining the spacing, and the font and element sizes. Aside from helping to determine each element's proportion in the app, the different wireframe prototype iterations were used to test different designs and compare them. This is seen in Figure 69, which presents three early-stage iterations of the same page, each using a different font to determine the final typeface for the app.

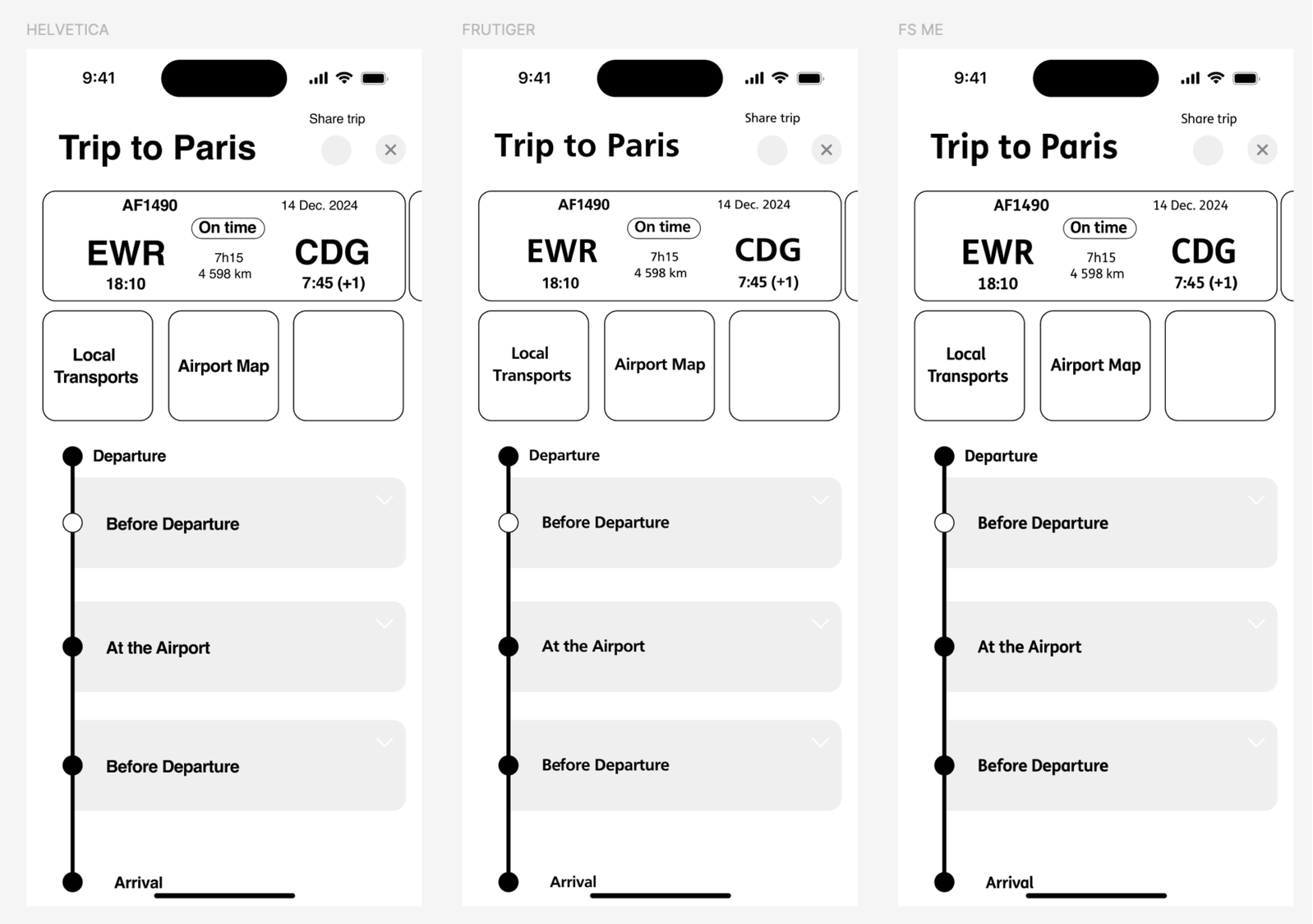


Figure 69. Marin Virieux, 2025, Comparison of three early-stage iterations of the same page, each using a different font: Helvetica, Frutiger and FS Me. This comparison allowed me to evaluate the visual result of each typeface. In the end, I selected FS Me for its clarity, readability, and visual appeal, as it best aligns with the tone and accessibility goals of the app.

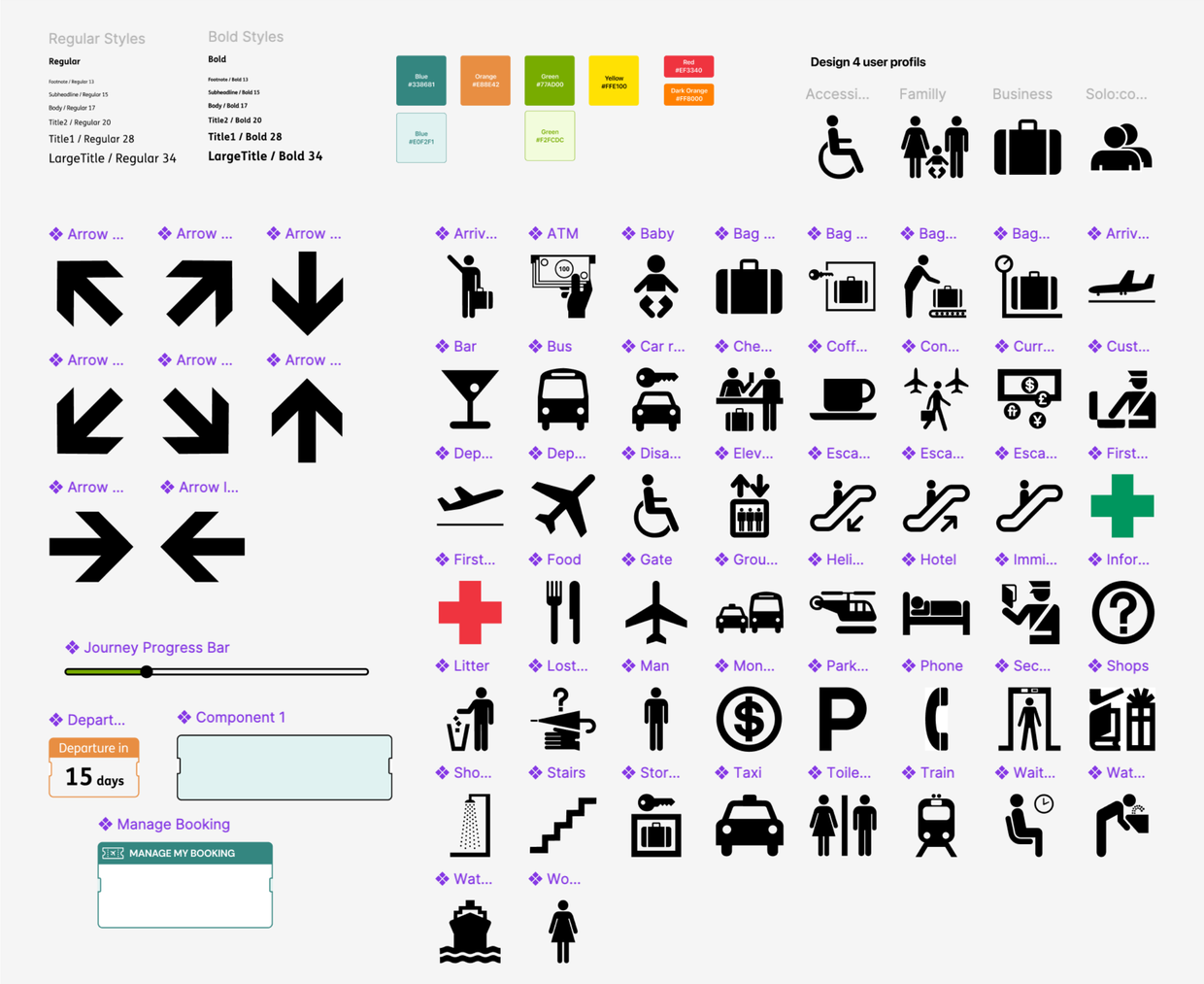


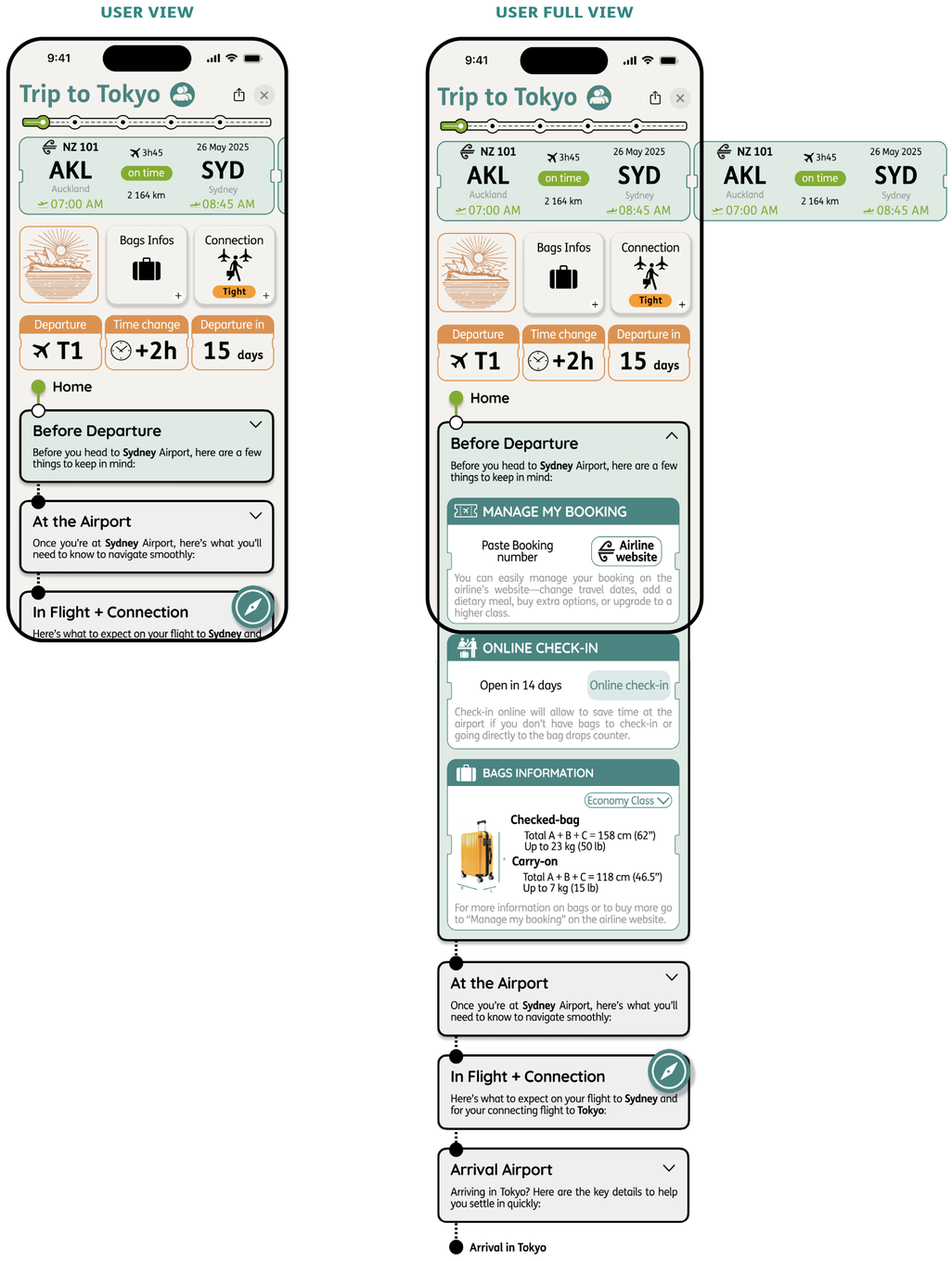
Figure 70. Marin Virieux, 2025, Component library with the main graphic elements of the app.

