



# Development of a Dog Carrier

*Using an animal-human centred design approach*

Nikolina Nordkvist & Desirée Ekberg

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DIVISION OF PRODUCT DEVELOPMENT, DEPARTMENT OF DESIGN SCIENCES, FACULTY OF  
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# Abstract

The project, initiated by Thule Group, examines how a dog carrier for the rear seat of the car can be designed to provide safety and improve user experience, for dog and human. To include both of the users throughout the process, an animal-human centred design approach was applied. The report presents the concept development process of the dog carrier and evaluates how selected methods fulfil the design approach.

Initially, the team conducted primary-and secondary research with a focus on mapping the market, the two main users and their needs. A concept generation was performed and structured around an iterative process that involved brainstorming, parallel prototyping, and evaluation. Real scale prototyping and testing with dogs and owners resulted in a conceptual model with main features such as compact folding to improve user experience, and a belt attachment designed to provide safety.

Employing an animal-human centred design approach contributed to an open-minded way of working and helped gain crucial insights concerning users and their specific needs. Using design methods such as animal-friendly personas and user journeys ensured that the dog perspective was not lost during the process. However, several challenges were encountered, such as finding a diversity of test dogs and interpreting the dogs' behaviour correctly. Even if the approach involved the dog's perspective throughout the project, many other aspects play a major role when it comes to how the dog experiences the product, such as learning habits, previous experiences with carriers and cars and genetics. Getting the dog familiarised with the product before using it in the car was shown to be one of the most important aspects to consider in order to improve the dog experience during transportation.

**Keywords:** Animal Centred Design, Human Centred Design, Carrier, Dog, Double Diamond Methodology

# Sammanfattning

Projektet, som initierades av Thule Group, undersöker hur en hundbur för bilens baksäte kan utformas för att ge säkerhet och förbättra användarupplevelsen, både för hund och människa. För att inkludera båda användarna i hela processen tillämpades en djur- och människocentrerad designstrategi. I rapporten presenteras konceptutvecklingsprocessen för hundburen och det utvärderas hur valda metoder uppfyller designstrategin.

Inledningsvis genomfördes en primär-och sekundär undersökning med fokus på att kartlägga marknaden, de två användarna och deras behov. En konceptgenerering genomfördes i en iterativ process som innefattande metoder som brainstorming, parallell prototypframställning och utvärdering. Storskaliga prototyper och testning med hundar och hundägare resulterade i en konceptuell modell med funktioner såsom fällbarhet, för att förbättra användarupplevelsen, och bältesinfästning för att öka säkerheten.

Att använda sig av en djur- och människocentrerad designstrategi bidrog till ett öppet arbetssätt och hjälpte till att få viktiga insikter om användarna och deras behov. Genom att använda designmetoder som djurvänliga personas och användarresor säkerställdes att hundens perspektiv inte gick förlorat under processen. Flera utmaningar uppstod dock, t.ex. att hitta en mångfald av test hundar och att tolka hundarnas beteende korrekt. Även om tillvägagångssättet involverade hundens perspektiv under hela projektet är det många andra aspekter som spelar en stor roll när det gäller hur hunden upplever produkten, till exempel inlärningsvanor, tidigare erfarenheter av burar och bilar samt genetik. Att göra hunden bekant med produkten innan den används i bilen visade sig vara en av de viktigaste aspekterna att ta hänsyn till för att förbättra hundens upplevelse under transport.

**Nyckelord:** Djur-Centrerad Design, Människo-Centrerad Design, Bur, Hund, Double Diamond Methodology

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Lund, June 2022

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# 1 Introduction

*In the Introduction chapter, the background of the project is presented, as well as information about the project initiator Thule and different stakeholders. The project's objective & aim, research questions and delimitations are also described.*

## 1.1 Background

The number of dog owners has increased globally over the past years, not least as a result of the pandemic where many people chose to get a dog as companionship. In America 9 million households acquired a dog during the pandemic (APPA, 2022) and in Germany, the dog sales increased by more than 20% during 2020 (Deutsche Hundewesen, 2020). This trend has been seen in Sweden as well. The Swedish market has seen a rising expenditure on pet premium products, explained by the pet humanization trend, in other word, more people consider pets as family (Market Research, 2022).

For many people, bringing the dog while working or travelling is a necessity. Since travelling by car is the most common way for people to travel in America and other parts of the world (Statista, 2022), many dogs will be transported this way. This puts a greater focus on safety during car transportation, where keeping the dog restrained during a car ride is the most crucial safety aspect for both dog and human. During a car crash at 50 km/h, an unrestrained dog with the weight of 15 kg will weigh 600 kg (Sakerhund, 2017).

Still, many people travel with their dogs unrestrained during transportation in the car. In a survey made by American Automobile Association (2011) 84% of the respondents stated that they do not restrain their dogs during a car ride.

The current pet transportation solutions on the market offer safe, crash tested dog cages for the luggage compartment, but for dog carriers placed in the rear seat the

market is not as big. Thule is a company that develops products for people in movement, that makes it easier for people to bring what they love. *Bring your Pet* is a new product category for dog transportation products that Thule will be launching in 2023 (Thulegroup, 2022). Thule wants to investigate if a dog carrier in the rear seat could be a potential way of transporting dogs and therefore initiated this project.

## 1.2 About Thule

Thule Sweden AB, hereinafter referred to as Thule, was founded in 1942 by the Thulin family in Hillerstorp, Sweden where the headquarter still is located. It is a global world-leading company of products for sports and outdoor activities and has about 2,600 employees at 9 production facilities and 35 sales offices worldwide. Their products are sold in 140 markets and in 2020 sales amounted to SEK 7.8 billion. Thule's business concept is to offer high-quality products with smart features and a sustainable design that make it easy for people across the globe to live an active life. The purpose of their products is to make it easy for people to bring the things they care for, easily, securely, and in style. They design, manufacture and sell products within the five product categories: Sport & Cargo Carriers, Active with Kids, RV Products and Packs, Bags & Luggage and, the latest category Dog transportation (Thule Group, 2022).

## 1.3 Stakeholders

The companies, people and authorities that are of relevance to the project and are presented as stakeholders below.

**The initiator** – The company that initiated the project were Thule Group, and were therefore of great importance. Thule were continuously involved in the project through weekly digital consultations and physical workshops when visiting the head office in Hillerstorp every second month. They provided support and guidance throughout the project in order to find solutions that fulfil their requirements and requests. If construction- or/and design solution patents will be an outcome of the project, Thule will own the patent(s).

**The user/intended audience** – The two main users are dog owners in the markets where Thule acts today and their dogs. The dog owners are the potential buyers as well as users of the carrier, which makes them an important stakeholder. The dog is the main user of the carrier, which makes their needs and requirements of great relevance.

**The Swedish Board of Agriculture** – The Swedish Board of Agriculture is an important stakeholder in this project as they provide the legislations, regulations, and recommendations for the area of this project. In order to create a solution that is approved for transporting dogs in cars, the legislations, regulations, and recommendations need to be taken into account. Other legislation, regulations, and recommendations in countries where Thule operates could also be of importance.

## 1.4 Objective & aim

The objective was to design a dog carrier for the rear seat of a car that provides safety and improves the experience for the users of the product - dog and human. The aim was to include the perspective of both users throughout the project by applying an animal-human-centred design approach.

The following brief was given as a starting point for the project:

*Develop a pet carrier that can be attached to the rear seat of the car.*

## 1.5 Research questions

- *How does an animal-human centred design approach affect the design process of a dog carrier?*
- *How should the solution be designed to improve the human and dog experience during transportation in cars?*
  - What affects the experience from a dog perspective?
  - What affects the experience from a human perspective?

- *How should a new transport solution be designed to provide safety for both the dog and the human?*
  - What does safety in a car mean for dogs respectively humans?
  - What design features are required to meet the safety standards?

## 1.6 Delimitations

- Since the project is on a conceptual basis, there will be no time to carry out simulations or crash tests to ensure that the product will fulfil safety standards. The design decisions made from a safety aspect will therefore be based on previous theory and similar products.
- The transportation solution will be designed for dogs. No consideration has been taken to cats or other pets in this project.
- The transportation solution will be designed for a standard family car with five seats. The size of the carrier will be limited to fit the rear seat of the car.
- It has been decided from Thule to only look at transportation solutions for a car, and not alternative transport methods such as train, aeroplane, bus, and bicycle. The transportation solution will also comply with Sweden's laws and regulations.
- The attachment methods that will be explored are the seat belt and ISOfix. Rear anchor points in the ceiling, parcel shelf and floor will not be researched.
- This report will only consider transportation of companion dogs, in other words, no research concerning transportation of professional dogs will be done.

## 1.7 Thesis outline

The report is outlined by 9 main sections with underlying sections. Initially, a context section defines the current situation. It is followed by a theoretical framework that explains the design approach, safety during transportation, dog behaviour and human-dog relationship. The following 4 sections describe the design process, with the headlines: *discover*, *define*, *develop* & *deliver*. In the next section the final concept is presented, followed by a discussion and conclusion part. All the main chapters are presented below in figure 1.



*Figure 1: Thesis outline*

## 2 Context

*This chapter presents the context of the project, which will highlight areas concerning transportation of dogs in a car. It presents the requirements and regulations for transporting animals in cars, both in Sweden and abroad. Attachment points and car seat dimensions are also presented, as well as crash testing of pet carriers. The research presented in the context is of great importance since it contributes to requirements that the final product must or should fulfil.*

### 2.1 Requirements and regulations

#### 2.1.1 Swedish Board of Agriculture

The rules that exist for dog caring must be known and informed by every dog owner. It is the dog owner's responsibility to meet the dog's basic needs (Swedish Board of Agriculture, 2022). The Swedish Board of Agriculture has the overall responsibility for maintaining and developing animal welfare in Sweden (The County Administrative Board, 2022) and issues the additional regulations that are necessary to supplement the EU regulations (Animal Welfare Act, 2019). If the regulations are not followed, the Swedish Board of Agriculture can issue fines up to 1500 SEK (NTF, 2021).

Following eight regulations from the Swedish Board of Agriculture (2022) are pointing out what has to be considered and complied with related to carriers and transportation of dogs in cars in Sweden.

**Table 1. Regulations from the Swedish Board of Agriculture (2022)**

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Nbr.	<i>Regulation</i>
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1	The dog must be secured in the car, for example by using a transport cage, cargo grille, or seat belt that is adapted for dogs, in order not to risk the dog being injured or suffering in connection with the car transport.
2	If transporting the dog in a cage or similar, it must be designed and placed in such a way that the dog gets shade and good ventilation
3	Luggage or other objects must not be placed in such a way that they risk falling over the dog and injuring it.
4	During transport, the dog must be rested and given water at least every 6 hours.
5	A dog may be kept in the car for a maximum of 3 hours when the car is stationary.
6	Dogs may be temporarily stored in the car during transport and overnight stays in connection with travel, during stays in areas where pets are not allowed or during other activities such as hunting, competitions, exhibitions and training for the dog.
7	The dog carrier must offer enough space for the dog to be standing or lying in a comfortable manner. The minimum dimensions of the carrier refers to: <ul style="list-style-type: none"> <li>- <i>The length of the dog x 1,1. This dimension is measured from the tip of the nose to the buttocks when the dog is in a normal position.</i></li> <li>- <i>The width of the dog x 2,5. The width is equal to the length of the chest. The dog should be able to lay down comfortably and roll around unhindered.</i></li> <li>- <i>The height of the dog x 1. This dimension is measured from the ground to the top of the head when the dog is in a normal position.</i></li> </ul>
8	If you travel with more than one dog in a carrier, the width of the carrier shall increase accordingly to the width of the chest of the biggest dog.

### 2.1.2 International legislations and regulations

The legislation and regulations for transportation of dogs in cars varies by country. To get an understanding of how they differ, the regulations in four different areas besides Sweden have been examined: Germany, UK, the US and Canada. These areas were selected because they are some of Thules main market areas, and therefore of special relevance to the project (Thule Group, 2022).

In the UK, the Highway Code provides legal requirements and guidelines for how to travel on the highway. Paragraph 57 states that all dogs need to be suitably restrained when travelling in or on a vehicle, so they cannot distract the driver or injure themselves or the driver during a quick stop. Ways of restraining animals in



cars are with a seat belt harness, pet carrier, dog cage or dog guard (The Highway Code, 2022).

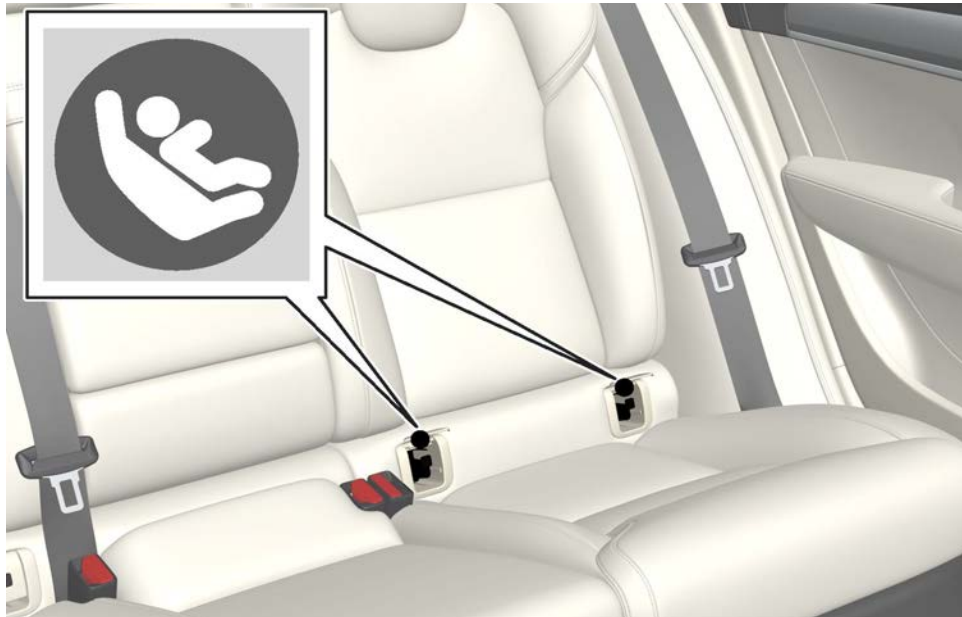
In Germany, a dog in a car is considered to be a load that must be secured against slipping, falling and rolling during road traffic (ADAC, 2021).