Design Refinements and Challenges

Once the wireframe prototypes were finished and the basic layout structure for the app was provided, I started creating a component library centralising all the UI elements, including icons, typography, colours, and interactive components. This library of predefined elements and rules aims to maintain a sleek, unified, and scalable design system to apply to all the app sections (Figure 70).

As the goal of the app is to support the traveller in their journey, it needs to offer an instinctive, easy-to-use, and understandable design. That is why it is crucial to facilitate the user experience and orientate them in their journey effortlessly by using consistent designs.

Figure 71. Marin Virieux, 2025, Last version of the trip page of the app on April 28th.



During the development stage, I made numerous design iterations to test different element layouts. The trip page (Figure 71) was the most challenging part of the design. This page needed to display multiple layers of information, flight details, navigation support, and real-time updates without overwhelming the user. While the app's core concept revolves around having all travel information in one place, the initial layouts felt cluttered, reducing clarity and usability.

Playing with the spaces and colours helped reduce the feeling of excessive elements on the page. However, the most effective solution was the "progressive disclosure principle," where the essential content is kept in the primary UI while the advances and extra information are available "upon re-

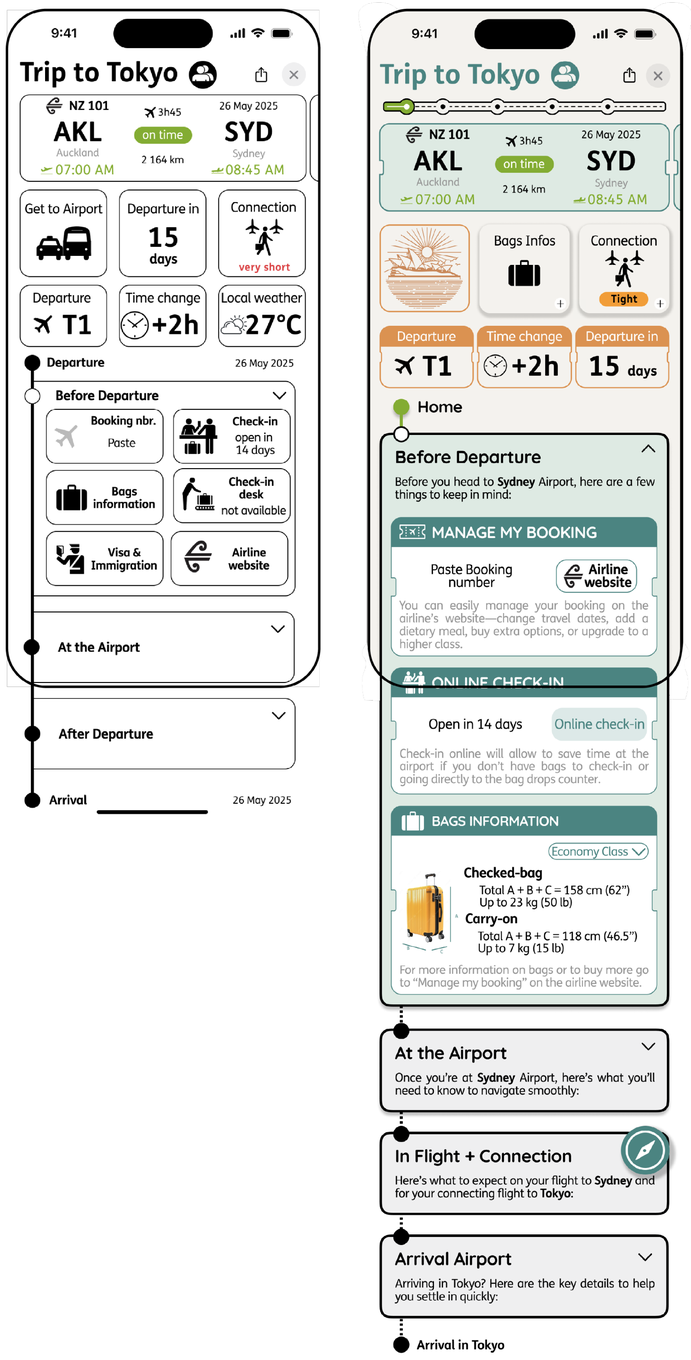


Figure 72. Marin Virieux, 2025, Before and after of the clogged trip page with analysis of solution used to improve it.

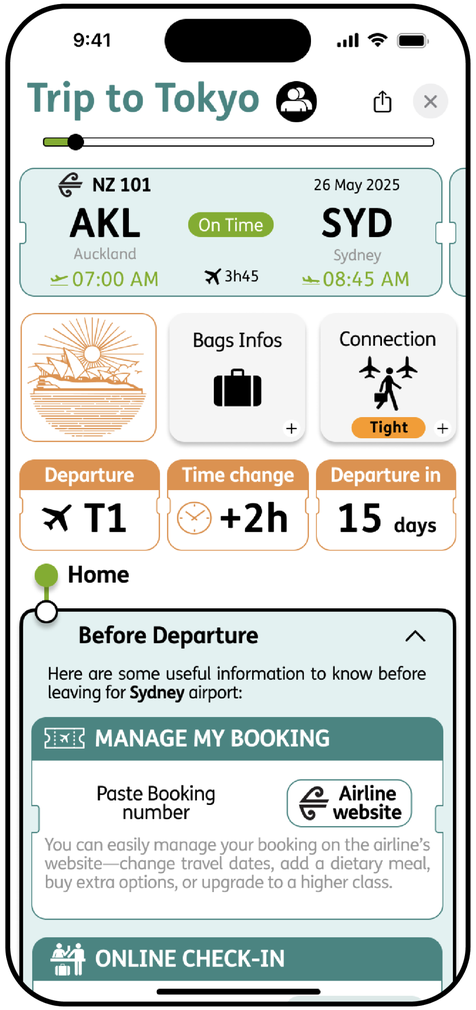
quest" when the user needs it.[34] This technique aims to improve usability and readability by using accordion sections or overlay windows – in my app this was achieved by using collapsible sections for each step of the trip and overlaying windows with extra quick-access information onto the main window. Doing so allowed me to reduce the information overload while maintaining accessibility and an easy-to-use design (Figure 72).

[34] Interaction Design Foundation, "What Is Progressive Disclosure?," (Interaction Design Foundation, September 13, 2016), https://www.interaction-design.org/literature/topics/progressive-disclosure?srsltid=AfmBOornZhS22kPs5J-2zvWlb1PY7tI8dF66_9_9Mrg7szwJzFKFT9Ef.

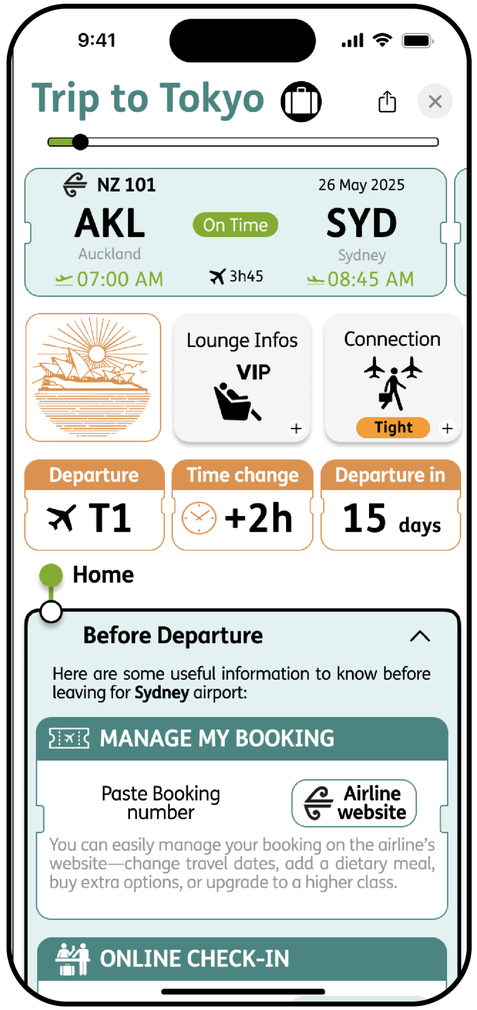
Another technique I used to reduce the information overload was filtering the displayed information based on the user's profile. To implement that, I used the user profile information as a filter, meaning that the app displayed only the relevant information to that particular user-type. This approach hides unnecessary or irrelevant content, simplifying the interface and helping the users focus on what they need most (Figure 73).

The following pictures illustrate the development process of the app at different stages (Figure 74 & 75).

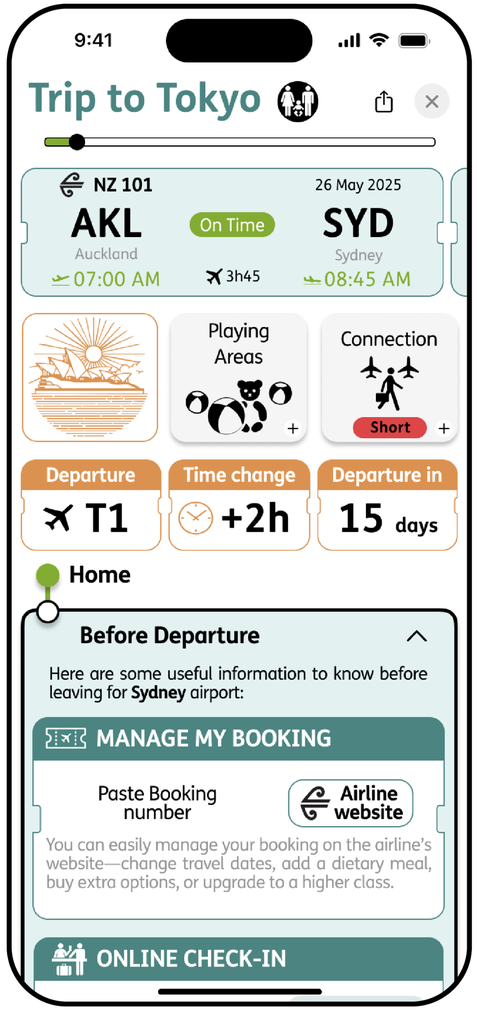
SOLO TRAVELLER / COUPLE



BUSINESSPERSON



FAMILY



ACCESSIBLE

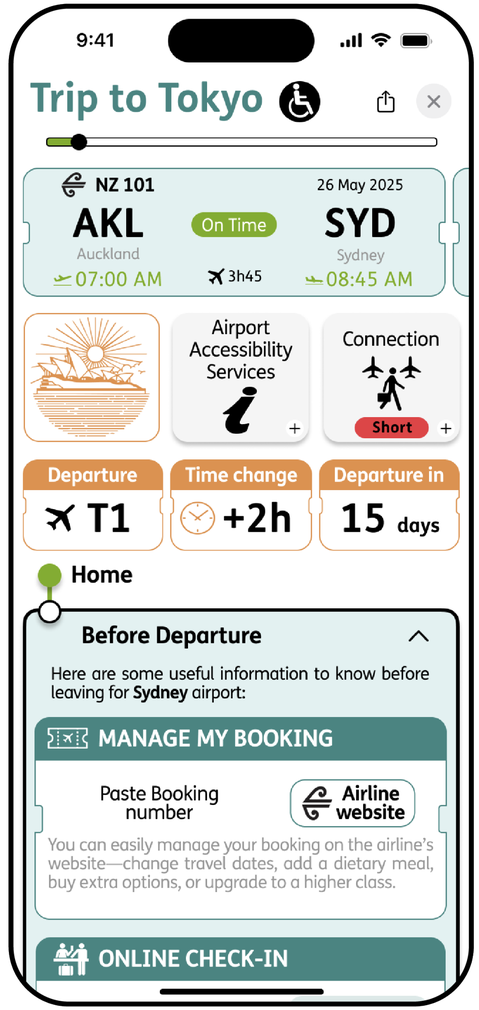


Figure 73. Marin Virieux, 2025, Image of the four user profiles and possible differences in features.

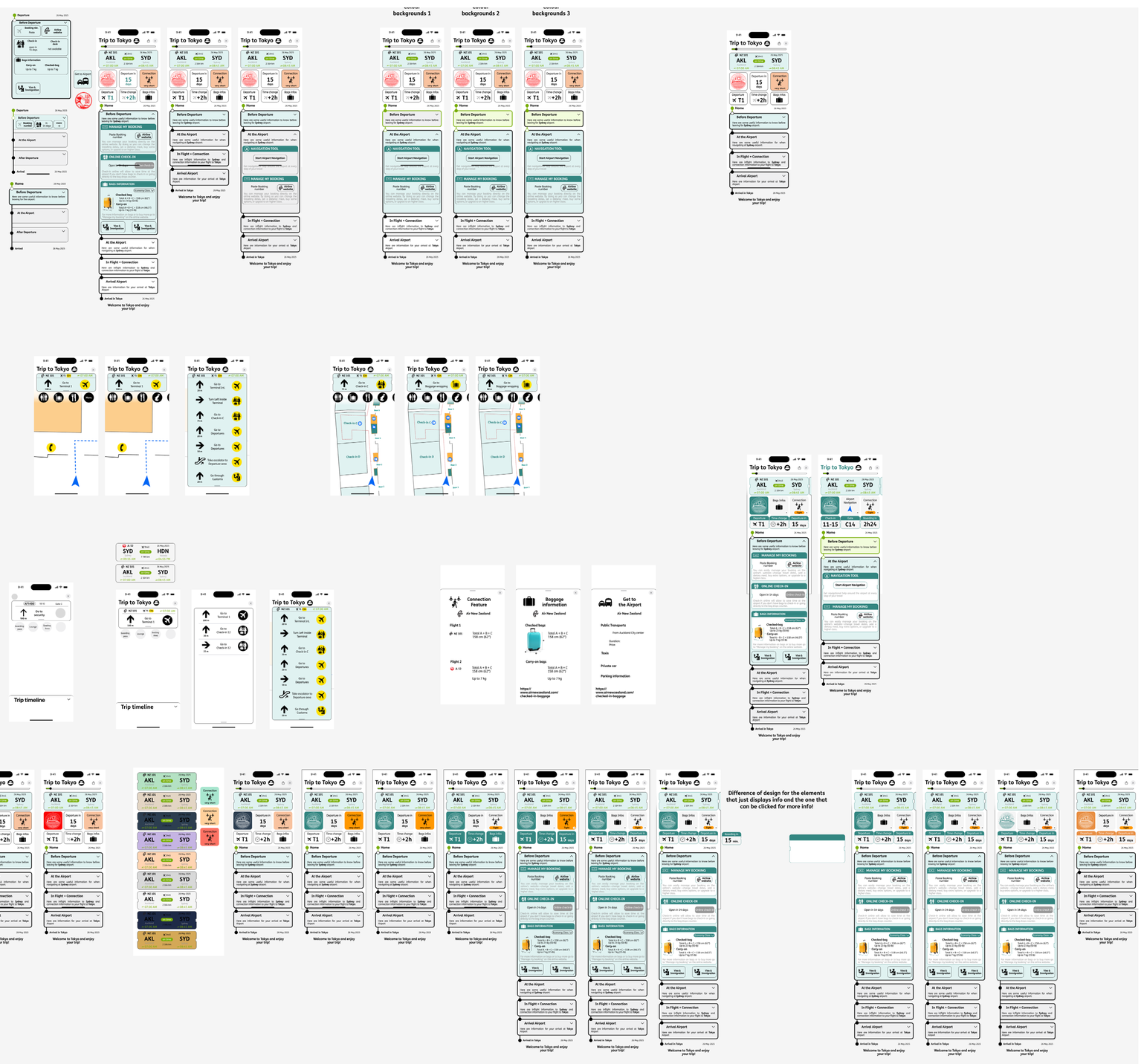


Figure 74. Marin Virieux, 2025, Screenshot of the progress of the app at different stages and on different pages. Part 1.

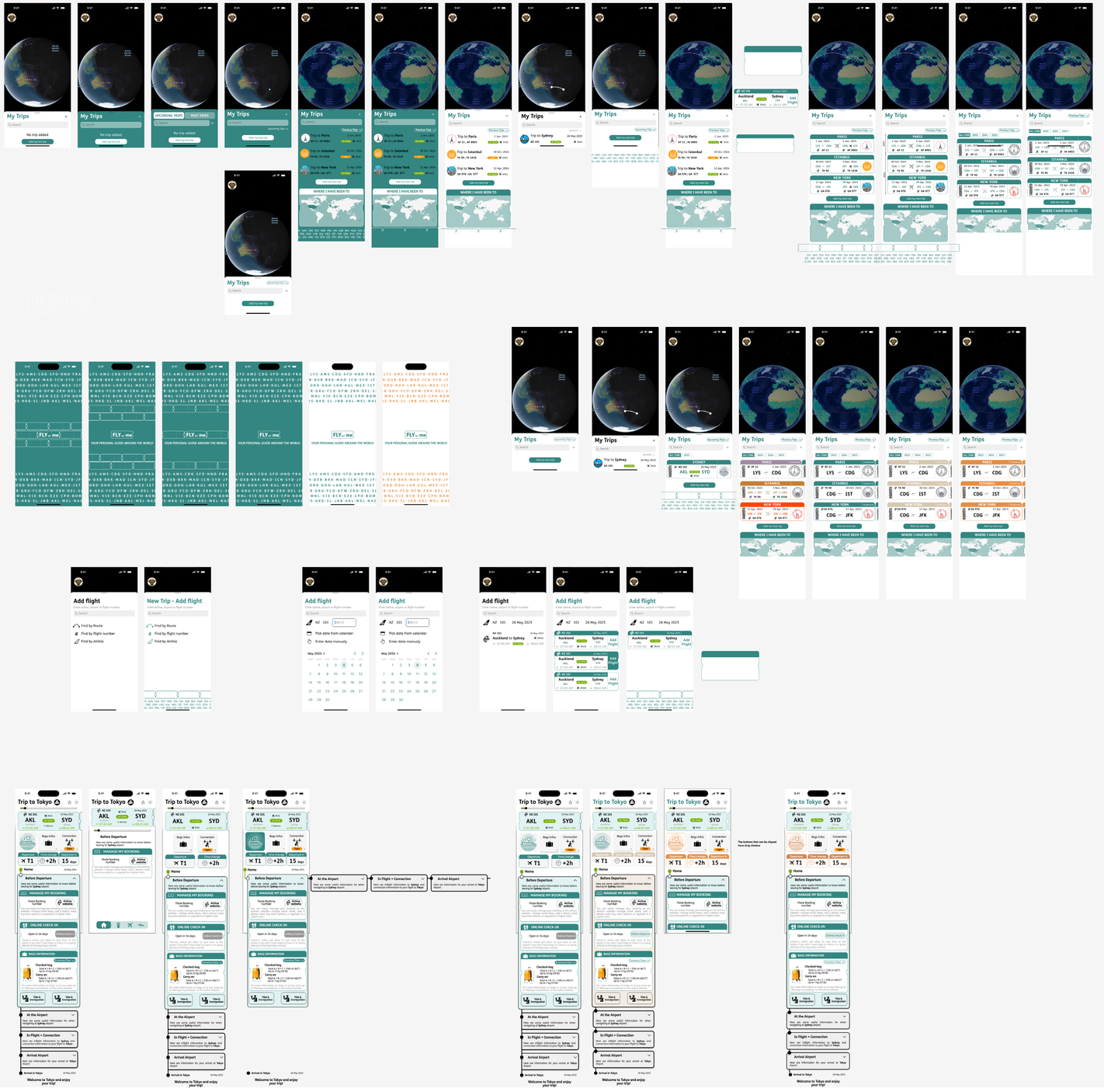


Figure 75. Marin Virieux, 2025, Screenshot of the progress of the app at different stages and on different pages. Part 2.

Unique Visual Identity and Inspiration

An essential active element that has been incorporated into the trip page is the progression bar to show the user their progress and give them a sense of where they are in the timeline of their journey (Figure 76). For the flight information section, I designed this as a widget that will display in the same way on the lock screen of the phone (Figure 77). Hence, the user always has their information accessible effortlessly to support them in their navigation in the airport. For the design of this section, I drew my inspiration from the live activity widget of the Lufthansa app and from Google Maps (Figures 78 & 79).