Each state in the US and Canada has its own laws regarding securing dogs in cars and most of them do not require the dog to be restrained in the car. However, a few states have regulations and more states are planning on implementing regulations (Orvis, 2021).

## 2.1 Attachment solutions

Two ways of securing a pet carrier in the car are to use the three point seat belt or ISOfix anchor points. Since 2001 most European cars have ISOfix anchor connections in the rear seat, which follows an international standard. The ISOfix system was developed to make installation of child car seats easier and are placed in the rear seat as shown in figure 2. It consists of metal attachments that are built into the vehicle's seating, which matches the corresponding ISOfix mounts (figure 3) that are found on child car seats (In car safety centre, 2022). The maximum weight limit for the ISOfix attachment is 33kg, including the weight of the child seat and child (NTF, 2022).

Another way of restraining a pet carrier is by using the car seat belt. The three point seat belt was invented in 1959 and is today compulsory to wear in most parts of the world (World Health Organisation, 2013).



*Figure 2: Placement of ISOfix anchor points (Volvo Cars 2020)*



*Figure 3: Left: ISOfix car seat installation (Monson 2022). Right: ISOfix mount (NFT 2022)*

## 2.2 Rear seat dimensions

Depending on the car model and brand, the dimensions of the rear seat differ. The dimensions of three different Volvo models are presented in figure 4 below. This

type of car was used as a reference car since the team had access to different Volvo cars during the project.

Definition of dimensions:

- Rear Hip Room - The total width of all three rear seats
- Rear Shoulder Room - The measurement from one door panel to another
- Rear Leg Room - Distance from seat to floor
- Rear Head Room - Distance from seat to roof

<b>Car model 5 seat</b>	<b>Rear Hip Room (mm)</b>	<b>Rear Shoulder Room (mm)</b>	<b>Rear Leg Room (mm)</b>	<b>Rear Head Room (mm)</b>
Volvo XC60 (SUV)	1480	1430	965	988
Volvo V90 (Kombi)	1416	1420	911	966
Volvo XC40 (SUV)	1388	1429	917	994

Figure 4. Rear seat dimensions of three different models of Volvo cars (Volvo Cars, 2022)

## 2.3 Crash Test

Today, there is one independent authority verifying pet products - the non-profit consumer advocacy organisation Centre for Pet Safety (CPS). CPS is working on behalf of pet owners around the globe and its mission is to “*have an enduring, positive impact on the survivability, health, safety, and well-being of companion animals and the consumer through scientific research, testing, and education*” (Centre for Pet Safety, 2020). CPS is fully independent of the pet products industry and with teams of independent experts they study product safety, author pet product standards, and hand out CPS certification (see figure 5). To get a CPS certification the product needs to pass a crash test (Centre for Pet Safety, 2020).

Looking at the demands of crash-tested products related to vehicles in Sweden, some products are required to be tested, others are not. For example, crash testing of cars is a basic requirement today. There are also regulations for components in cars such as seats, belts, windows, and handicap equipment carrier systems (RISE,

2022). However, pet products are not classified as consumer products, in other words, federal regulations do not exist and manufacturers are not mandated to test their products (Centre for Pet Safety, 2020). Thus, there are no crash testing demands for dog cages regulated in Sweden, but there can be competitive advantages to performing a crash test anyway (RISE, 2022).



*Figure 5: Logo of CPS Certification (Centre for Pet Safety, 2020)*

## 3 Theoretical Framework

*This chapter presents theoretical research about the design approaches applied during the project, as well as the Double Diamond methodology that has been used as a framework. Research about dog behaviour in cars is also presented. The topics in this chapter will lay the foundation for the final concept.*

### 3.1 Design approach

The project follows the Double Diamond Design methodology (read more in section 3.1.1) and has an user-centred design approach (UCD). The product intends to be used by two different users - human and dog - whose needs and communication methods differ. Hence, there was a need to reformulate the predominant role of human beings in UCD by undertaking a less anthropocentric design approach. In order to allow both users a centric position during the design process and to understand the needs of each user, two approaches have been combined - Human Centred Design (HCD) and Animal Centred Design (ACD).

The two users have been considered throughout the project but in different ways as they will interact with the product differently. The human will use the product in terms of carrying and attaching it to the car, while the animal will be using the product for its actual purpose - riding in the car. Regardless of how the users will interact with the product, the human- and animal needs must be fully understood. The HCD and the ACD approaches will further be discussed separately in section 3.1.2 respectively 3.1.3, whereby methods recommended for each approach will be selected and used in the design process. The design approach and selected methods for the different phases of the Double Diamond framework are presented in figure 6.

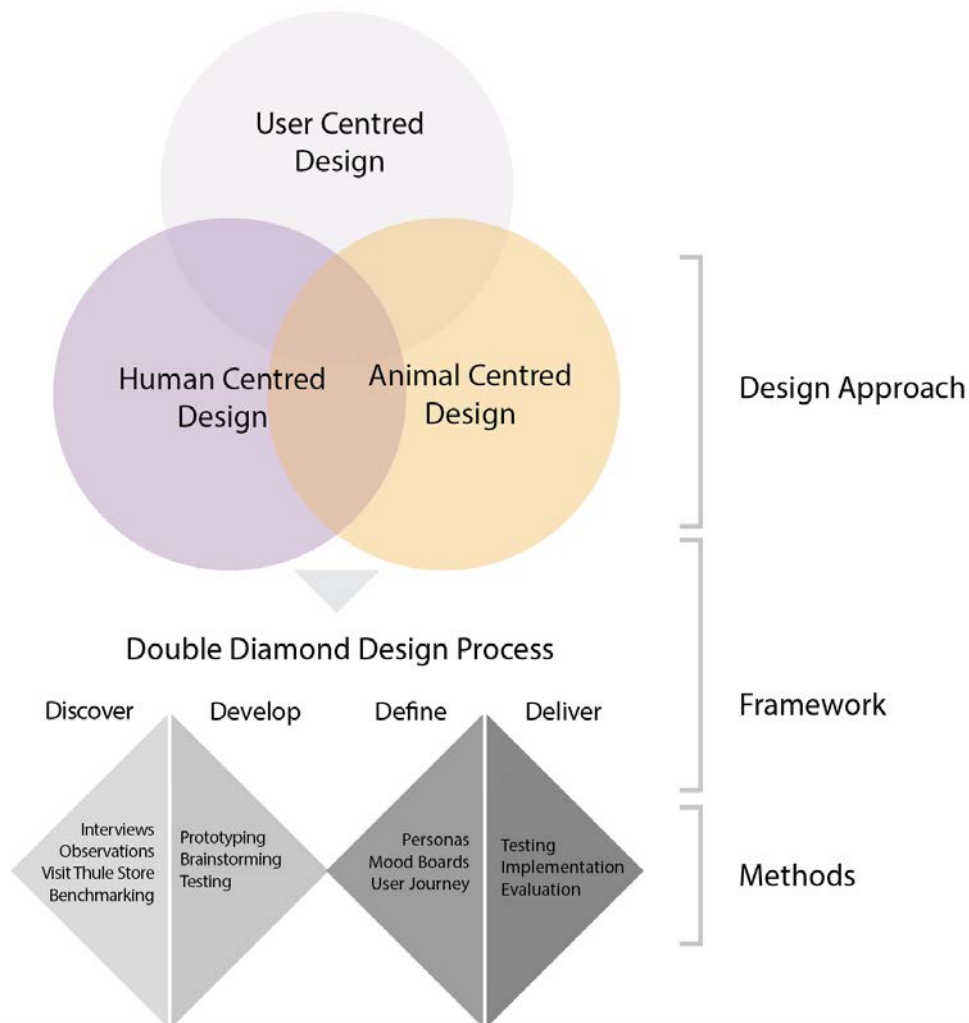


Figure 6. Selected design approach, framework and methods

### 3.1.1 Double Diamond Methodology

The Double Diamond methodology has been used as a theoretical framework for the design process and modified with specific methods according to the unique animal-human user scenario. The Double Diamond design process model was launched in 2004 by Design Council and is divided into four different phases - *discover*, *define*, *develop* and *deliver*, shown in figure 7 (Design Council, 2022).

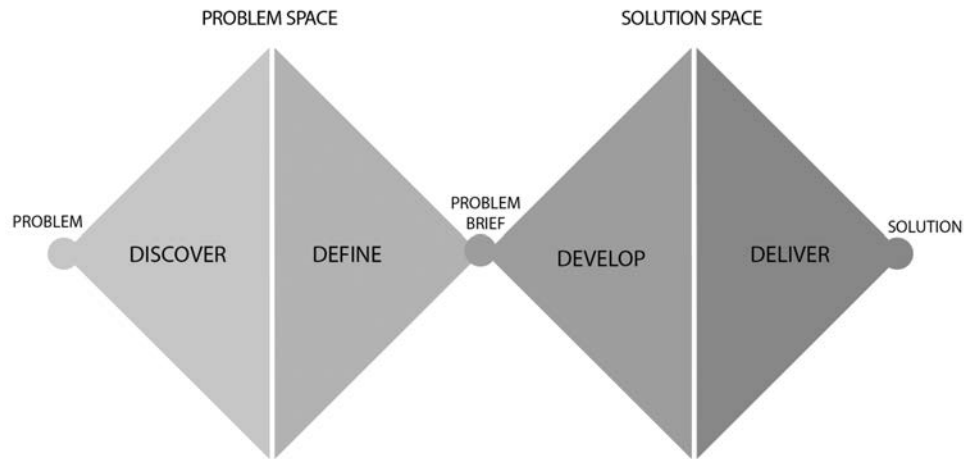


Figure 7. Illustration of the Double Diamond Methodology

The goal of the *Discover* phase is to understand the problem by doing research and collecting data. It helps the designer comprehend the problem, instead of assuming what it is (Design Council, 2022). This has been done with primary and secondary research methods, specifically selected to understand human and dog behaviour.

In the next phase, the *Define* phase, the insights from the Discover phase are gathered and analysed to define the problem and reformulate the brief. The goal is to narrow down the main challenges of the project, and understand what difficulties the users have, both humans and dogs.

The *Develop* phase focuses on finding solutions to the problem formulated in the Define phase. The goal is to keep a wide perspective when generating ideas, by using brainstorming methods centralising both the human and dog. Parallel to the ideation, the different concepts are tested in real user scenarios.

In the last phase, the *Deliver* phase, a final concept is formed and evaluated with regard to human and dog perspectives. They are evaluated with physical testing as well as feedback from experienced designers.

### 3.1.2 Human Centred Design

Human-centred design (HCD) is a design approach that makes design decisions based on human needs and behaviour. Norman discusses how the HCD approach is applied within the double-diamond methodology (Norman, 2013). The double-diamond has a problem and solutions space as mentioned before, focusing on defining the right problem and then fulfilling the user needs. The HCD consists of four activities that take place within each of the diamonds, which are: observation, idea generation, prototyping and testing (see figure 8). The four activities are iterated throughout the process, meaning they are repeated to get more insights and improvements for the final solution (ibid). Each of the activities are explained further in the following sections.

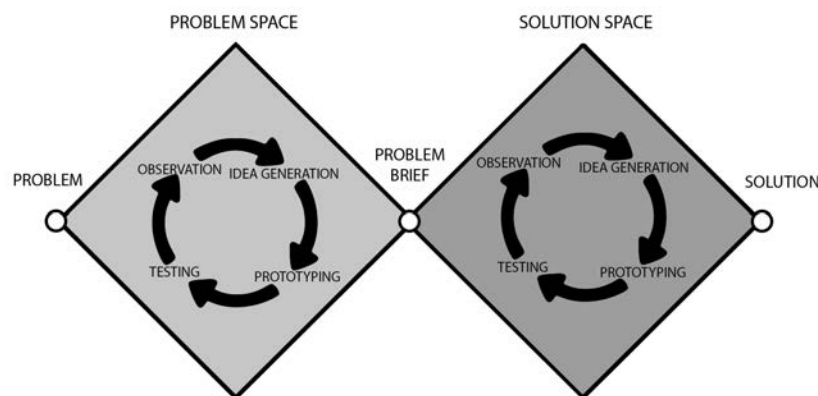


Figure 8 - Illustration of HCD approach within the Double-Diamond methodology

#### *Observation*

According to Norman (2013), the first step in HCD is to completely understand people and what needs they have. Since people often are unaware of their true needs and difficulties it is useful to observe people to truly understand them. Another reason why observing is important is because *what* people say they do does not always correspond to *how* they do it, says Norman (ibid).

*“Requirements produced by asking people what they need are invariably wrong. Requirements are developed by watching people in their natural environment.”* (Norman, 2013, p.230)



An important aspect in order to understand the user needs, is to get first hand information from the accurate target group. A way of doing this is to visit the places where the product will actually be used, and not only researching it online (ibid, p.223). To study people this deeply can be time consuming, therefore designers tend to only include a small number of participants in the research.

#### *Idea Generation*

Norman (2013) has three rules of his own when it comes to ideating and generating ideas. The first is to generate a large amount of ideas to avoid becoming fixated on one. Secondly, he states the importance of not criticising any ideas. All ideas can lead to some insights later on, even the ones that at first seem wrong or crazy. His final and third rule is to question everything. A question that asks about the most fundamental thing, that might be seen as a stupid question, can often open up for meaningful and important discussions (ibid p.226).

#### *Prototyping*

Building a prototype is an essential part of understanding if an idea is reasonable or not. These prototypes can early in the process be simple pencil sketches, cardboard models or images (ibid p.227) During the problem space, the first phase in the double-diamond methodology, prototyping can be used to ensure that the problem has been correctly understood. In the solution space the prototyping will simulate a solution (ibid. p.228).