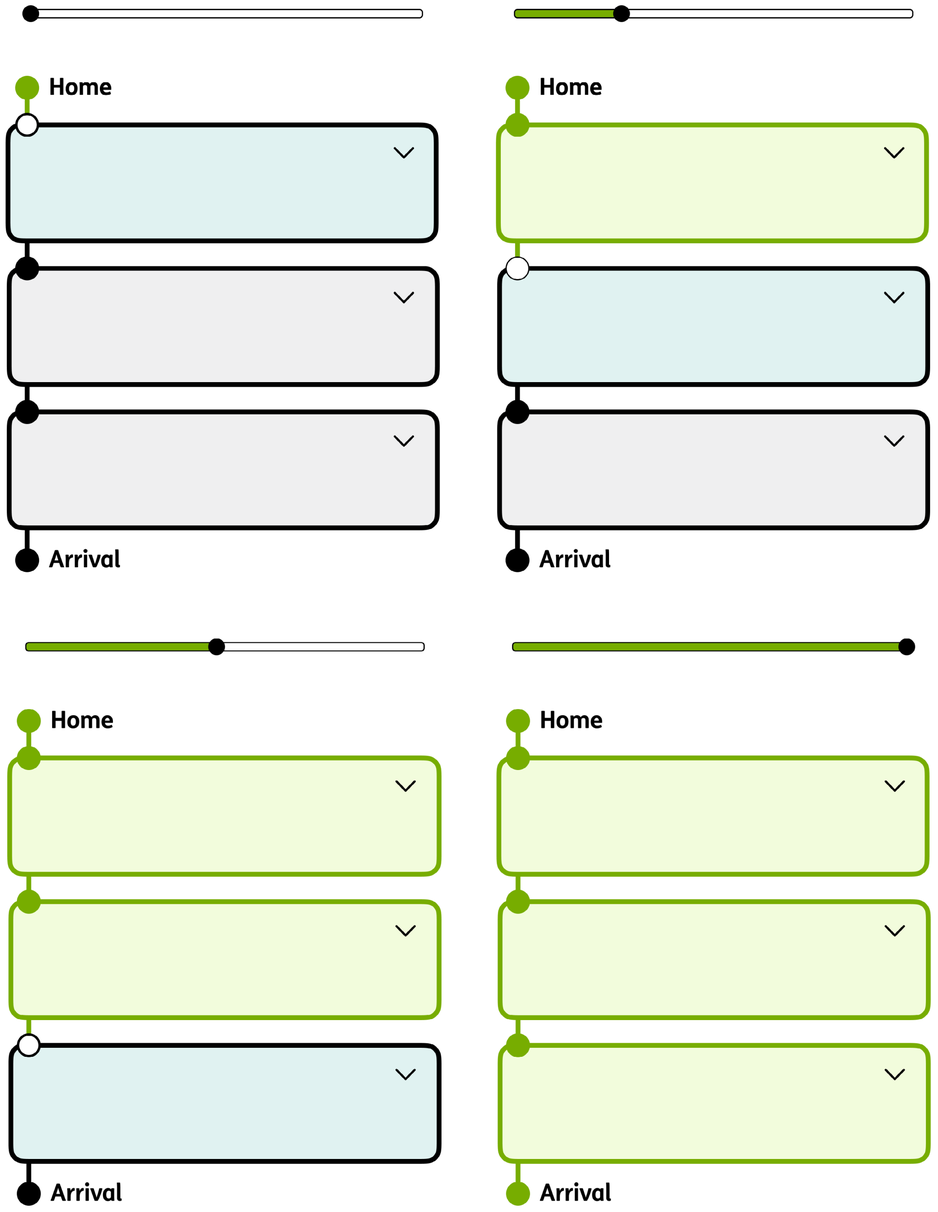
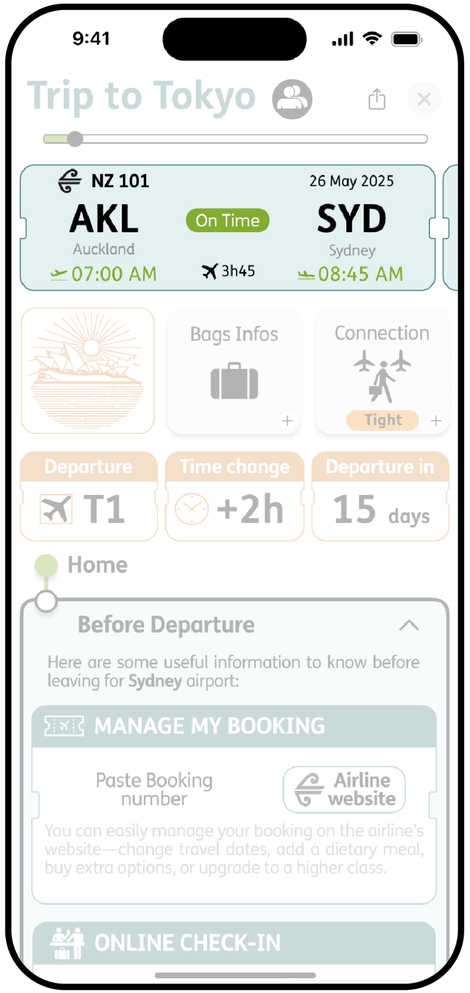
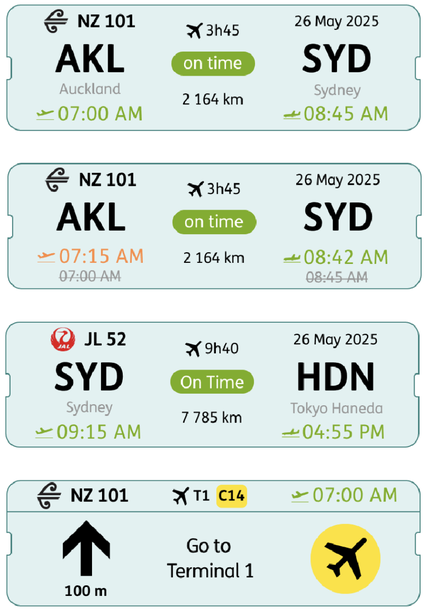


Figure 76. Marin Virieux, 2025, Frame with the progress bar in multiple positions to show the user's progression in their travelling journey. Having a visual timeline helps the users to situate themselves in time.

LIVE ACTIVITY WIDGET



DIFFERENT VERSIONS OF THE LIVE ACTIVITY WIDGET



LIVE ACTIVITY WIDGET ON LOCKED SCREEN

LIVE ACTIVITY WIDGET ON HOME SCREEN

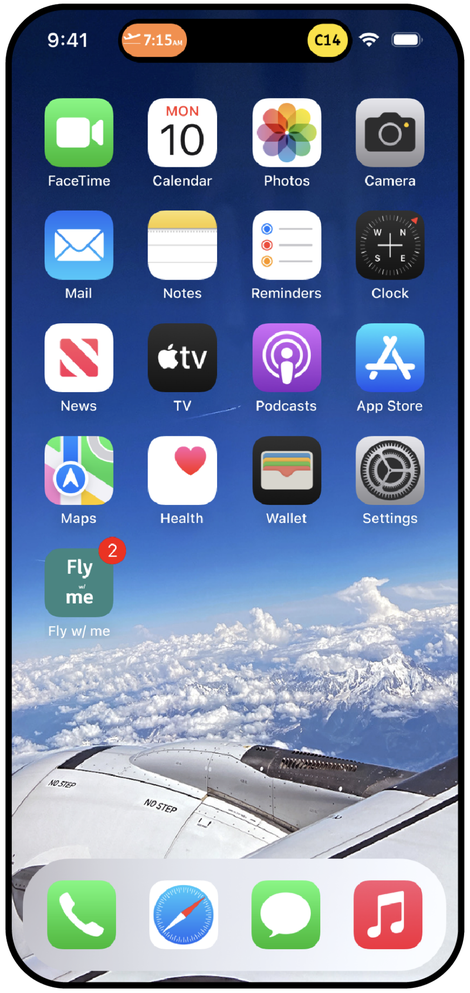


Figure 77. Marin Virieux, 2025, The various flight information is displayed as a live activity widget.

Figure 78. Marin Virieux, 2025, Screenshot of the Lufthansa app live activity widget.

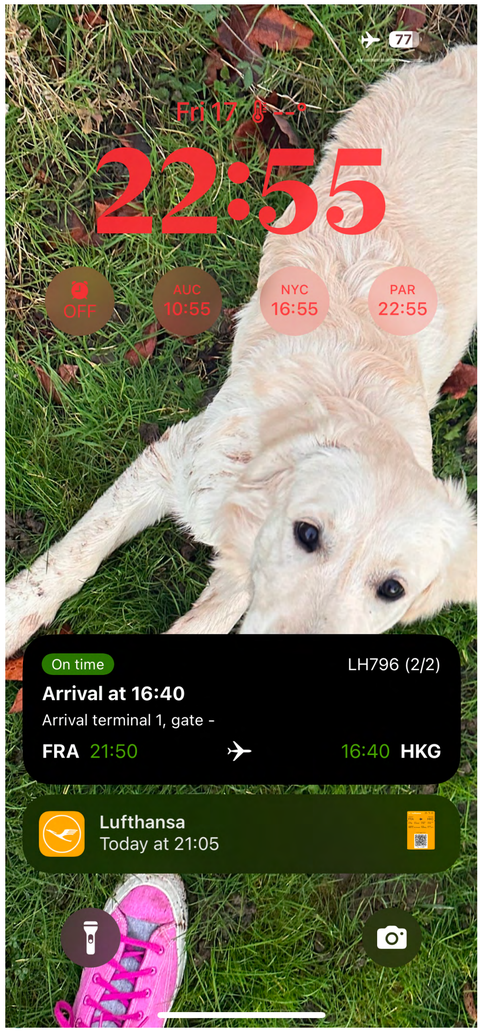
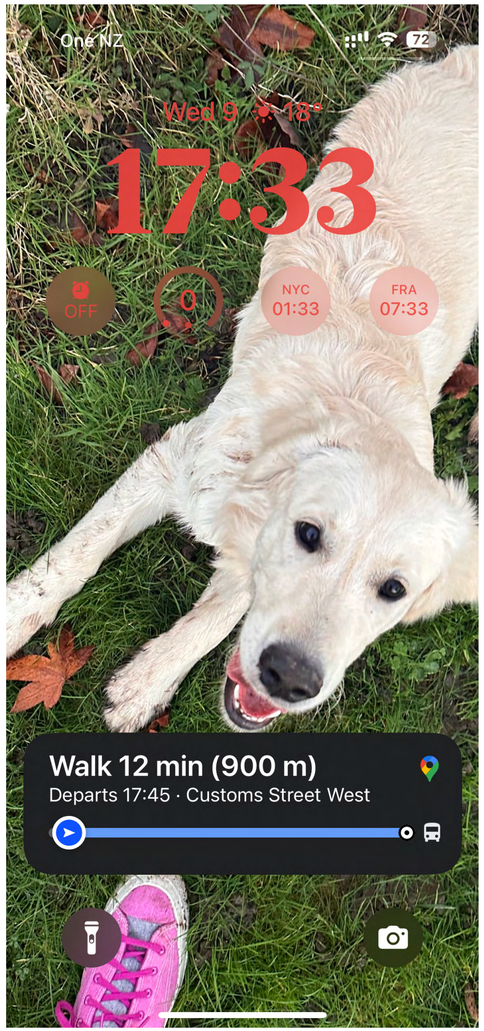


Figure 79. Marin Virieux, 2025, Screenshot of the Google Maps app live activity widget.



At some points in the app's design development process, I was frustrated by trying to obtain a functional result for the user while also giving the app personality and keeping the user entertained. I tried changing the colours and the sizes, but it kept feeling off. One day, while doing my collage for my personal travel book where I collected all my travel, boarding passes, museum entrance, and transport tickets (Figure 80) I realised that boarding passes have a universally recognisable shape, making them a firm visual reference to travel (Figure 81 & 82). It has a particular detail, a small notch on both extremities, making the shape easily recognisable. By incorporating this distinctive notch design into the UI elements and the concept of boarding passes for the flights, the app's design reinforces the theme of travel, evoking familiarity and emotional engagement as well as having a visual identity rooted in real-world travel elements.

Figure 80. Marin Virieux, 2025, Picture of my travel book as a source of inspiration.

Figure 81. Marin Virieux, 2025, Pictures of the boarding passes shapes with the notch. Part 1.

Figure 82. Marin Virieux, 2025, Pictures of the boarding passes shapes with the notch. Part 2.

Implementing this visual concept is closely related to the metaphor of the guide concept as it represents some memories of travels and allows us to make some links between the virtual guide and reality (Figure 83).

To go further in this reflection on the travel book, for the page of upcoming and past trips, I have again used the boarding pass design to display the flights, and I added a city stamp – this will be an illustration of an emblematic element from each city to remind us the idea of travel and the traveller's journey as a memory (Figure 84).

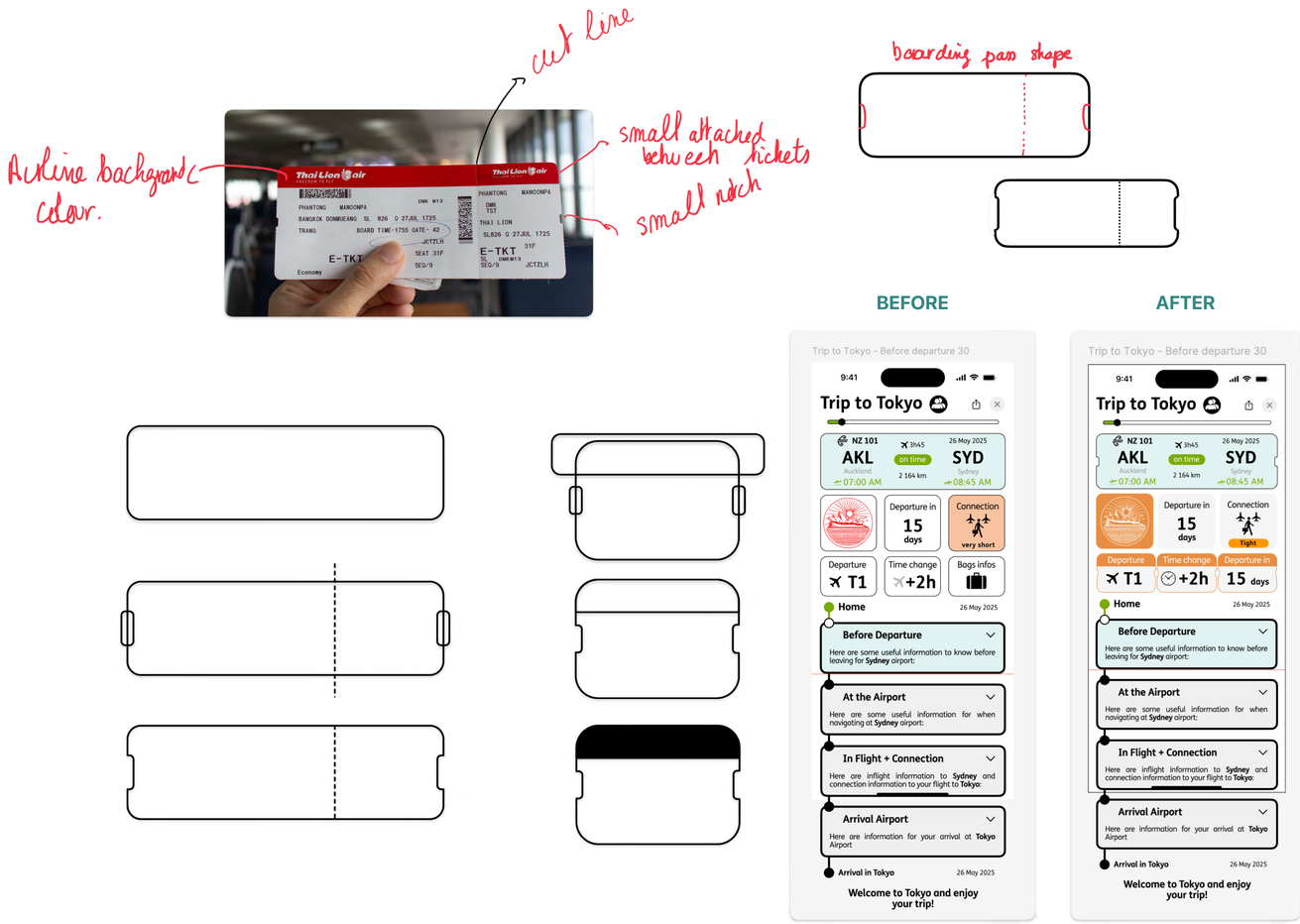


Figure 83. Marin Virieux, 2025, Screens of the implementation of the notch in the design.

CHRONOLOGICAL ORDER

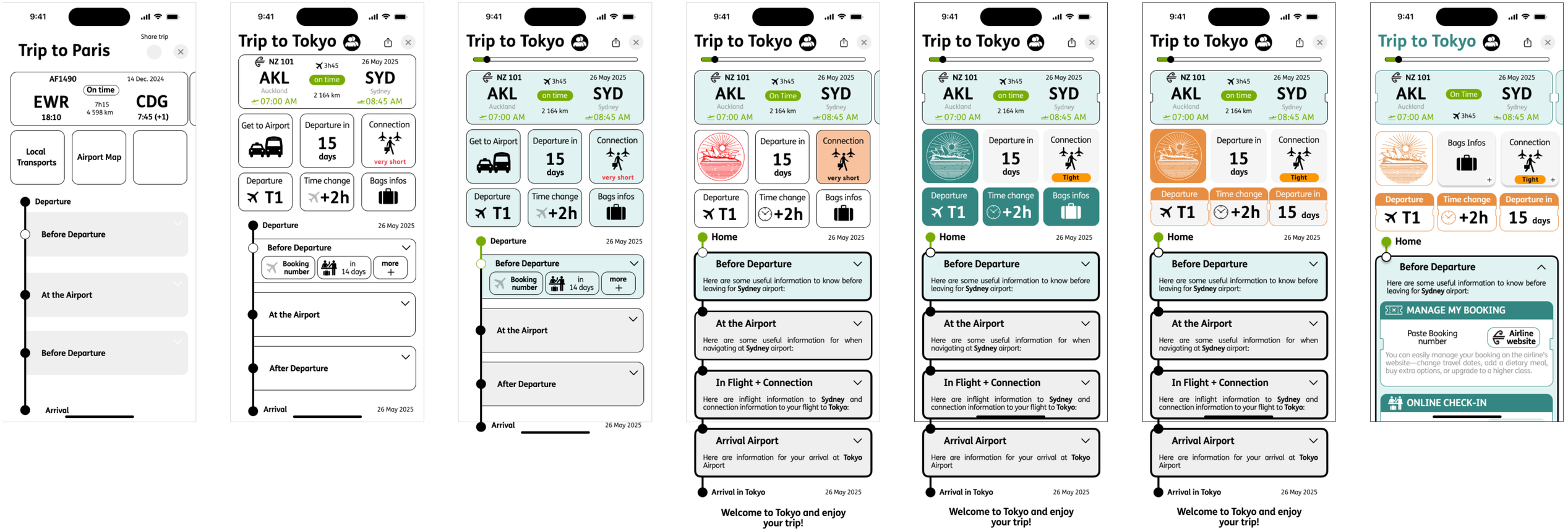


Figure 84. Marin Virieux, 2025, Screen of the trips page evolution and with some annotations.

The metaphor of the guide was visually embedded in the app through the elements, as stated before, but it is also present as an essential feature – "the navigation." This feature supports the traveller to navigate the airport by using unique indications: this is similar to Google Maps, but inside the airport. In this feature, the guide monitors the user to verify that they are on time for the flight, are following the steps required before departure, and are in the correct location. Through this feature, the guide gives navigational information and real-time assistance to orient the user in the airport and follow their progress. This addresses the most significant need of travellers for navigation assistance inside the airport, with the possibility of adding stops effortlessly during the journey through the airport, as if the user is just asking their guide to bring them to a stop before boarding (Figure 85).

Finalisation and Implementation

At this stage, there are still many changes to make to the prototype; this will be more in the design details, such as the final choice of colours, icons, and graphic changes to finalise the tone of the app. After making these choices, I will be able to develop the prototype across the different pages so I can obtain a flow and some working examples of the mainframes of the app.

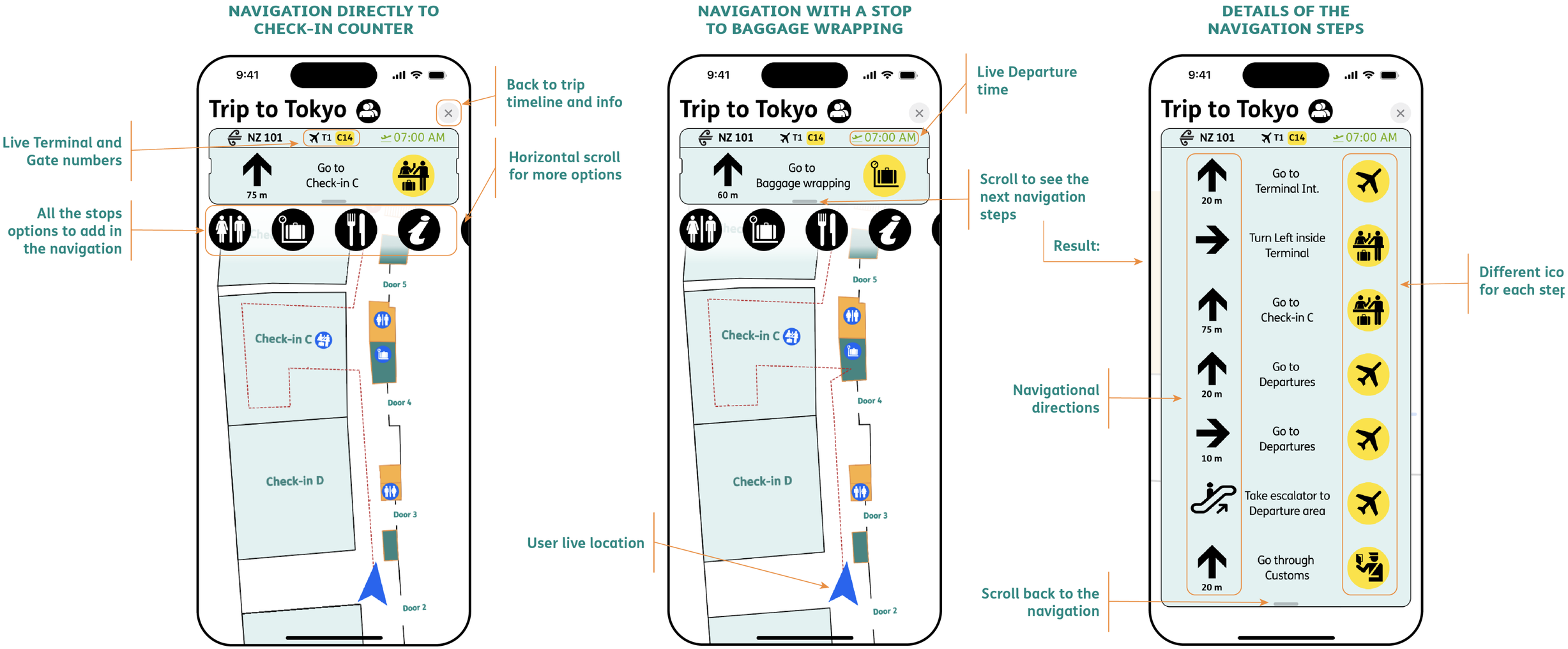


Figure 85. Marin Virieux, 2025, Screen of the navigation screen with the details of the step and the possibility of adding a stop using the round options.