#### *Testing*

The final activity is to test the prototype with the target group. The testing should be done as close to a real scenario as possible and could be recorded for later evaluation. Just like prototyping, the testing is done both in the problem space and solutions space to make sure the concept fulfils the user needs (ibid. p.228).

### **3.1.3 Animal Centred Design**

Apart from HCD, our design process takes inspiration from a design approach called Animal Centred Design which was developed by the product designer Holly Martin Bates (Holly Martin Bates, 2022) in her fourth year dissertation at The Glasgow School of Art in 2016/2017. Her intention was to bring animals into the design process to enable codesign between humans and animals. By helping

to design a more suited environment, product, or service for the animal, it could benefit them emotionally, psychologically, physiologically, improve inter-species relationships or even improve human-animal relationships, advocated by Holly Martin Bates (16/17).

By examining people who are knowledgeable about animals, ethnography, ethology, human centred design and products that have been released on the market on animal subjects by people, Martin Bates re-designed the Double Diamond design process to an animal-friendly one and concluded what methods would make for a successful approach for each step of the Double Diamond methodology. Similar to HCD, where humans are included within the whole design process, ACD considers the animal user should be included to the same extent. In figure 9, the ACD framework is represented in its original format (Martin Bates, 2016/17).

Design Stages	Method	Outcome	Value / benefit	Methodology sourced from
<b>Discover</b>	Observe in natural 'habitat'	Discover behavioural insights	Behaviour observed is natural and contextual	Ethnology and ethnography
	No hypothesis, only foreshadowed 'problems'	Discover behavioural insights	Discover insights that were potentially unforeseen	Ethnography
	Animal training is kept to the minimum whilst gaining observations	Visual and written data	Different media to enable different insights	Ethology, ethnography, behaviourism
<b>Define</b>	Create animal-friendly personas, storyboards and scenarios	Stories and narratives based on real animal-users	Structures data and helps to define who the user groups is and their key characteristics	User Centred Design and animal rescue shelters
<b>Develop</b>	Rapid-prototyping or other generative	Designer and animal co-design to choose design	Helps the animal understand and contribute, as	Co-design and clicker training

	techniques	direction	well as creating a 'conversation' between designer and animal	
	Rely on animal 'specialists' to help observe and analyse body language when interacting with prototypes	Animal 'specialists' can converse with designer to decide what the best designs are to bring forward	Trusted knowledge can help to produce meaningful designs that animals will accept and engage with	Co-design
	Develop/utilise animal-friendly interfaces of technologies	Animals could engage and produce design ideas	Helps the animal become autonomous and have more control in the design process	Co-design and User Centred Design
<b>Deliver</b>	Refine prototypes and test	Animals engage with refined models and can determine if any further changes need to be made	Designer doesn't need to wait till the products is on the market to get feedback	Co-design, User Centred Design and experience design
	Use video prototyping and personas to test products with users	Test product in context and with real animal-users	Helps designer understand if the product will be viable and contextual	Experience design, User Centred Design
	Observations of body language translated into anecdotes using anthropomorphism	Stories and narratives that focus on animal's emotions	Helps people understand how and why the animal engages with the product on an emotional experience level	Experience design, pet owners, animal documentaries

Figure 9: ACD framework (Martin Bates, 2016/17)

The ACD approach acknowledges the animal's perspective by seeing them as participants instead of research subjects. To understand the behaviour of the

animal, Martin Bates advocates the importance of consulting experts on animal behaviour, like ethnologists. Ethnologists study the behaviour of animals and believe that the behaviour is instinctive and comes from their evolutionary past (Kattenburg, 2016). By studying the animals in an environment seen as their normal and routine ‘home’, meaningful design decisions can be made. Depending on the animal, this environment could be at a zoo, in the wild or in the home of the owner. During the Discover phase these observations can be done and would help the designer to create products that are meaningful and accepted by the animal (Martin Bates, 2016/17).

### 3.1.4 Our Approach

As explained in the Design Approach section, the approach of the project will be a combination of both HCD and ACD by selecting methods that fulfil both of the approaches. Which methods that have been selected from each approach will be presented in the introduction of each phase of the Double Diamond. It will be visually represented with different colours depending on the origin of the method. Purple represents origin from HCD and yellow origin from ACD (see figure 10 as an example). How the methods fulfil the different approaches will be explained in the *methods* section of each phase. The methods without a colour are selected as a part of the design process, either to help the designer generate ideas, make design decisions or gain other relevant information.



Figure 10: Methods origin from HCD or ACD

### 3.3 Dog behaviour during car transportation

#### *Stress response*

Car transportation can be a stressful experience for dogs. A study made by Vienna University of Veterinary Medicine, investigated how dogs with no previous experience with transportation responded to transport by car (Herbel, 2020). The study showed an increase in the dogs cortisol concentrations, changes in white blood cells and increasing heart rate, which all indicate stress response.

There are different factors that can have an impact on the well-being of dogs during car transportation. It does not only depend on external circumstances. Aspects such as learnt behaviour, association with previous events and genetics also affect the behaviour of the dog. For example, the transportation can be very stressful for the dog if it is associated with a previous negative event, like a visit to the vet, which can cause the dog to associate transportation with a negative and stressful feeling (Nagel & Reinhardt, 2005; Jensen, 2011).

A lot of dogs get stressed in new environments and by meeting new people, which often occur during transportation. In these situations the dogs tend to seek objects that are associated with the owner (Palestrini et al., 2005). Another reason for stress during transportation is motion sickness. The sickness can be caused when the dog is lying down, because the brain gets information about the dog resting, while the balance organs send signals about movement (Zetterström, 2014).

# 4 Discover

The Discover phase is the first of the four steps in the Double Diamond methodology (see figure 11). The goal with this phase is to understand the user and the problem. This is done by conducting research with methods such as interviews, observations and benchmarking. The findings in the Discover phase will lay the foundation for the Define phase, where the findings will be turned into user needs.

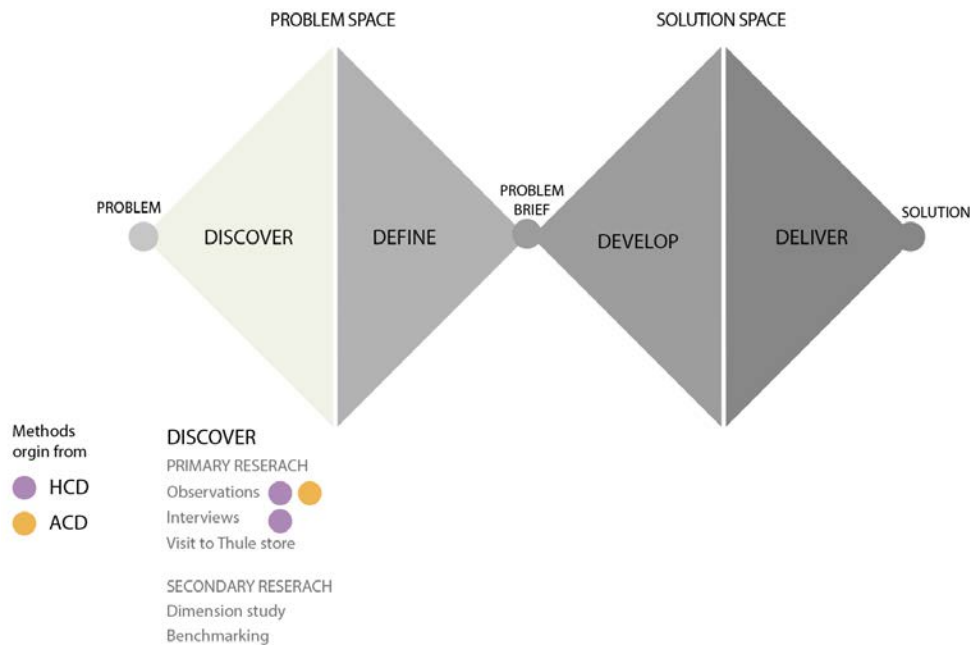


Figure 11: Methods selected from an HCD & ACD approach during Discover

## 4.1 Methods

This section provides an overview of the research methods and the choice of Lund as the study area. Each method has been selected from a HCD and/or ACD approach to understand the needs of both human and dog. How the methods are fulfilling the different design approaches are explained in each method section.

To ensure a successful data gathering it is necessary to use a mixture of investigative methods (Interaction Design Foundation, 2020). Data for this report was collected via two research methods – primary research and secondary research. Primary research requires seeking ‘real life’ information by conducting fieldwork (Martin & Hanington, 2012). Primary data was collected through interviews, semi-structured observations, fly-on-the-wall observations and visits to Thule store. Secondary research consists of information collected and synthesised from existing data (Martin & Hanington, 2012). According to Martin & Hanington (2012) ‘secondary research is an excellent method for establishing definitional boundaries of the design project, because it identifies what precedents exist and where there may yet be opportunity gaps.’. Benchmarking existing products and dog size definition were included in this step.

Lund was selected as the location for the study for a number of reasons. First, the home of the authors was located in central Lund. Secondly, access to a 5 seater family car, Volvo XC60, was possible during the project which simplified the observation process and testing scenarios. In addition, to test the prototypes involving both dogs and dog owners, acquaintances with dogs in the immediate area could be involved in different steps during the project.

### 4.1.1 Primary Research

Primary research requires the designer to seek 'real life' information from speaking to the actual chosen target market. This is often seen as being more important than secondary base research (Hanington, 2012).

#### *Observations*

Both in human centred design (HCD) and animal centred design (ACD), observation is a useful research method to understand the true needs of the user. To

gain a better understanding of the users' needs while travelling with a pet, two different observation methods were carried out - Fly-on-the-wall observation and Semi-structured observation.

### *Fly-on-the-wall*

The ACD approach recommends the designer to observe the animal in its natural 'habitat' to discover behavioural insights (Martin Bates, 2016/17). This is similar to the HCD approach, where the true needs of the user often are found by observing the user in their everyday lives (Norman 2013). To understand both dog and human behaviour while travelling in a car, the observation method called Fly-on-the-wall was selected. In this method, the observer never comes in contact with the observed object. This minimises the potential influence of the participant that could occur when interacting with the user. This method is appropriate when observing public places and activities and in situations where the actions may change if interrupted (Hanington, 2012, p.90).

Two different situations were observed with this method: the parking lot of an agility training and outside a dog day care. The goal was to observe in what way dogs travelled in cars depending on the different situations as well as the behaviour of the dog and owner. The team took notes about the following things:

- The size of the dog
- Where in the car the dog travelled (luggage compartment or rear seat of the car)
- If the dog travelled in a carrier
- What type of car it travelled in

### *Semi-structured observations*

Another advice from Holly Martin Bates (2016/17), for the ACD approach, is to keep animal training to a minimum whilst gaining observations, to ensure honest data being collected. With the Fly-on-the-wall observation the observer never interacts with the situation and can be seen as honest data being collected. However, because animal behaviour is highly affected by the level of training and past experiences, it is important to get background information about both the dog and human to fully understand the situation. To understand how much previous training the dog has got, follow-up questions can be asked after the observation. Therefore another observation method was selected, called Semi-structured observations. The intent of the Semistructured observation is to collect baseline



information by observing with an open mind. The observation should be done systematically and well documented, with notes, photographs, or raw video footage. During or after the observation, questions can be asked to the participants in order to verify their actions (Hanington, 2012, p.120).

Two semi-structured observations were carried out. The first one was at a parking lot outside a Pet Store. The team asked a customer if they could observe and ask questions when they put their dog inside the car. The goal of this observation was to understand *how* the person transported their dog and, most importantly, *why* they had decided to do it that way.

The second semi-structured observation was done by observing how a dog owner installed a prototype of a pet carrier in the rear seat of the car and then let their dog enter. The prototype was made out of a carton box, with the dimensions of one rear seat. The scenario was staged, meaning it was not the animal or the owner's natural environment or routine. The purpose was to observe where the dog was located in relation to the owner, how the dog entered the car, as well as understanding how the human perceived the situation and their dog's behaviour.

### *Interviews*

The goal was to obtain more specific and in-depth information about the users and their opinions in order to reveal unanticipated needs. Since it is not possible to interview the dog, this method was selected as a part of the HCD approach, with a focus of understanding the human needs while travelling with a dog in a car.

Unstructured interviews allow the interviewer to be flexible and exploratory by following an open-ended question format and using probing. The benefits of unstructured interviews are that they often generate data that provides a deep understanding of the topic and interviewees may mention issues that the interviewer has not considered (Sharp, Preece, & Rogers, 2019, p.269, 273).

The team conducted unstructured interviews remotely with six dog owners. The dog owners were friends or family members to the team and were selected since they owned at least one companion dog and used the car as a means of transportation when travelling with their dog. Each interview lasted for about 20 minutes and was based on a selection of pre-made questions. Depending on the answer of the participant, the interviewer could ask follow-up questions when necessary. The focus of the questions were on how and why the participant

transported their dog in a certain way, what they value when selecting a carrier and basic information about their dog and car type (The questions for the interview can be found in Appendix A).

#### *Visiting Thule Store*

To get a deeper understanding of Thule's product categories, internal research was made by visiting the Thule Store in Malmö. From the visit to the Thule Store in Malmö different folding mechanisms were examined. Other Thule products were also examined, such as bike carriers for dogs and safety seats for children in cars, to find inspiration.

### **4.1.2 Secondary Research**

The secondary research uses already existing data instead of collecting original information directly from the participants. Data can be collected by sources such as books, research papers, articles and previous projects (Hanington, 2012). The team did secondary research by collecting information through websites and articles. Different keywords were used in the search depending on what information was to be found.

#### *Dog dimensions*

To understand what dog size to design for, the team used websites to search for common ways of classifying dogs depending on their size. Keywords that were used were: dog, size, classification.

#### *Benchmarking*

The current market for pet carriers in the rear seat was investigated and data was collected by studying competitors' products. Keywords that were used in the search were: pet carrier, dog, cage, safety, rear seat, ISOfix, seat belt.