Font and Icon Choices

For the design elements, I have chosen to stay close to the signage style used in most airports. This approach ensures consistency between physical airport signage and the app, reducing the effort for users and reinforcing the connection between both sources of information. That is why I have selected the sans serif font similar to Helvetica, "FS me," because of their high readability and wide use in airports[35] (Figure 86). The icons I have chosen are those used in airports worldwide, originating from two international standards: ISO 7001:2023 and DOT (Department of Transports) (Figure 87).

[35] James R Harding et al., "Wayfinding and Signing Guidelines for Airport Terminals and Landside" (Washington, D.C. Transportation Research Board, 2011), p137.

THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG

01

THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG

SMALL TITLE

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat.
Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros.

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae

FS ME

Uppercase - Regular
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Uppercase - Bold
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Lowercase - Regular
a b c d e f g h i j k l m n o p q r s t u v w x y z

Lowercase - Bold
a b c d e f g h i j k l m n o p q r s t u v w x y z

Regular
0 1 2 3 4 5 6 7 8 9

Bold
0 1 2 3 4 5 6 7 8 9

Figure 86. Marin Virieux, 2025, Presentation of the font chosen for the app.

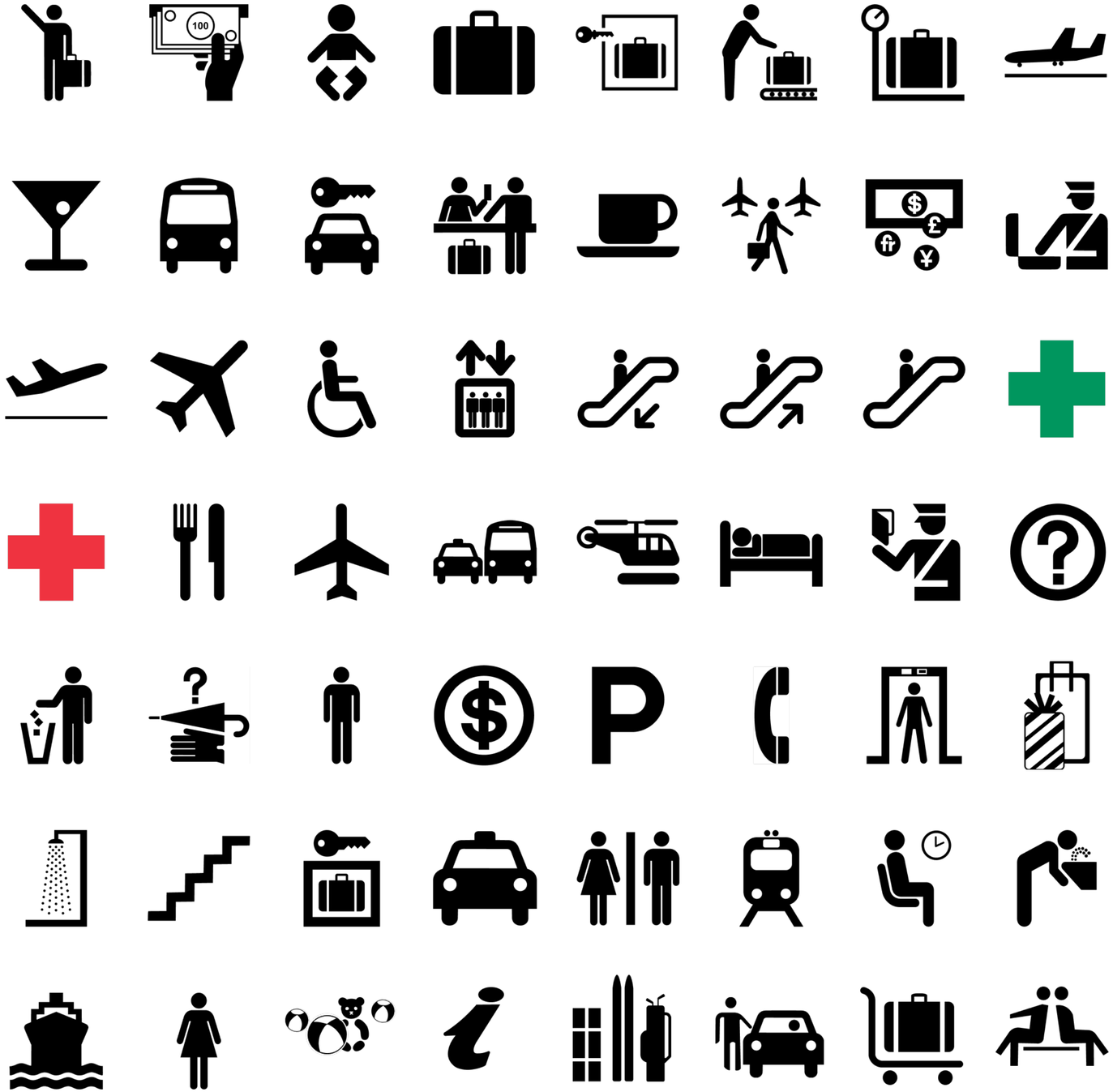


Figure 87. Marin Virieux, 2025, Screen of all the icons chosen for the app.

For the colours, the primary colour is blue #338681, (Figure 88), chosen as a calming colour that will relax the user but also link to travel and the colour of the sky. Blue contrasts nicely with the white background for better readability and clarity. To complement this, I wanted to include a warm colour that contrasts well with the blue, and chose the orange hue #E88E42 (Figure 89). This colour represents the warm sun in the early morning: as the airports operate on a 24/7 timeframe, there is always a special feeling about being at the airport in the middle of the night and then witnessing, either at the airport or in the plane, the sun rise on a new day of adventures. According to the Interaction Design Foundation, blue represents calm, trust, peace and loyalty, while orange is for warmth, adventure, happiness, and success, which are the feelings that the app is sending to the user.[36]

[36] Interaction Design Foundation "What Is Color Symbolism?" (Interaction Design Foundation, November 4, 2021), https://www.interaction-design.org/literature/topics/color-symbolism?srsltid=AfmBOorcQTJh5jfd91NzDl2qiCzUQ_UNZunDlEV2YBmiELkeVxuVDdgf.

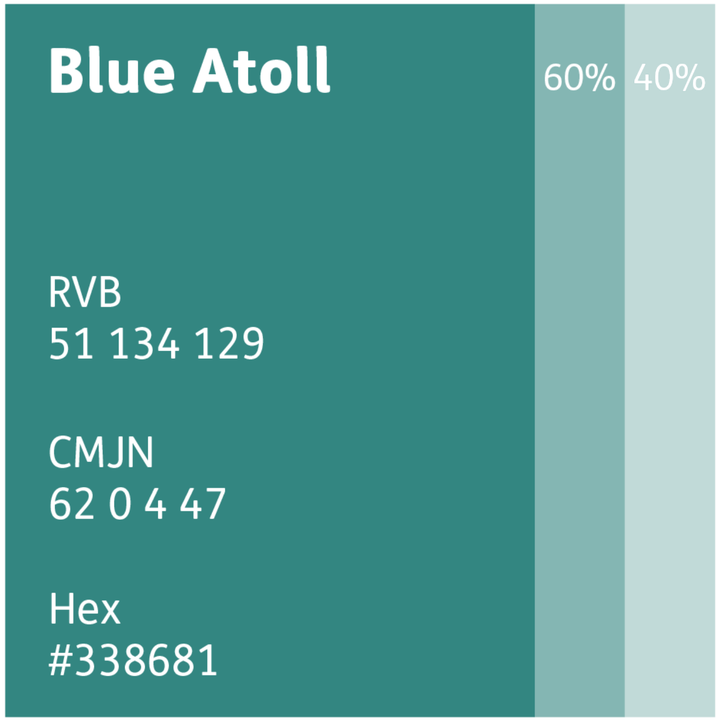


Figure 88. Marin Virieux, 2025, Presentation of the colour blue.

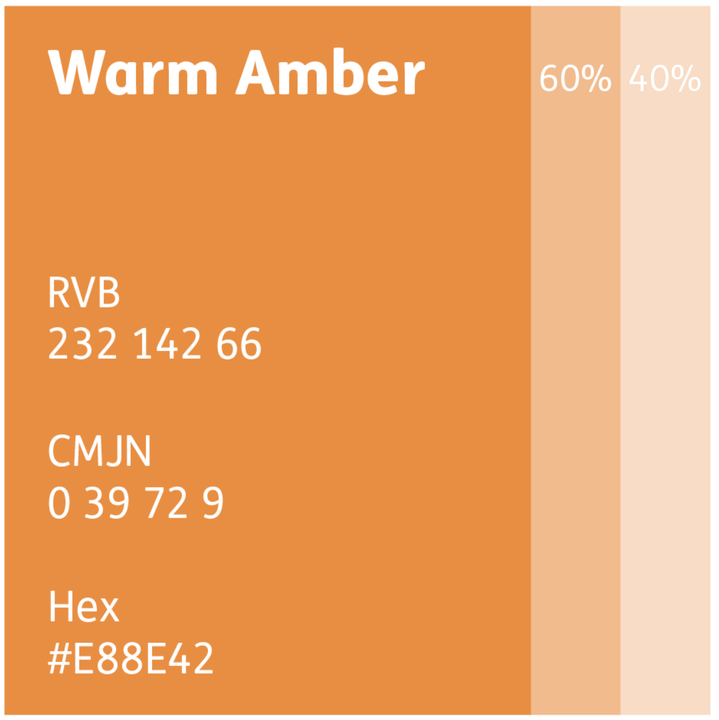


Figure 89. Marin Virieux, 2025, Presentation of the colour orange.

In order to have a sleek overall rendering of the design, I have also spent time on a cohesive branding system for the app. This system is composed of a name, “Fly with Me,” a logo, and key design elements to represent the app and make it recognisable, such as the boarding pass shape and some “ornaments” that are going to be used as branding elements across the app, such as the airport codes. These design elements will need some refinement before the end prototype version to enhance the clarity and alignment with the overall app’s visual identity.

The prototype will also include some animations and dynamic elements to guide the users intuitively and bring dimension to the different levels and frames of the navigation actions. These elements will improve the user experience, guiding them to take advantage of all the features of the app, whether they are novices or beginners. After setting up the account for the first time, there will be an onboarding element composed of a few slides explaining the main features and how to use the app.

Figure 90. Marin Virieux, 2022, Istanbul Airport (IST), Türkiye.

V. RESEARCH FINDINGS, CHALLENGES, AND IMPLICATIONS

The research part of this project confirmed the complexity of signage in airports due to the important load of information they convey, and the influence of culture. As my reporting work concluded, signage can be very different from one airport to another, leading to navigation difficulties for the travellers. Although there is currently an absence of international regulation for signage and airport wayfinding systems, there is a will to improve these systems for better accessibility and inclusivity by organisations publishing reports to suggest a unifying development approach using international standards such as ISO 7001 and DOT icons.

The goal of this project was to support the traveller in their navigational journey through airports from home to the final destination by personalising a wayfinding systems that would reduce the overload of information and improve navigation. The research and reporting phase laid the foundation for the development of the project artefact. It allowed me to get familiar with the subject by researching the particular needs of users, the different issues encountered in airport navigation, and the impact of context, resolving these to improve the user experience.

From this, the artefact I developed is the prototype of an app that combines all necessary travel information in a single user-friendly platform. The app provides an initial digital solution to enhance the traveller experience by addressing key navigation challenges and contextual influence. The app at this stage is a prototype to test my ideas and hypotheses for this project while providing an example of a possible solution to support the traveller experience. To obtain a working solution, further refinements and improvements will be needed to make it more accessible and adaptable. However, this prototype acts as an example for improving the experience of travellers worldwide. In a further stage, the development of the app could address one issue that was not explored at this stage: adjustable font sizes for users with visual impairments; multiple languages; and other accessibility features to make the app more inclusive.

This research process also presented personal challenges. Coming from an engineering background, the development stage of the prototype was very challenging. As I lacked experience in the creative process, it was not easy to adopt a

more iterative and user-centred approach. However, trying new development techniques and methodologies, such as the use of a metaphor, making iterations and autoethnographic testing to obtain feedback, has allowed me to refine my design skills and gain a deeper understanding of the importance of user experience in the development of digital solutions. I will be able to use this knowledge in the future when working on new projects.

These key findings from this project identified inconsistencies in airport signage and proposed a digital solution for personalised wayfinding. They demonstrate a possible solution with the use of digital signage and mobile applications to complement physical airport signage to create a seamless, accessible, personalised and interactive wayfinding experience for travellers in airports. Even though not all these subjects have been studied and developed, the idea of incorporating them in the app has been evoked for further development or research area.

Limitations

Due to the project's limited development time, some aspects of the work could not be explored. First, concerning the workload and skills requirement to develop a working app, this project only reached the prototype stage of the main frames with some possible restricted interactions to obtain a simple flow of the principal's actions. The prototype was developed according to one single smartphone size, the iPhone 16. However, with the high number of phone display sizes, the app would need to be responsive and suitable to the different smartphone displays in the final version.

At that stage, the app has some limitations, such as responsiveness and will need further refinements and improvements to make it more accessible and adapted. In a further stage, the development of the app could address one issue that wasn't explored at this stage: the accessibility features with adjustable font sizes for users with visual impairments, multiple languages and other accessible features to make the application more inclusive.

Thorough user testing would be required to obtain in-depth feedback, user testing from the different user types and more precise app scope research in order to design a final adapted version with users' respective needs enhanced. User testing was outside the scope of this proof-of-concept demonstration. Ethics approval would be essential to conduct this user-testing as I would need to make sure that the study respects the consent, privacy and well-being of the participants.

In the technical development of the app, more work with airport companies and airlines to allow access to their maps and infrastructure data would allow a more exhaustive and accurate source of information, in order to offer navigation features at every airport. Some hypotheses have been considered that would need to be solved to allow the app to work in real life. For instance, this project has assumed some perfect life scenarios where the user would have total access to the internet at each step of the travel, including during the flight, to be able to access live updates on flight information. For this project, this data was assumed to be accessible and implemented into the app framework from websites like FlightRadar24 without taking into consideration possible complications regarding the use and implementation of this data. This included access to the airport's data to provide live updates on waiting times at the airport infrastructure. On a similar note, the app would have a strict and stated policy on data privacy and processing to respect the confidentiality and security of the user regarding the information that can be collected, such as location and personal information. All these previous hypotheses should be addressed and implemented in order to obtain complete and more realistic results in future iterations.

Outcomes

Navigating through airports can be time-consuming and stressful. My research highlighted the need for a solution that provides all the navigation information for a smooth journey but also a feature to support the user and offer them personalised and user-centred assistance. The interactive prototype developed will demonstrate the main features and design principles – particularly the metaphor of the guide – and bring them together to create a sleek result.

This project uses a unique approach in the research area that distinct it from other works by identifying inconsistencies in airport signage with worldwide examples and proposes a digital solution for personalised wayfinding. Due to the lack of such wayfinding solutions in airport navigation, the project develops a possible working solution that can be complemented by research on wayfinding, inclusivity and navigation methods. Its central innovation is the metaphor of the guide as a way to develop a user-centred vision that prioritises relevant, timely information presented in straightforward, easily understood ways, using UX/UI elements such as progressive disclosure, boarding-pass-inspired visual identity. The guide metaphor can also contribute to future studies on improving airport navigation and enhancing the traveller experience globally. The integration of an overall inclusive travelling experience starting from home to the final destination with features answering the different needs of the users, such as cultural considerations, user personas, and personalised navigation, will contribute as a new comprehensive approach to navigational projects.

This work demonstrates a realistic solution to support airport navigation with a possible option to enhance accessibility and inclusive wayfinding in complex spaces, such as airports, but could be applied to different locations, such as train stations, commercial areas, and transportation hubs. This approach also brings support to companies and organisations managing these spaces.

The design work of this thesis was exhibited at Te Wai Ngutu Kākā Gallery, St Paul St, Auckland, in June 2025.

The proof-of-concept demo was presented on an iPad. First, composed of onboarding steps to explain to the user how to use the app, and then a simplified prototype of the app with two user profiles (traveller and business). In the prototype, at each step, it is possible to see the difference of the features

adapted to each profile in order to show the high personalisation level of the app concept. I chose to follow two different scenarios, on presenting a regular traveller with all the steps going smoothly and the available different features, as well as a stressful situation of a businessperson missing a flight due to the user being delayed by traffic on their way to the airport. Doing so highlights how the app reacts and supports the user in stressful situations to provide efficient information to make the process smooth, and how the app adapts and communicates with the user to make them feel safe and guided all along.

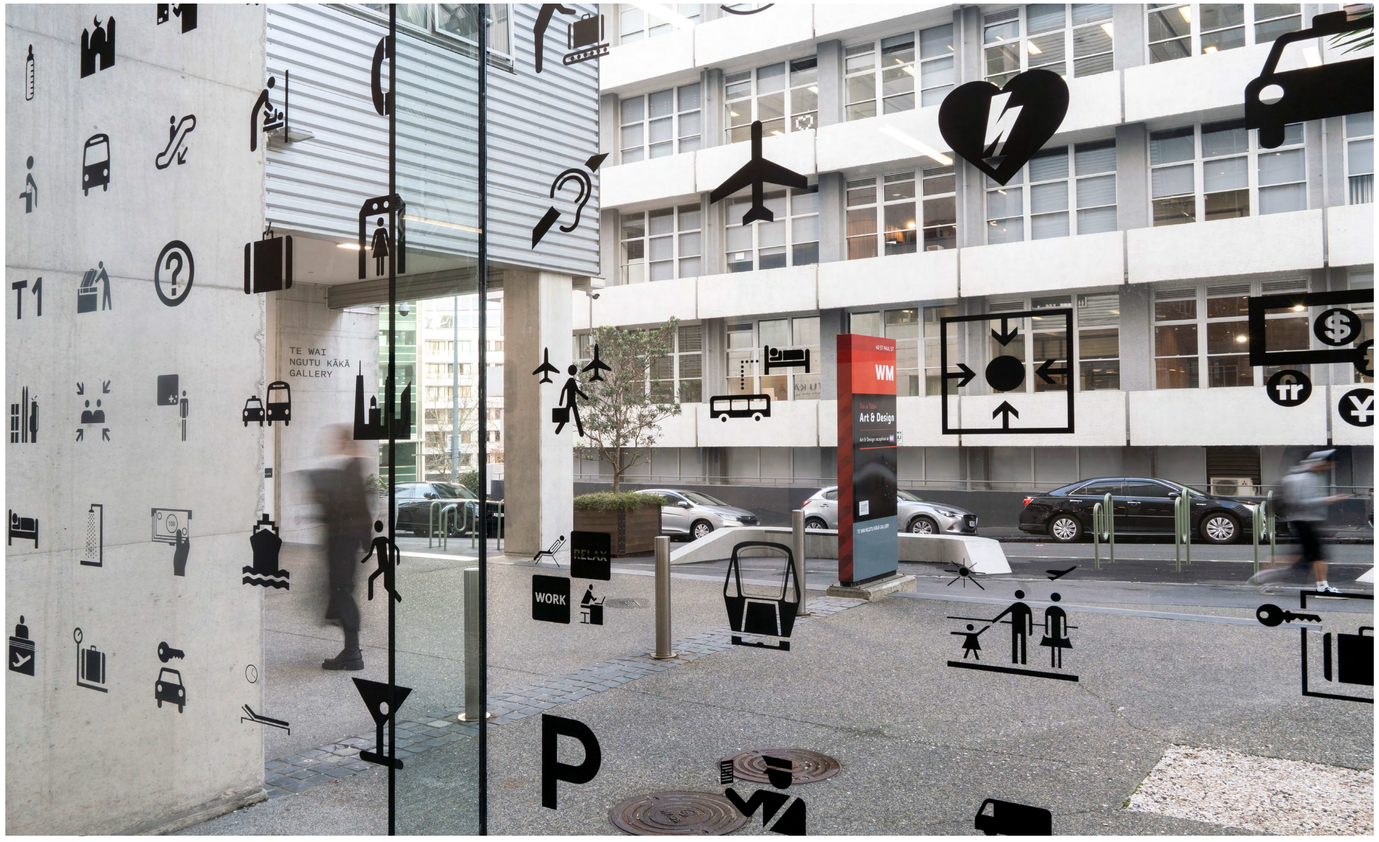
To highlight the underlying insight into how confusing airport travel is, I printed 89 different icons I had encountered in my reporting phase and stuck them on the windows of the gallery, covering a surface of around 20 m^2. A brief video explained the idea and concept of the project, including the problems this project addresses.