For a product to be included in the benchmarking, it had to be produced by a company that had its own website. A lot of pet carriers were found on websites such as Amazon.com and Ebay.com, without the possibility of finding the original manufacturer. These products were not included since the team wanted to research the company before including the product in the benchmarking. No consideration was given to the geographic location of the companies, since online sales allows

for the products to be sold worldwide. The search was made by looking at articles recommending the best pet carriers on the market, or blog posts about travelling with dogs in cars. The products that were recommended in these articles were further researched and tracked back to their original websites before they were included in the benchmarking. Online pet stores were also searched to find what products they offered.

### *Crash Study*

The team wanted to investigate how the design of different carriers resists a car crash. On the Centre For Pet Safety's website, different pet carriers for the rear seat of the car are crash tested. The crash study was done in 2015 with popular pet carriers on the market that claim to be crash tested. CPS wanted to independently evaluate the safety of these carriers to give pet owners better understanding of the products. As well as being able to recommend top performing carrier brands. To draw a conclusion on why different carriers pass the test and why some don't, the team made a comparison and analysis of the crash test films.

A company that crash tests their pet carriers is the Swedish company MIM Safe (Mim Safe, 2020). The team studied a MIM Safe crash test method report which explained how their dog carriers could resist a car crash.

## 4.2 Result

### 4.2.1 Result from primary research

#### *Interviews*

The interviews resulted in useful information about the experience of travelling in a car with a dog. A sample of interesting quotes from dog owners are presented below, which in the next phase *Define* were transformed into user needs.

*“We used a soft dog carrier in the car and brought it with us when visiting friends, this way our dog would go in there and relax on its own”* (Dog owner, Helsingborg)

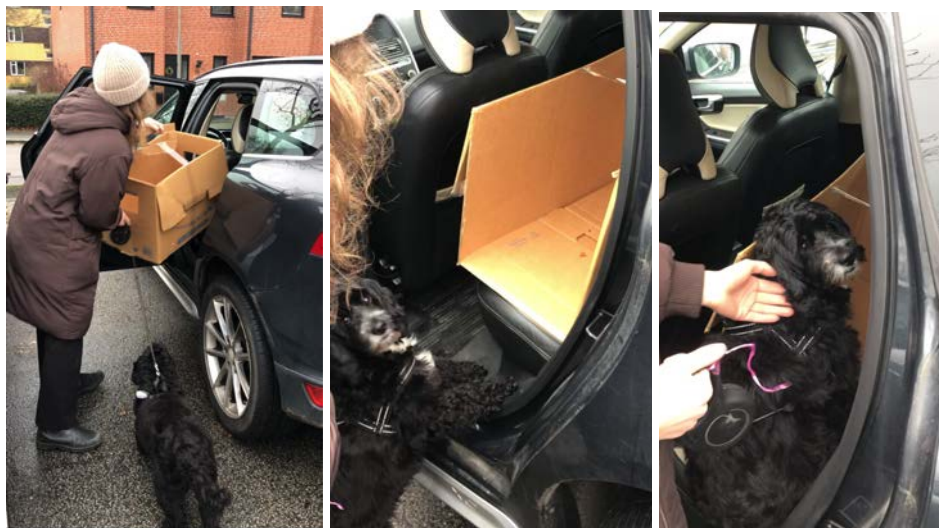
*“For us it is important that bringing the dog in and out from the car is simple and quick”*  
(Dog owner, Helsingborg)

*“I would like to have an easy way of bringing the carrier, over the shoulder or on the back”*  
(Dog owner, Malmö)

*“I don't want the carrier to be permanent in the car, it should not be a project to install”*  
(Dog owner, Lund)

#### *Semi-structured observation*

From the semi-structured observations the team observed how an owner installed a prototype of a pet carrier in the rear seat of the car and let their dog enter. During the scenario the owner first attempted to let the dog jump inside the carrier, placed on the rear seat. The dog did not succeed and had to be carried inside (see figure 12).



*Figure 12: Semi-structured observation*

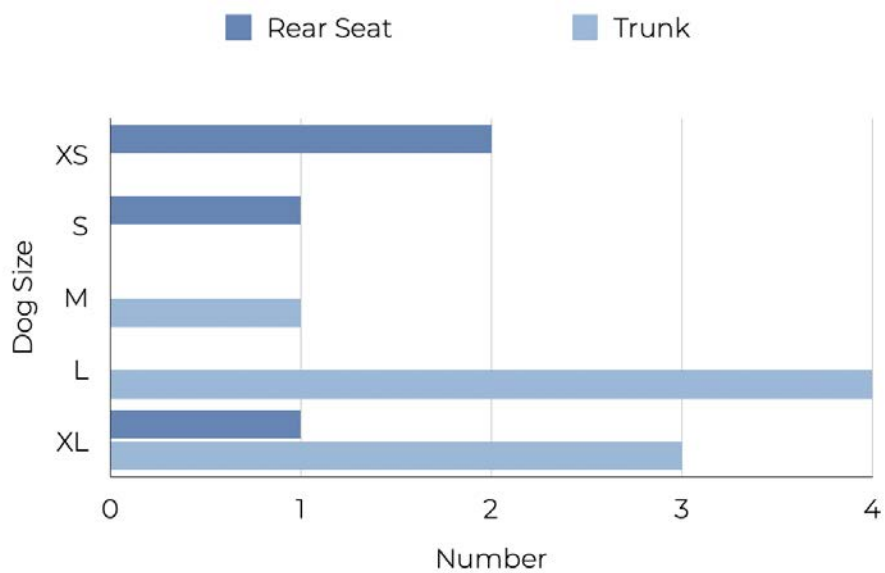
Two key insights from the observation were:

- It was difficult for the dog to jump into the carrier on its own
- It's bulky and difficult for owner to place it in the car with the carrier upfolded

*Fly-on-the-wall observation*

From the Fly-on-the-wall observations the team could draw the conclusion that depending on the destination of the trip, the dogs travelled in different ways. At the agility training most dogs travelled in robust and permanent cages in the luggage compartment of the car. In comparison, the dogs that were picked up outside the day care centre mostly travelled in the rear seat without any cage.

Another interesting observation was how the dog size correlates to where in the car it is transported. Bigger dogs were seen to be transported in the trunk to a higher extent than smaller dogs. The distribution of where in the car different dogs travel, depending on the size, are presented in figure 13.



*Figure 13: Correlation between dog size and transportation place in car*

*Visiting Thule Store*

From the visits to Thule Store the team got an understanding of Thule’s business concept and the expectations customers had on the products. Requirements such as high quality, easy-to-bring and smart functions were identified to bring higher value to the final product. In addition, Thule’s products aim to be multifunctional

in order to give the customer the opportunity to adjust the products to specific purposes.

#### 4.2.2 Result from secondary research

##### *Dog dimension*

From the online research it was found that a common classification system for different dog breeds is to classify them by weight, ranging from the size XS to XXL. The classification is a way for companies to market their products and for owners to understand what product size matches their dog. The size scale is presented below in table 2 and will be used as a reference throughout the project.

**Table 2. Classification of dog size**

Weight [kg]	Dog size	Examples of breeds
0-4,5	X-Small	Yorkies, Chihuahuas, Maltese, Papillons
4,6-11,5	Small	Shih Tzu, Pug, Dachshunds, Boston Terrier, West Highland Terriers, French Bulldog
11,6-18,0	Medium	Beagles, Miniature Schnauzers, Shetland Sheepdogs, Cavalier King Charles, Scottish Terrier,
18,1-30	Large	Boxer, Bull Dog, Cocker Spaniels, Basset Hounds, Australian Shepherds, Bull Terriers, Shar Pei
30,1-41	X-Large	Labrador Retrievers, Golden Retrievers, German Shepards, Rottweilers, Doberman Pinschers, Siberian Huskies, Chow Chows
41,1-	XX-Large	Alaskan Malamute, Bernese Mountain Dog, Great Dane, St Bernard, Old English Sheepdog

##### *Benchmarking*

A selection of the carriers included in the benchmarking are presented in figure 14, together with information about price, dimension, weight limit and if they have a certified crash test by CPS.

























<p><b>Paulibox</b>  Price: 6500 SEK  Max. weight: 15.5kg  Carrier weight: 10 kg  Dimensions: 60 x 48 x 43 cm</p>  	<p><b>Mimsafe Care2</b>  Price: 4570 SEK  Max. weight: 9 kg  Carrier weight: 5.6 kg  Dimensions: 48 x 44 x 41 cm</p>  	<p><b>TRIXIE</b>  Price: 900 SEK  Max. weight: -  Carrier weight: -  Dimensions: 44 x 37 x 40 cm</p>  
<p><b>DOGGYFIX with ISOFIX   LATCH-System</b>  Price: 2000 SEK  Max. weight: 15.5kg  Carrier weight: Not applicable  Dimensions: 60 x 45 x 25 cm</p>  	<p><b>Sleepypod mobile pet bed</b>  Price: 2240 SEK  Max. weight: 7 kg  Carrier weight: -  Dimensions: 43 x 43 x 34 cm</p>  	<p><b>Sleepypod Atom</b>  Price: 1400 SEK  Max. weight: 5.4 kg  Carrier weight: 1.5 kg  Dimensions: 27 x 22 x 43 cm</p>  
<p><b>EB Jet Set Jumbo ISOFIX</b>  Price: 1340 SEK  Max. weight: 15.5kg  Carrier weight: 2.7 kg  Dimensions: 60 x 40 x 45 cm</p>  	<p><b>DOGSTYLER safety bridge ISOFIX</b>  Price: 3000 SEK  Max. weight: 12 kg  Carrier weight: Not applicable  Dimensions: 62 x 66 x 20 cm</p>  	<p><b>Away Pet Carrier</b>  Price: 2250 SEK  Max. weight: 8 kg  Carrier weight: 2 kg  Dimensions: 47 x 27 x 27 cm</p>  
<p><b>4pets Carree</b>  Price: 3000 SEK  Max. weight: 8kg (ISOfix) / 15kg (belt)  Carrier weight: 7.5 kg  Dimensions: 46,5 x 47,2 x 57 cm</p>  	<p><b>Jet Set pet carriers ISOFIX connector</b>  Price: 650 SEK  Max. weight: 33 kg  Carrier weight: Not applicable  Dimensions: 46,5 x 47,2 x 57 cm</p>  	<p><b>Diggs Passenger Travel Carrier</b>  Price: 2250 SEK  Max. weight: 8 kg  Carrier weight: 2 kg  Dimensions: 50 x 27 x 29 cm</p>  

Figure 14: A sample of the findings from the benchmarking Crash Tests

Some of the insights that were made from the Centre For Pet Safety crash study are presented below. More images of the crash tests that lay the foundation for the insights can be found in Appendix A.4.

Key insights from observing the crash tests:

- Placing an opening with a zipper in the force direction can cause the carrier to break (see figure 15).
- Carriers with too brittle material can break.
- ISOfix improves the safety during a crash.
- Wrapping the seat belt around the carrier improves the safety, if it is done in a certain way.
- A hook or clip that holds all the load can break. Instead, the load needs to be spread out.



Figure 15: How the placement of a zipper affects a crash (Centre for Pet Safety, 2020)

When looking at dog carriers produced by MIM Safe, it was found that they used an interesting safety technique. By having deformation zones in the carriers, the impact energy during a collision can be better absorbed. In the MIM Safe crash test method report, they state that “if a carrier is too soft it will not be able to keep its shape during a crash, and if it is too rigid it will not be able to absorb the kinetic energy”. Finding a balance between the rigidity and the safety of the carrier is crucial for ensuring safety (Mim Safe, 2020). Something MIM Safe has done by creating carriers that slightly collapse during a crash.



### 4.2.3 Takeaways

#### *Crash Study*

Based on the crash study the takeaways were that it is important to consider the placements of the openings when designing a safe carrier. They should not be placed in the load impact area. The material choice is also important, since a material that is too rigid or brittle will not hold the load during a crash. The last takeaway is regarding the attachment points of the load. Carriers with small attachment points such as a single hook or clip that are supposed to carry the whole load will break. By spreading the load across the carrier, for example, by wrapping the belt around it, it will resist a crash more effectively. Inspiration can be found when observing how MIM Safe uses deformation zones to absorb the energy of a collision.

#### *Relation between dog & car dimensions*

From the dimension study the team got information about the size of a seat and dog. To get an understanding of what the maximum dog size in the rear seat would be, a comparison was made between dog size and rear seat size. Since the ISO-fix attachment can hold up to 33 kg it allows dogs up to size L/XL to be secured. However, the backseat dimensions set the limitation to what dog will fit.

The maximum width could vary depending on whether one or two seats would be covered. If only one seat should be covered the maximum space would be 50 x 60-65 x 60 cm, depending on car model (Volvo Cars, 2022). This dimension corresponds to a dog in size XS - S, meaning the maximum weight would be 11.5 kg (see table 2 in previous section). If two seats would be covered, the available space would be 72 x 60-65 x 60 cm, corresponding to a dog of the size M, weighing 18 kg. The comparison is presented in figure 16. The relation between dog size and seat dimension was used as a reference for further development and gave the team an understanding of what type of dog the carrier would be designed for.