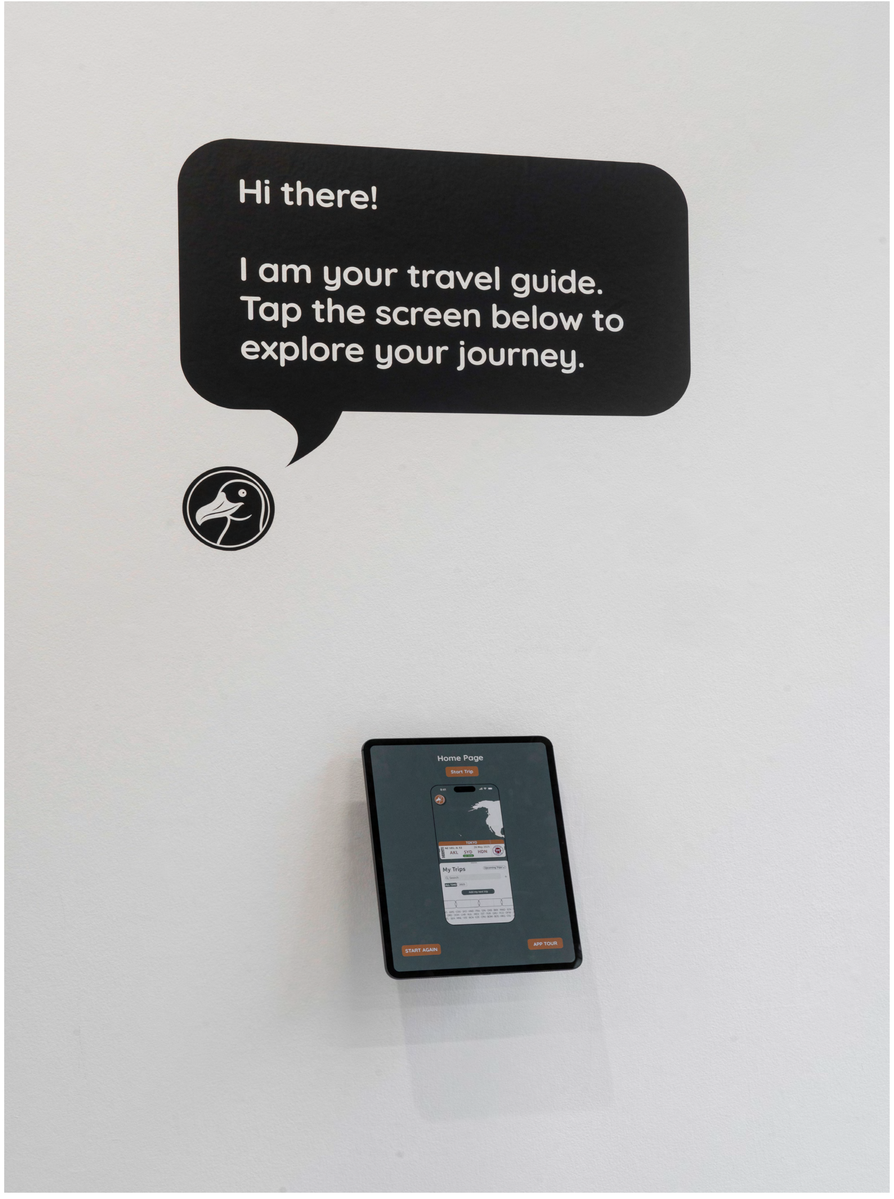
Link of the prototype displayed at the gallery:

https://www.figma.com/proto/BVFLAVbWPpQh-gi2mZr5qyR/Wireframe-app?page-id=1289%3A2919&node-id=1829-118268&p=f&view-port=426%2C-708%2C0.24&t=idRqfKtetFTctg8n-1&scal-ing=scale-down&content-scaling=fixed&starting-point-node-id=1829%3A118268&show-proto-sidebar=1


Hi there!
I am your travel guide.
Tap the screen below to
explore your journey.
Fly with me
Your personal guide
around the world
T1
RELAX
WORK
P
Tax refund

Figure 91–94. Paul Chapman, 2025, Exhibition of my thesis project at the Te Wai Ngutu Kākā Gallery, St Paul St, Auckland, in June 2025.






AT THE AIRPORT
Live updates, smart tips, and reminders when you need them.
Trip to Tokyo
AKL
SYD
T1
on time
15
Traffic's a bit heavy. Get your travel documents ready. I'll guide you straight to check-in once you arrive.
to T1
VIP
T1
RELAX
WORK
P
Tax refund

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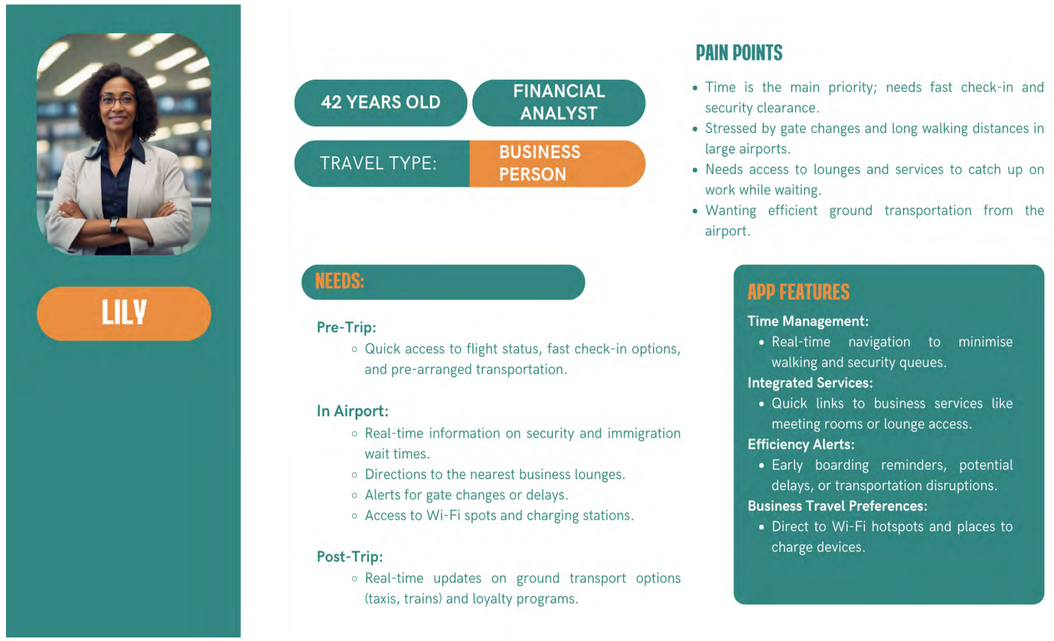
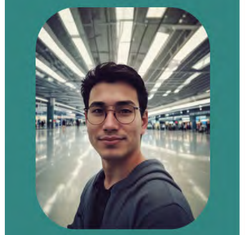
APPENDICES

Appendix 1: User personas





MARK

28 YEARS OLD | TRAVEL BLOGGER

TRAVEL TYPE: SOLO-TRAVELLER /COUPLE

PAIN POINTS

- Anxiety in unfamiliar airports.
- Lack of knowledge of local language or signage.
- Concerns about finding Wi-Fi, safety, and personal space.
- Managing all details of her trip by herself (flight, accommodation, local transport).

NEEDS:

Pre-Trip:
- Personalised travel tips and flight status info.

In Airport:
- Clear maps in multiple languages and translations.
- Information on local customs, transportation, and currency exchange.
- Real-time information on activities near the airport, local transport, and food options.

Post-Trip:
- Seamless connection to ground transportation or local services for solo travellers.

APP FEATURES

Custom Itinerary Planning:
- Integration of flight info, activities, and accommodation options.

Language Assistance:
- Live translation for signs and airport staff conversations.

Solo Travel Safety:
- Alerts on airport safety zones or emergencies.

Local Info:
- Suggestions for nearby local experiences and food outlets within the airport or city.

SARAH & JOHN

ALEX (4) & EMMA (2)

35 & 37 YEARS OLD | OFFICE MANAGER & TEACHER

TRAVEL TYPE: FAMILY

PAIN POINTS

- Managing luggage, strollers, and young children
- Need for clear directions to family-friendly areas (restrooms, play areas)
- Anxiety over missing flights due to slow movement
- Difficulty finding suitable food options for kids and dietary needs

NEEDS:

Pre-Trip:
- Easy check-in with family-friendly services (e.g., priority boarding info, family parking areas)

In Airport:
- Clear and direct routes to play zones, family restrooms, and quiet areas.
- Alerts for flight status, boarding reminders with early calls for families.
- Notifications of family-friendly restaurants and services.
- Real-time stroller-friendly navigation and assistance with luggage.

Post-Trip:
- Navigation to family-friendly transport services (e.g., bigger taxis, child car seats).

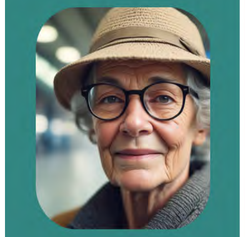
APP FEATURES

Live Wayfinding:
- Simplified paths with family-priority routes and elevator locations.

Customised Recommendations:
- Recommendations for play areas, nursing rooms, and kid-friendly food places.

Push Notifications:
- Alerts for early boarding calls or potential gate changes.

Stress-Free Navigation:
- Easy-to-understand maps showing quiet routes.



BARBARA

75 YEARS OLD | RETIRED NURSE

TRAVEL TYPE: ELDERLY

PAIN POINTS

- Mobility issues, difficulty walking long distances, especially in large terminals.
- Needs assistance with clear, easy-to-read signage and comfortable waiting areas.
- Anxiety over getting lost or missing important flight information.
- Needs easily accessible healthcare and support services.

NEEDS:

Pre-Trip:
- Clear instructions on check-in, baggage help, and requesting wheelchair services.

In Airport:
- Wheelchair-friendly navigation with alerts for rest stops and lifts.
- Access to health services or assistance points.
- Clear, easy-to-read signs with large fonts and colour contrasts.
- Alerts for boarding and assistance to the gate.

Post-Trip:
- Assistance with connecting flights, baggage claim, and ground transportation services.

APP FEATURES

Assisted Navigation:
- Personalised maps showing the best routes for those with limited mobility.

Health Support:
- Locations for medical support, pharmacy, or resting areas.

Visual Accessibility:
- Large fonts and clear signage integration for easy reading.

Service Request:
- Easy access to assistance or wheelchair services.

MICHAEL

33 YEARS OLD | SOFTWARE DEVELOPER

TRAVEL TYPE: WHEELCHAIR TRAVELLER

PAIN POINTS

- Navigating large and unfamiliar airports can be stressful, with restricted mobility capacities.
- Concerns about finding accessible services and restrooms.
- Need for support at security checkpoints and boarding.

NEEDS:

Pre-Trip:
- Ability to request support or pre-book assistance.

In Airport:
- Accessible route navigation in the airport at all times.
- Real-time notifications for gate changes, boarding announcements, or delays.
- Clear routes to accessible restrooms, boarding areas, and transportation.

Post-Trip:
- Assistance with finding luggage and support to reach ground transportation.

APP FEATURES

Accessible Wayfinding:
- Navigation guidance with live data highlighting wheelchair-accessible routes, elevators, ramps, and barrier-free pathways.

Accessibility Features:
- Detailed information on accessible toilets, priority seating areas, assistance points, and lounge access.

Personalised Alerts:
- Custom notifications for boarding times, gate changes, service delays, and assistance request confirmations.