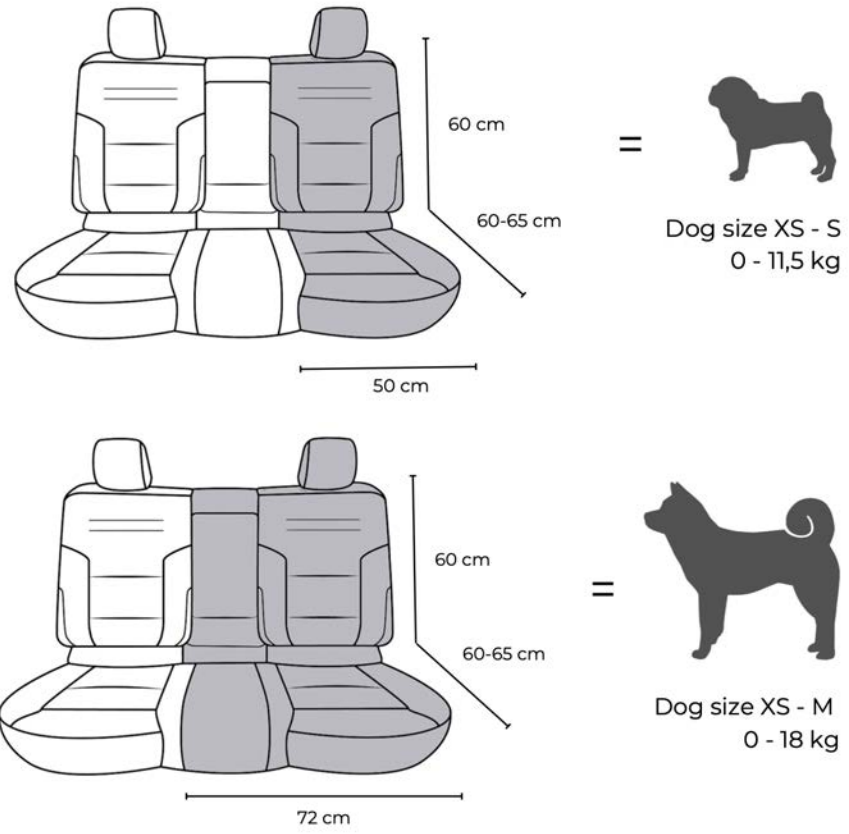
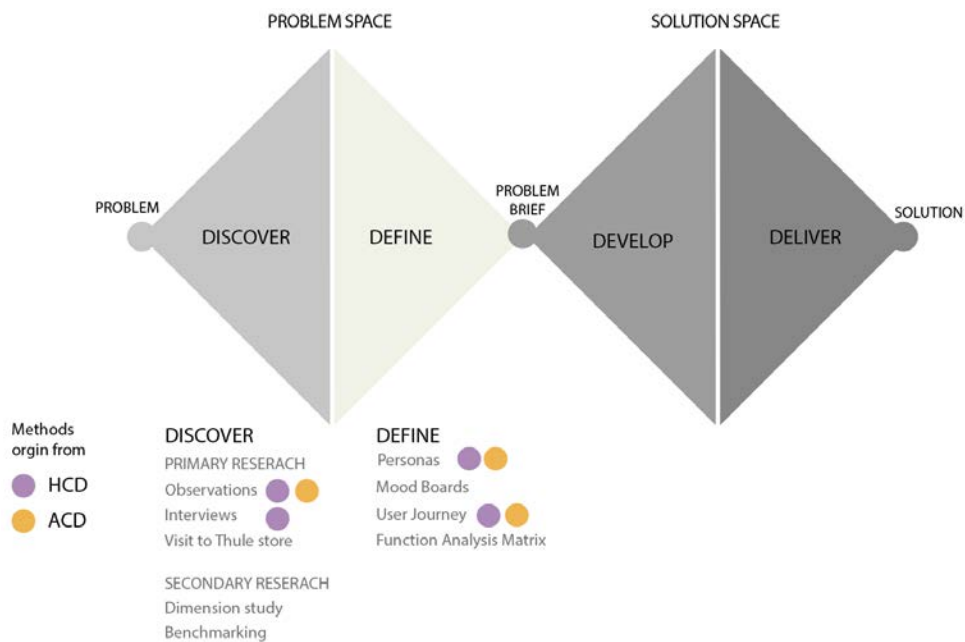


Figure 16: Correlation between seat size and dog size

# 5 Define

*In the Define phase all of the collected information from the Discover phase is compiled and transformed into user needs. Different personas and their user journeys are created, as well as a function analysis matrix to rank the importance of the needs (see figure 17). A final brief is formulated, based on the insights from the Discover phase.*



*Figure 17: Methods selected from an HCD & ACD approach during Define*

## 5.1 Reformulating the brief

From the primary and secondary research, insights about attachment solutions and dog dimensions were gathered. The attachment solutions that would be relevant for the rear seat of the car are ISOfix and seat belt solution, since it is available in most of the cars today. The dimension comparison from the secondary research concluded what dog size would fit in one or two rear seats. To delimit the project and define it further, it was decided together with Thule to design for only one rear seat, since it was considered easier to start developing the concept on a smaller scale.

The attachment solutions and size limitation was added to the brief, and the updated version states the following: *Develop a carrier that can be attached with ISOfix and/or belt, for a dog of the size XS-S.*

## 5.2 User Needs

From the primary and secondary research, user needs were identified. The key user needs are presented in table 3, where the needs are divided between human and dog since they have different needs on the product. On the right side of the table, the origin of the needs are presented. When mentioning Thule, it is from the visit to the store in Malmö. The user needs will later be used to evaluate different concepts, ensuring that they are being fulfilled.

**Table 3. Key User Needs**

<b>HUMAN</b>	<b>From where</b>
The solution provides an overview of dog	Interview
The solution enables cleaning	Interview
The solution is foldable	Thule, Interview
The solution is time efficient	Observations
The solution is easy to handle	Interview

The solution is easy to transport outside car	Interview
The solution enables entrance from several sides	Interviews
The solution is multifunctional	Thule, Interview
The solution is easy to install / remove	Interview
The solution protects from dirt	Interview
The solution offers fastening solution	Thule, Legislation
The solution does not damage the car	Interview
The solution fulfils standard dimensions	Legislation
The solution can be handled in an ergonomic way	Interview
The solution offer storing space	Observation

#### **DOG**

The solution offers pleasant temperature	Interview
The solution is comfortable	Interview
The solution enables standing/lying /sitting position	Legislation
The solution offers ventilation	Interview
The solution offers light input	Interview
The solution provides coverage from sun	Interview
The solution enables easy walk in / out	Interview
The solutions offers a safe environment	Litterature, Interview
The solution is a “safe spot”	Interview
The solution offers view	Observations

## 5.3 Methods

To include the ACD approach in the Define phase it is important to create personas, storyboards and scenarios that are animal-friendly. The stories and narratives should be based on real animals (Martin Bates, 2016/2017). The Define phase is a converging phase, meaning the insights from the research is compiled and narrowed down to find what to focus on (Design Council, 2022). From a HCD approach the Define step is a way for the designer to ensure that the user and the problem has been fully understood. The methods selected to get a clear understanding of the users and their needs were *Personas*, *User Journeys*, *Mood Boards* and *Function Analysis Matrix*.

### **Persona**

Hanington emphasises the importance of having some level of consolidation - designing for everyone results in ‘unfocused or incoherent solutions’ (Martin & Hanington, 2012). Personas could provide an ideal consolidation solution by capturing common behaviours in meaningful and relatable profiles. “*Their human description facilitates easy empathy and communication, while their distinctions create useful design targets for responsible design.*” (ibid)

As Martin Bates (2016/17) suggests in ACD, animal-user persona was used as a method to ensure that the animals’ perspective is considered and listened to. This method deepens the understanding of the animal through narratives and would be used by anyone who is involved in the design process (ibid) - which is similar to the persona method described by Martin & Hanington (2012). To help the designer create an animal persona that will add value to the design process, the ACD approach has certain recommendations on what the persona should include. It should be based on real animals and be described with quotes from people close to the animal. The description should also include the animal’s key goals, behaviour, frustrations and motivations (Martin Bates, 2016/2017).

Four different personas were created based on the collected and interpreted data, two personas representing the human user, and two representing the dog (the result is presented in chapter 5.4).

## **Mood Board**

A mood board can be created to communicate the design esthetics, style and context of the user. The purpose of the mood board is to inspire and visually present a description of the user, and can be done by combining pictures, illustrations or brand images (Martin & Hanington, 2012). The team created two different mood boards, representing what products the different personas would use from Thules current product portfolio (see the result in chapter 5.4). These pictures were gathered from Thule's website and their instagram with the intended to inspire the team during brainstorming sessions. As well as communicate the desired aesthetics and image of the carrier.

## **User Journey Workshop**

The ACD approach recommends designers to create animal-friendly storyboards, also called user journeys, to help define the user group and their key characteristics. This method was selected since it is a tool that can be used for designers to understand the user's experience while interacting with a product. The purpose of the user journey map is for designers to evaluate and discuss each step of a scenario, in order to find improvements for each moment.

The User Journey should represent each of the personas' individual journey, since different personas might use the product in different ways (Martin & Hanington, 2012). User Journey Workshops is a good way for design teams to identify the faults and weaknesses during a situation, as well as what works well. A workshop will also help the team to come to a common understanding of the user behaviour and how to improve the situation. Together with members of Thules concept and design team, the team had a User Journey Workshop at Hillerstorp. The goal was to collectively identify the user needs in different parts of the personas daily journey.

## **5.4 Result**

### **Persona**

#### *Human persona*

The typical Thule persona is seen as an active, adventurous and outdoors person, whose lifestyle is portrayed through Thules various platforms. This persona is often seen out in nature, and at times together with a dog, usually in the size M-XL

(based on Thules instagram). A conclusion that the team made was that the Thule persona might not buy a small dog, in size XS-S, which is the size that the product will be designed for. The persona interested in a pet carrier for a small dog might be different from Thules already existing customer, therefore the team decided to create two different personas. One called *The Adventurer* with the purpose to reflect the traditional Thule person, but with a small dog. The second one is called *The City Person* and was created to represent the people found during interviews and observations, that tend to have smaller dogs and live lives less active than The Adventurer. The Adventurer persona is presented in figure 18 and the City Person persona can be found in Appendix A.3.

#### *Dog persona*

From the observations, the conclusion was made that people who use their dogs in competition (as observed, during an agility training) tend to transport their dogs in a robust cage in the luggage compartment of the car. Since the project's target group is dog owners who transport their dogs in the rear seat, the dog persona would not be a competing dog. The observations also showed that dogs in the size XS-S travelled in the rear seat to a greater extent than larger dogs. This was also concluded in the dimension study and therefore the dog persona is in the size XS-S. When it comes to the behaviour of the dog, Martin Bates (2016/2017) recommends the animal persona to be based on a real animal. As well as including a description of the animal's key goals, behaviour, frustrations and motivations. The team used experience with their own dogs to describe the personality of the dog personas. The Adventurer dog persona is presented in figure 19 (City Person dog persona is found in Appendix A.3).

#### **Mood Board**

Two different mood boards were created, one representing the Adventurer and one for the City Person. The focus of the mood boards were to visualise what type of products the different personas would use. The idea was that the final concept of the Pet Carrier would be able to fit into these product portfolios (mood boards presented in figure 20).





**Jim Carell**

*I love hiking, camping, skiing, and exploring nature together with my family, no matter what time of the year. Simplicity, lightweight, high quality, smart packing solutions, and multifunctional gears are what I value the most during my trips.*

**Demographics**

**Age** 40  
**Gender** Male  
**Location** Östersund  
**Occupation** IT-consultant  
**Family** Living together with my wife Ida and our dog Suni.  
**Car** Volvo

**Favourite brands**  
 THULE, Fjällräven, Naturkompaniet, Haglöf, Volvo


**Frustrations / Pain points**

I can't find a cool, functional & safe carrier for the rear seat that can hold necessary gears for Suni. Having a dog while hiking and camping can be a struggle. It requires a lot of time planning and space with all the extra packing. The last time we were out camping Suni slept in our tent, but everything got wet, dirty and hairy. She walked around the whole night trying to find a good place to sleep.

**Needs**

I need one space-saving solution that works both in the car and also as a "home" for Suni when we are out on our adventures. I also need a smart way to carry the carrier together with all our other gears.

Figure 18: The Adventurer human persona



**Suni**

*I am a playful and active dog. My family and I love to discover new places but I also love a good sleep after a long day in nature. Being close to Jim and Ida is very important. I can only relax when I have everything under control.*

**Demographics**

**Age** 1,5 year  
**Gender** Bitch  
**Breed** Pembroke Welsh Corgi  
**Size** S

**Needs**

I need a cool seat for the car that allows me to get a good overview. It would be really good if it stands steady to avoid bumpiness. And hey, have you heard about ventilation??? Is it too much to ask for?

**Frustrations / Pain points**

I don't like cars. Who likes being squeezed into a carrier? It is bumpy, warm, often dark, and tight... It's so hard to see what's going on outside the carrier and that's making me anxious and stressed. Jim seems to believe I need to be carried into the carrier. That's not true. If he would just put something in front of the carrier, it would be super simple to jump on my own. We're often enemies during the car ride, but I forget to be angry every time he lets me out again. He is my best friend.

Figure 19: The Adventurer dog persona

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EXPLORE,  
TOGETHER



Easy strolling,  
easy living



Flexible  
Fun  
Functional

Figure 20: Mood Board The Adventurer & The City Person

## Workshop at Thule - Creating User Journey

The two personas - The Adventurer and The City Person, acted as a basis for the User Journey workshop. This workshop was conducted together with the concept and product design team at Thule in Hillerstorp (see figure 21 and 22).

Depending on the destination of the car trip, the pet carrier could be designed in a way that adds value for both humans and dogs. Besides providing safe transportation, additional design features could be integrated in the pet carrier. Based on the two personas, different areas of use were investigated by following the different user journeys and analysing what needs might occur. Brainstorming sessions about how to make the pet carrier more adapted to the areas of interest was done together with the Thule team that resulted in the following insights.

For the City Person, it is important to be able to bring the dog everywhere. While visiting friends, to work etc. In new environments and while meeting new people a lot of dogs can get stressed. In these situations the dogs seek objects associated with the owner to get calm (Palestrini et al., 2005). The carrier could in those situations serve as a safe place for the dog.

The Adventurer also wants to bring the dog but chooses activities out in nature such as hiking and camping. In these situations the carrier could serve as a dog "tent" or a way for the owner to carry things during the hike.



Figure 21: User Journey workshop at Thule

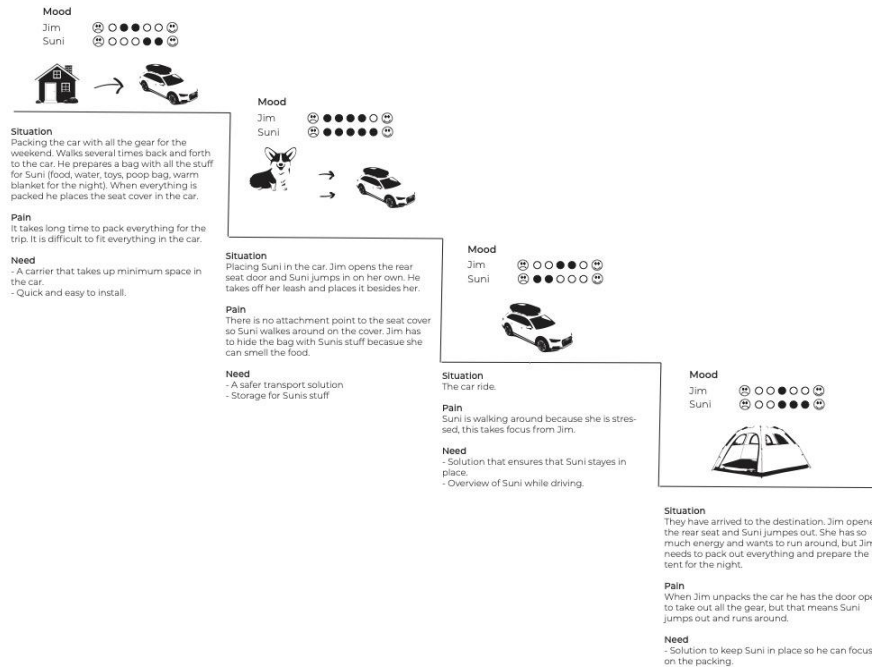


Figure 22: User Journey

# 6 Develop

*In the Double Diamond process, Develop concaves from the Define phase to include generating and testing potential design concepts. In order to generate these concepts, design methods from ACD and HCD were combined, including brainstorming, parallel prototyping, and concept screening matrix (see figure 23).*

*In the following section, Method and Result are not divided in separate chapters as in previous phases, instead it is presented alternatively to make it easier for the reader to follow the process.*

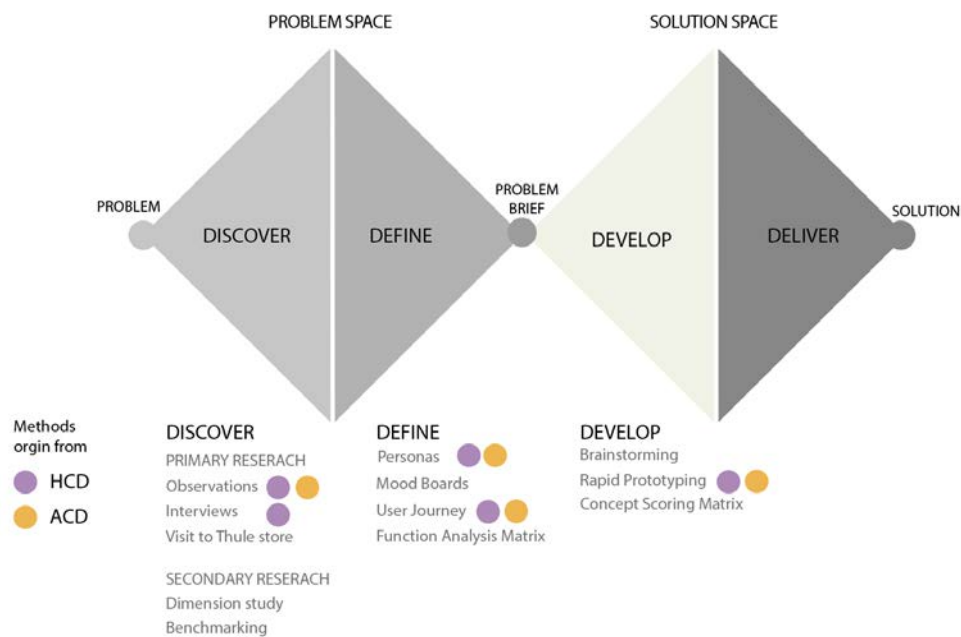


Figure 23: Methods selected from an HCD & ACD approach during Develop

## 6.1 Concept Development

The concepts were developed within three main categories before combining them into one final concept (presented in figure 24). The reason to divide the concept development into three categories was to allow the team to focus entirely on one feature at a time, without having to compromise any idea because of restraint from the other categories.

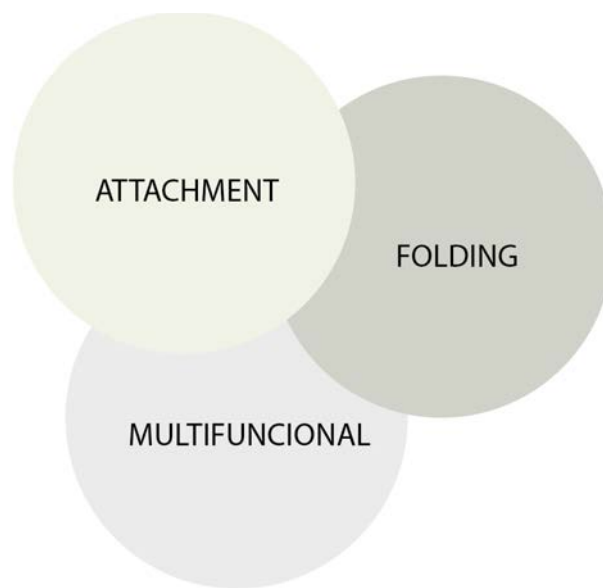


Figure 24. The three categories for the Concept Generation

The three main categories that were chosen were *attachment*, *folding* and *multifunctionality*, and are based on the identified user needs shown in table 4 below. As shown in the table, the *attachment* solution is a need based on the current legislations and *foldability & multifunctionality* are based on the human user needs. The involvement of the dog will be in the category multifunctionality, where the different personas will be the basis for the idea generation.

**Table 4. Selected user needs**

The solution is foldable	Thule, Interview
The solution is multifunctional	Thule

### **6.1.1 Brainstorming**

Brainstorming is a method used with the intent to generate a large amount of ideas and concepts. To create a safe atmosphere for the participants to express their ideas, Martin & Hannington has come up with some rules of brainstorming. Some of the things they mention are to “go for quantity over quality”, “withhold judgement”, and “build on each other’s ideas” (Martin & Hannington, 2012).

The brainstorming method was selected because it fits well in with the HCD approach. As mentioned in the theoretical framework, Norman has three rules when generating ideas; create a large amount of ideas, not criticise any ideas and ask questions about everything (Norman, 2013). Thus, brainstorming is a good way to achieve this. In the ACD approach Bates does not bring up any specific methods for generating ideas, however the focus should be on involving the animal as much as possible in all the different phases and therefore the team brainstorms from both of the users perspectives.

The team conducted several brainstorming sessions with all the above in mind. Some of the sessions started with an individual idea generation by using sketching. After a time the ideas were switched between the participants and continued to build on. The concepts that were generated focused on the areas described above, folding mechanism, attachment and multifunctionality. By generating ideas for the different categories individually, the team could explore and dig deeper into different solutions before combining them into one concept.

To visualise and communicate different concepts in an organised way, Brainstorm Graphic Organisers can be used. One type of Graphic organisers is a Tree Diagram, that works as a visualisation framework and can be constructed from the top down. This is useful when there is a need to show the relationship between main ideas and supporting ideas, or to classify the ideas in different categories (Martin & Hanington, 2012). A Tree Diagram was used to categorise the different concepts in the three different areas of folding, attachment and multifunctionality (figure 25) and gave the team a better overview of the process.





Figure 25. Concept generation for the three different categories

### 6.1.2 Parallel Prototyping

The parallel prototyping method explores different design solutions simultaneously, without deciding on a specific direction too early. This method is useful for designers to not favour a design, but instead reflect on how all the individual parts of the design fulfils the goal. By generating modular and interchangeable low-fidelity prototypes the team can get feedback on different features in an early stage of the development process. These features can then be refined and combined to gain a better design result (Martin & Hanington, 2012). In the HCD approach, prototyping is an essential part of the development process. It could be done with simple material such as cardboard or foam models (Norman, 2013). Martin Bates highlights rapid prototyping as one ACD method to be used during *Develop* as this could allow for a physical conversation when the animal interacts with the prototypes. Observing and analysing the body language and interaction between object and animal could reveal important insights into what element to modify, remove or add to the product (Martin Bates 2016/17).

The team built both small scale and real scale prototypes parallel to the brainstorming sessions to verify the different concepts. Small scale prototypes were used to quickly test folding mechanisms and evaluate them before continuing with the concepts. In the beginning methods such as cardboard cutting by hand were used, while getting closer to a final concept, laser cutting and 3D printing were used.



The team did not have access to a dog during the brainstorming sessions, therefore the involvement of a dog took place only when a real scale prototype with selected features from the three categories had been made, described in chapter 7.

## 6.2 Development and selection of concepts

In the following sections, the development and selection of the different concepts within the three categories are presented (see figure 26). Different methods were used when selecting what concepts to continue with. The foldability concepts were evaluated with a concept screening matrix (read more in the foldability section), since it was the category that had the most potential to be evaluated with parameters. For the attachment solution and multifunctionality categories, the team made the decisions based on user needs and after discussion with Thule.

The process of selecting and narrowing down the different concepts are presented in figure 26. The question marks symbolise the decisions that will be made from each category after the selection process.

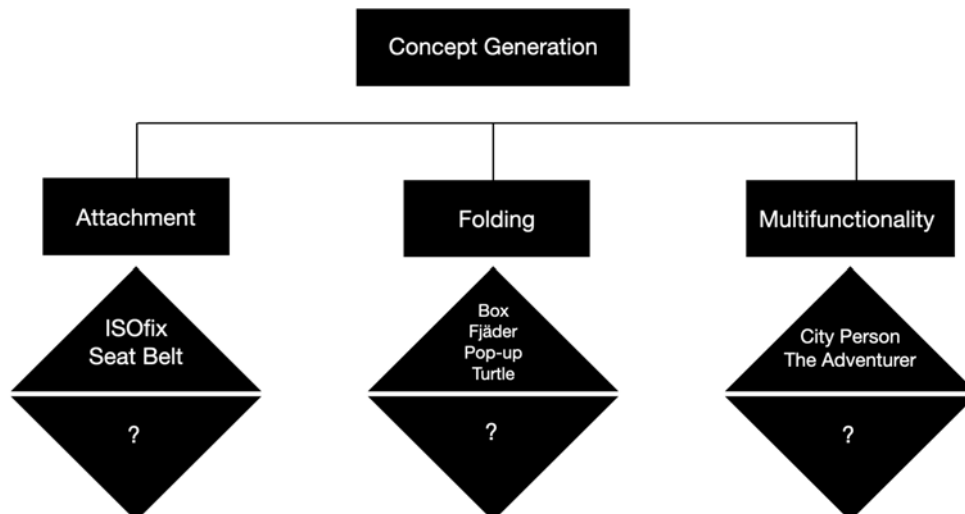


Figure 26: Concept development & selection process for the three categories

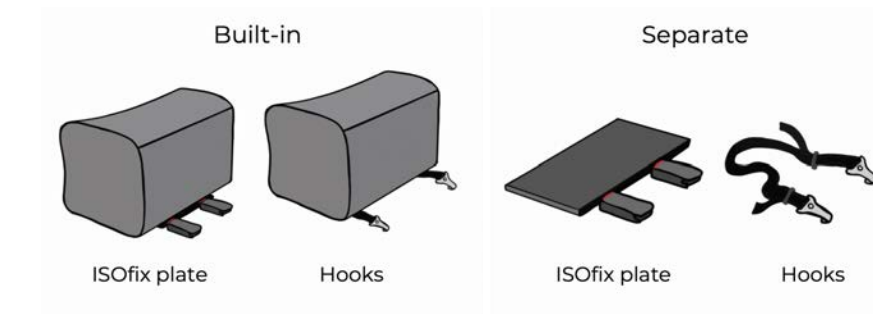
## 6.2.1 Attachment solution

### *Development of concepts*

Since the carrier should be able to be attached with the car's seat belt or ISOfix anchor points, different concepts for the attachment were generated. The human will be the user that interacts with the attachment solution, as a consequent the animal user has not been taken into consideration while generating ideas for this area.

For the belt solution the team researched various ways on how to attach a pet carrier with a seat belt, before creating prototypes and testing different concepts. The prototypes were made by 3D printing and tested in the car for evaluation.

For the ISOfix attachment, the team divided the concepts into two main categories; built-in ISOfix and separate ISOfix. Within both of these categories the team decided to try two concepts: ISOfix plate and ISOfix hooks (shown in figure 27). These concepts were evaluated by building parallel prototypes that were tested in the car.



*Figur 27: Categorization of attachment solutions (Nordkvist & Ekberg, 2022)*

### *Selection of concept*

The concepts in the attachment solution category were evaluated by the team testing the prototypes in a car and determining what felt most intuitive. In discussion with Thule the decision was made to only focus on the seat belt as a fastening solution based on the fact that not all cars have ISOfix attachment anchor points. The ISOfix attachment should rather be seen as a compliment that can be purchased as an add-on to the carrier for improved safety, and was marked as a

potential area for Thule to look deeper into, but does not longer fall within the scope of this project. Further, the seat belt attachment was the primary focus.

### **2.2.2 Folding mechanism**

#### *Development of concepts*

The folding mechanism was explored with brainstorming, by using sketching, building prototypes and doing online research. The user in focus in this category was mainly the human, since folding origins from the human need “the solution is foldable”. Parallel prototyping was used throughout this category, since quick feedback was necessary to confirm the folding mechanism. To understand how the folding mechanism would be affected by the seat dimensions, the prototypes were regularly tested in a car. In figure 28, a selection of pictures are presented, showing the development of different concepts for the folding.

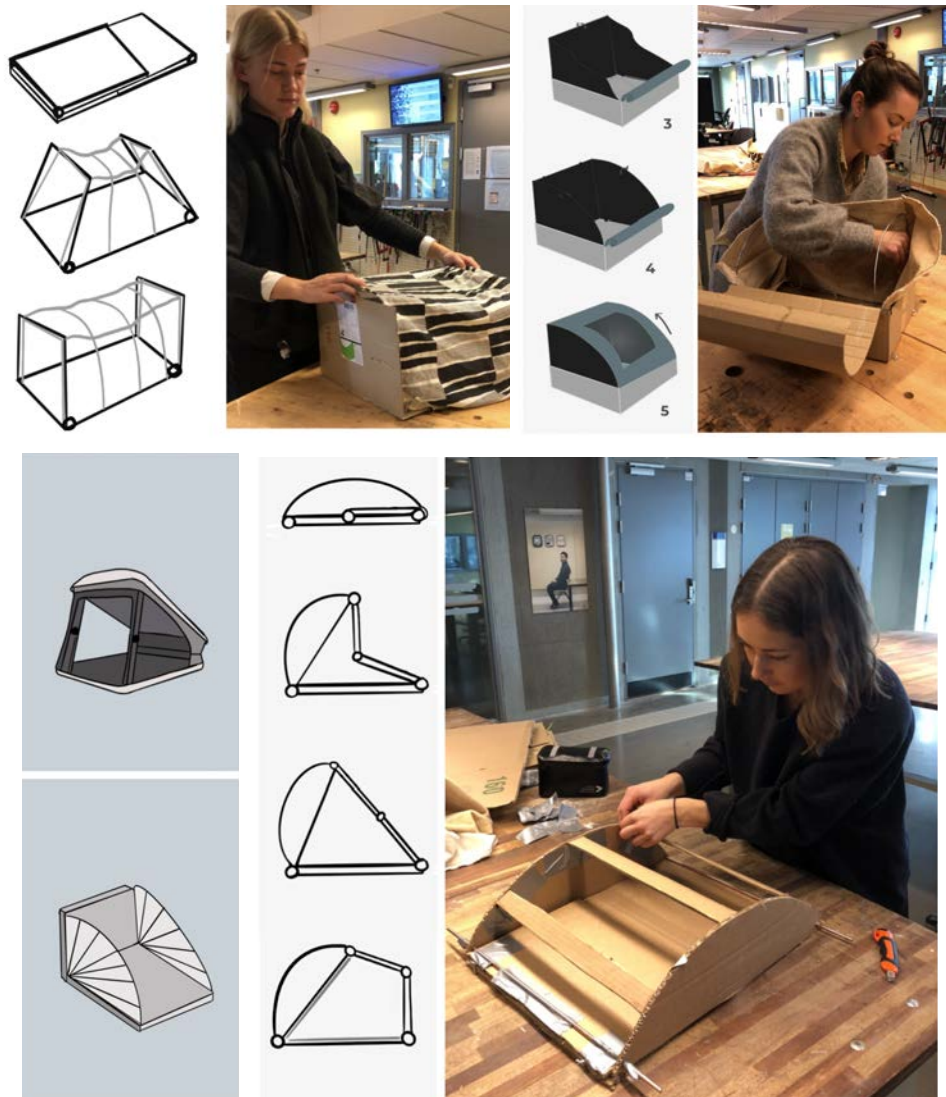


Figure 28: Different folding concepts

### *Selection of concepts*

To select what folding mechanism to continue with, a concept screening matrix was used (see figure 29). A concept screening matrix is a quick and systematic way to compare and evaluate different concepts against each other (Ulrich & Eppinger, 2012). By narrowing down the number of concepts, the matrix can be a

tool for designers to decide on what concepts to continue with and improve. The different concepts are rated against a reference concept, in relation to the user needs. If a concept is better than the reference, it is assigned the code (+), if it is worse (-) and the same (0). These values are summed and presented in a net score which decides the ranking of the concepts (ibid).

The criterias that the concepts were compared against were selected to evaluate the concept from both the animal and human perspective. The parameters evaluated from a human perspective were: the number of steps to completely fold, how much space it saves when folded, how time efficient it is, and how easy it is to transport outside the car. From the animal's perspective the parameters were: number of entrances, if it enables standing/sitting/lying position of the dog, how easy it is to walk in/out and dimensions to fulfil the legislations for animal transportation. The concept fulfilling these parameters the most were the concept called “the turtle” shown in figure 30.







						
Key needs	Box 1	Box 2	Onto	Pop-up	Sköldpadda	Solfjäder
Foldability steps	0	-1	-1	1	1	0
Foldability %	0	0	-1	0	-1	0
Enables entrance several sides	0	1	-1	0	0	0
Time efficient	0	-1	-1	1	1	0
Enables standing/lying/sitting position	0	0	-1	-1	-1	-1
Easy walk in/out	0	0	-1	1	1	-1
Easy to transport outside car	0	0	-1	1	1	0
Dimensions	0	0	-1	-1	0	-1
Pluses	0	1	0	4	4	0
Sames	0	5	0	2	2	5
Minuses	0	2	8	2	2	3
Net score	0	-1	-8	1	2	-3
Rank	3	4	6	2	1	5
Continue?	NO	NO	NO	NO	<b>YES</b>	NO

Figure 29: Concept-Screening Matrix for folding mechanism

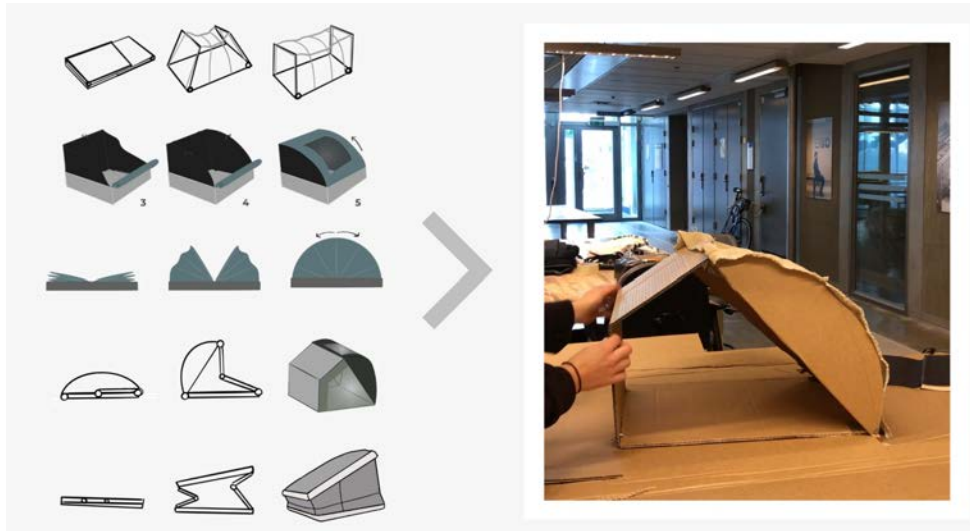


Figure 30: Turtle concept, chosen as foldability concept

### 2.2.3 Multifunctionality

#### *Development of concepts*

The purpose of the multifunctionality category was to find design features that could add value to the carrier depending on the destination of the dog and owner. Since the carrier is foldable, it already has added value because it will be able to be brought to new places. But, depending on where these new places are, it might be possible to design the carrier in a way that fulfils the users needs even more.

The team decided to brainstorm around situations outside the car with inspiration from the User Journey Workshop at Thule. To make the pet carrier interesting for both of the personas, common areas of interest were identified. The common areas of interest were based on different activities that both the human and dog personas (the Adventurer and the City Person) might do. The activities were categorised in 2 groups - activities done when the carrier is moving and when it is still. The activities that were thought to be common for the two personas are highlighted in yellow in the Activity Tree below (figure 31).

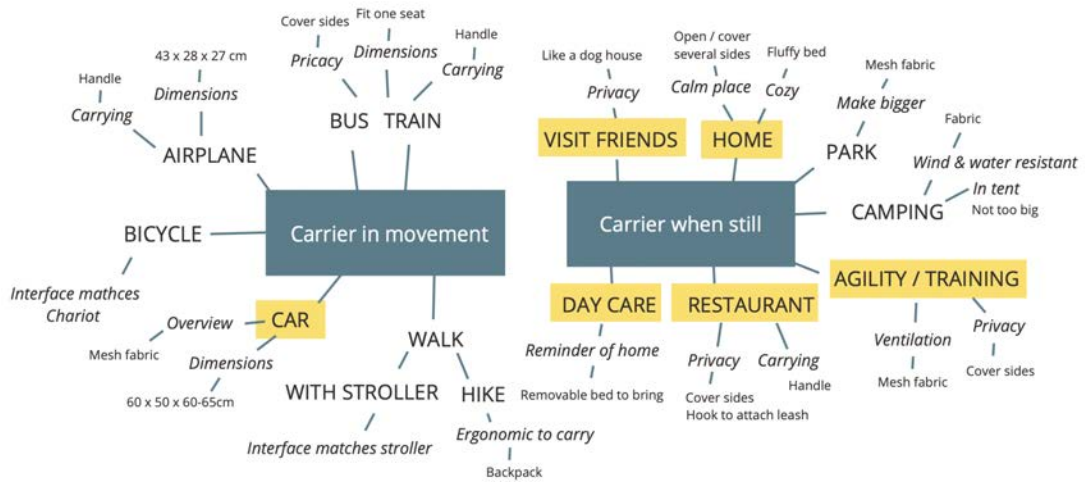


Figure 31: Activity tree

### Selection of concept

For each of the different activities, the team tried to identify what needs the personas could have on the carrier. These needs are presented in a cursive font in figure 32, and are linked to specific design suggestions that could fulfil them. In many of the activities, the user needs were the same. For example, during agility training, at a restaurant and while visiting friends the dog could have the need for privacy. The insight that a lot of different activities required similar design solutions made the team focus on implementing the common features instead of trying to make a carrier specifically designed for an individual activity, such as an agility training. By designing it in this way it will be usable in many different situations and thereby become multifunctional.

<b>CAR</b>	<i>Overview</i> — Mesh fabric <i>Dimensions</i> — 60 x 50 x 60-65cm
<b>VISIT FRIENDS</b>	<i>Privacy</i> — Reminder from home — Like a dog house
<b>HOME</b>	<i>Calm place</i> — Open / cover several sides <i>Cozy</i> — Fluffy bed
<b>AGILITY / TRAINING</b>	<i>Privacy</i> — Cover sides <i>Ventilation</i> — Mesh fabric
<b>DAY CARE</b>	<i>Reminder of home</i> — Removable bed to bring
<b>RESTAURANT</b>	<i>Privacy</i> — Cover sides <i>Carrying</i> — Hook to attach leash — Handle

Figure 32: Common activities and design features that can be implemented

The conclusion from the common activities were that most of the selected situations required the carrier to be a calm place for the dog that would remind of the home and give privacy. This is also supported by theory, since dogs tend to seek objects related to the owner in new stressful situations (Palestrini et al., 2005). If the carrier is used in the home as a doghouse, it will be associated with something secure and calm. Then, having this safe place during a car ride, when visiting friends or in public spaces would give the dog a feeling of recognition and security and prevent the dog from getting stressed.

During the primary research, this need was found while talking to dog owners. Below, a fitting quote from a dog owner is presented.

*“Our previous dog had a very hard time being alone and thought it was scary to ride in the car. Even when people came over, she was sometimes stressed and we wished we had taught her to be in a carrier first at home, so she could just walk away and find her own space.” - Dog owner, Helsingborg*

Bringing the carrier to new places supports the decision of making it foldable, as it makes it easier for the user to bring it in new situations. It will be the human transporting the carrier to all of these new places, therefore the addition of ergonomic handles needs to be considered further.

*“It would have been very good if the carrier was collapsible as it fulfils more purposes then. You can take the dog with you when you go to a party / dinner and*



*do not have to ask for a blanket when you arrive, the dog feels safe in the carrier.”*

- Dog owner, Helsingborg

Concrete ways to enhance the calm experience could be to design the carrier with the possibility to cover all sides. This will shield the dog from everything happening on the outside, ensuring privacy and a relaxed environment. To make it more comfortable for the dog, soft material could be added on the inside of the carrier.

In conclusion, the multifunctionality aspects that were selected were that the carrier should be “a calm place for the dog” and “easy to bring” for the owner.

### 6.3 Implementation

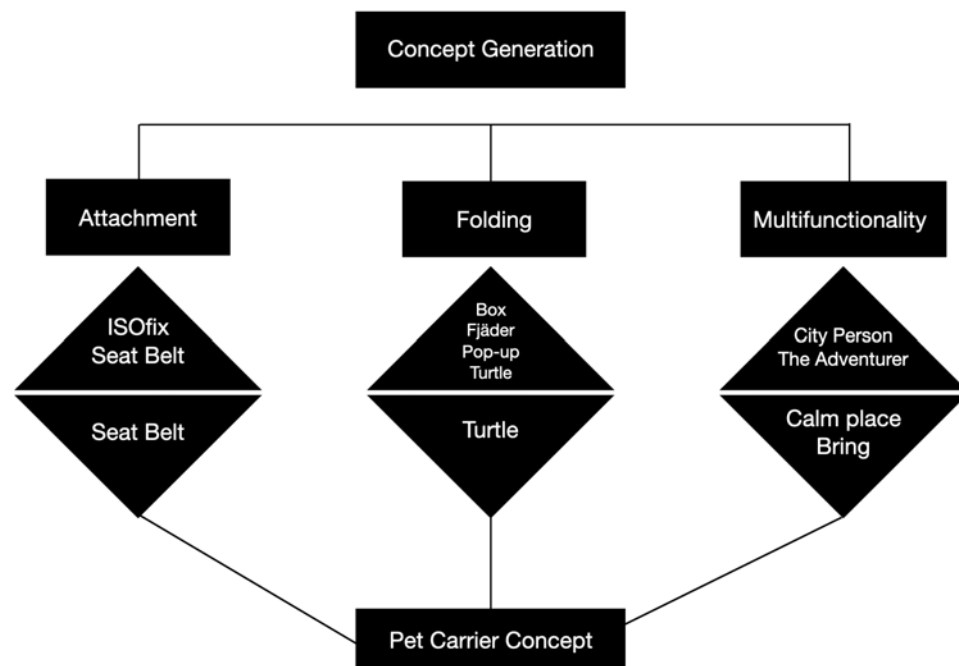


Figure 33: Combination of selected sub-concepts into new concept

The selected concepts for each of the three categories were combined into one common concept for the pet carrier (see figure 33). The concept was evaluated against different aspects to ensure that the solution fulfils the legislations and user needs before developing further. Aspects such as safety, geometric shape and legislation were evaluated and are discussed below.

### Geometric shape

The carrier has a curved front, designed in a way that follows the natural shape of the dog, both while standing and sitting (see figure 35). It also follows the shape of the seat in front, making maximum use of the available space. This shape fulfils the animal need in figure 34:

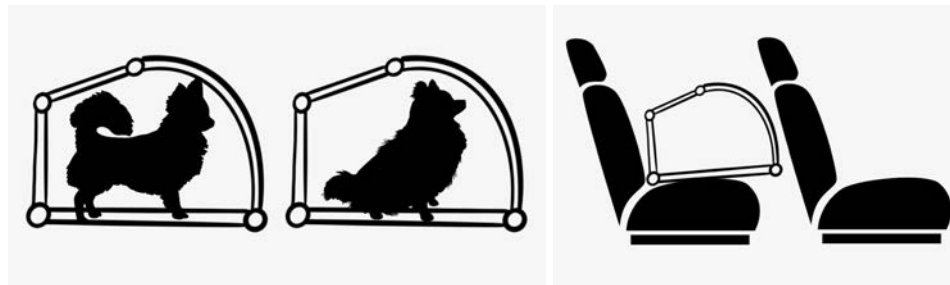
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The solution enables standing/lying /sitting position

Legislation

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*Figure 34: Extract from user needs*



*Figure 35 - Geometric shape*

#### *Dimensions from a legislations perspective*

For a dog carrier to be approved on the Swedish market, it must fulfil the legislations and requirements from the Swedish Board of Agriculture. One of these requirements states that “the length of the roof must not be more than 5 percent shorter than the specified length” (Swedish Board of Agriculture, 2022). From the car seat dimensions research during the Discover phase, it was found that the maximum length of the carrier could be 60 mm. With this as a maximum dimension, the length of the roof must be 57 mm to fulfil the 5 percent requirement from the Swedish Board of Agriculture. By having the curved shape

in the front, the approved length of the roof is reached (figure 37). This means that the user need “the solution fulfils standard dimensions” is met (see figure 36).

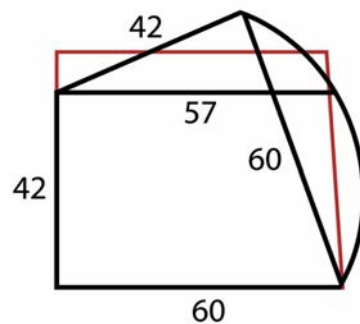
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The solution fulfils standard dimensions

Legislation

---

*Figure 36: Extract from user needs*



*Figure 37: Maximum dimensions of carrier*

### **Safety**

Safety is a requirement for the pet carrier, since regulations require the animal to be restrained in the car while travelling. Proving that the concept will be safe is not included in the project scope, but since the product must express safety and have an opportunity to be further developed to ensure safety in the car, the concept has been evaluated from a safety perspective.

The curved front of the carrier does not only follow the shape of the dog and the car, it could also function as a shield that prevents the animal from flying through the carrier in the event of a crash. Based on the Centre For Pet Safety crash test, it was decided to not place any zippers or openable parts on that area.

Since the carrier is foldable it has potential to better absorb the energy during a crash, than if it would have been completely rigid. This assumption is based on a comparison with the MIM Safe carriers, which slightly collapse during a collision to absorb the energy.

# 7 Deliver

*In contrast to the Develop phase, Deliver is a converging step in the Double Diamond methodology including similar methods as previous steps such as main persona, benchmarking, mood board, ideation, prototyping, and testing. However, these methods are hereinafter combined to define, formulate and understand the nature of the final concept and are presented continuously with the result. The selected methods are presented in figure 38 below.*

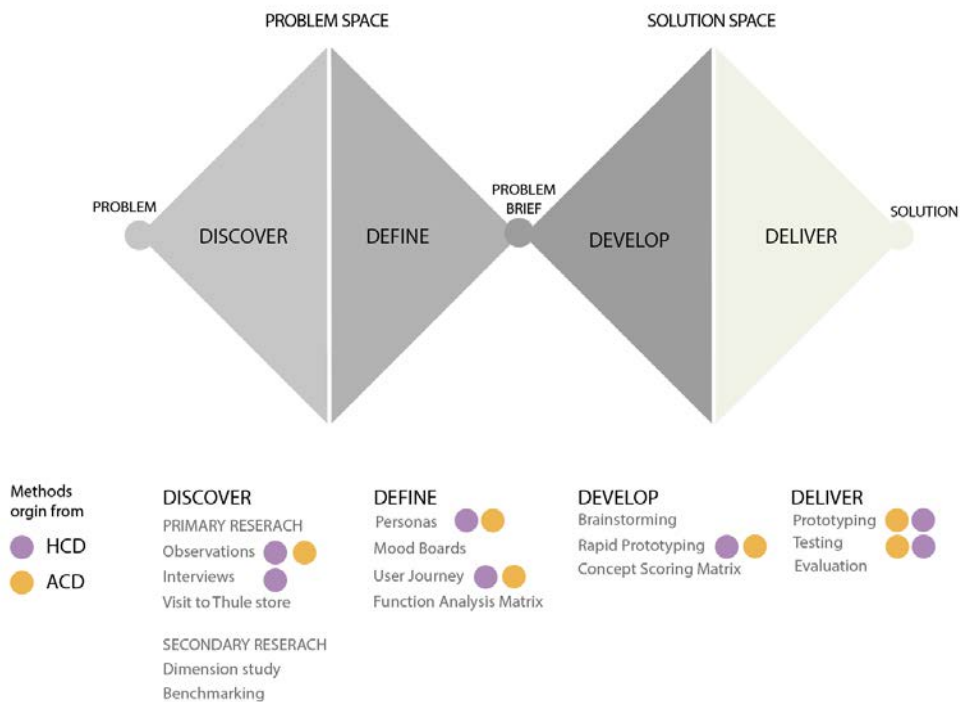


Figure 38: Methods selected from an HCD & ACD approach during Deliver

## 7.1 Prototyping & testing

Martin Bates explains the Deliver step to where the design team ‘produces refined and resolved design solutions’ and mentions the importance of prototyping to gather user feedback. This approach is similar to the HCD approach where prototyping is a part of the solution space as a way to simulate the solution (Norman, 2013. p.228).

Even in this stage, the involvement of the user is as important as it was in *Develop*. However, the prototypes created in *Deliver* are nearing the final product in terms of look, feel and interaction (Martin Bates, 2016/17). It is important that both human and animal test the prototypes for the designers to be able to refine and make improvements. This was done throughout the Deliver phase, by having a dog and owner test the prototypes to get feedback and gain insights on how to improve the concept.

Brainstorming and parallel prototyping was used to generate and implement improvements for the turtle concept. Five different prototypes were made, each with improvements from the previous version. In the following sections, the prototypes and testing will be described, with a focus on the key takeaways from a human and dog perspective, that led to new implementations for the concept.

### **Prototyping**

The team used both small scale prototyping and full scale to improve the turtle concept. The purpose of the small scale prototyping was to improve the folding mechanism since it had to be updated when fabric was added. The full scale prototypes were used to test the concept in a real scenario in a car with a dog and a owner. The five different versions of the full scale prototypes are presented in figure 38, in the order they were developed.

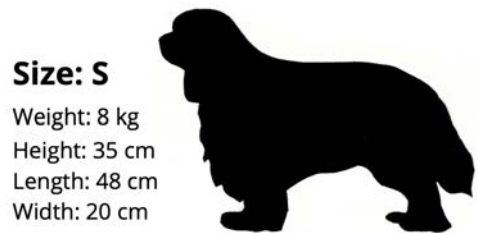


*Figure 38: Evolution of the Turtle concept*

## **Testing**

Three semi-structured observations were made with an owner and a dog during the Deliver phase. Insights from each observation led to improvements that were implemented on the next prototype version. The dog that was used during all of the tests was in the size S, and was selected since the carrier is designed for the

size XS-S. The goal with the observation was to evaluate how the owner experienced the installation of the carrier, both carrying it to the car as well as unfolding and attaching it with the seat belt. At the same time the behaviour of the dog was observed. The dimensions of the test dog is presented in see figure 39.



*Figure 39: Test dog*

#### *First testing*

The first testing was done with the prototype number 2 (see figure 40). The updates from prototype number 1 was that fabric had been added and the dimensions of the carrier were made bigger to correspond to the maximum size of a car seat. The testing of the prototype is presented in figure 41 with a sequence of pictures in combination with comments, describing the scenario.



*Figure 40: Updates from version 1 to 2*



*Figure 41: Sequence of images from first testing*

From the testing, the team got useful feedback on improvements that could be made for the next prototype version. By asking the owner questions during and after the testing, the team got an understanding of how the owner experienced the situation. An important insight was regarding the size of the entrance. The owner decided to carry the dog inside and saw advantages with having an opening that is as big as possible. Another interesting observation was that the dog slipped on the inside of the carton, this could be improved with slip protective material in the bottom. Since the owner did not have good supervision over the dog while installing the carrier, the team put up the goal that the carrier should be able to install using only one hand, to make the installation as smooth as possible. A final comment from the owner was the wish to see the dog while driving.

The key takeaways from the first testing are summarised and presented below:



- Big entrances on both sides with insight/outside
- Non-slippery soft bed inside the carrier
- Goal to install with one hand
- Placement of windows should enable contact between owner and dog

### *Second testing*

The insights from the first testing were updated in the prototype version 3. Big openings were added on the sides, a mattress was placed inside the carrier and a big window was placed in the front to allow contact between dog and owner (see figure 42). To test the updated prototype, the team used the same dog but this time without the presence of the owner (see figure 43). The decision to not include the owner was to see how the dog acted in an unknown situation, thus no interview with the owner was carried out.



*Figure 42: Update from version 2 to 3*



*Figure 43: Second testing*

Reflections that were made by the team during the testing were that the dog was more stressed this time. This could be explained by the owner not being present, making the dog feel insecure.

A key takeaway from the previous testing was to enable visual contact between dog and owner. This was implemented in this version by having a big window in the front of the carrier. During the testing, one of the team members tried the driver's seat to see how much visual contact the carrier gave with the dog. The big window provided a good overview, but since the seat in front blocked most of the window, a conclusion was made that the size of the window could be smaller and still obtain the same result. With the added mattress on the floor of the carrier, the dog did not slip which confirmed that the implementation was good.

An observation that was made during the testing was how the sun shone straight on the dog through the car window. An insight from this was to add cover on the both sides of the carrier. The key takeaways from the second testing are summarised below:

- The front window of the carrier can be made smaller
- A sun cover should be added to cover the side windows

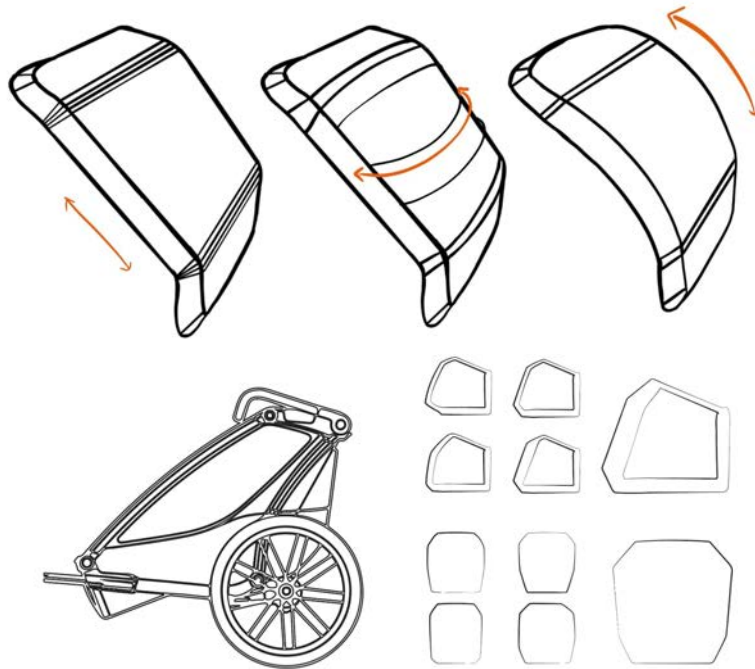
## 7.2 Form & function



*Figure 44: Updates from version 3 to 4*

The fourth prototype version (see figure 44) was not tested with a dog and owner, instead the goal with this prototype was to explore the shape and function of the front part of the carrier. The form was explored by using digital sketching and comparison to other Thule products.

According to Thule, the product should convey motion & energy - and this is done by creating “tension” in the design. The products have a direction and look like they are moving somewhere. This gives the image of a built-in power, and at the same time, it gives a light feeling. By examining Thule’s product catalogue the team found valuable inspiration for the shape. The dominant curve that gave the carrier its identity was inspired by Thule Chariot Lite (to the left in figure 45).



*Figure 45: Formstudy from reference model*

A key takeaway from the second testing was regarding the window on the front part of the carrier. A big window provides a great overview of the dog while the owner is driving. Different ways of placing a window were explored by sketching (see figure 46). From a safety perspective, a big window could be contradictory since the purpose of the front part was to act as a shield in the event of a crash. However, the need to have an overview of the dog is an important user requirement. Therefore a compromise regarding the safety aspect was made. A small window on the top part of the front was implemented, since it was concluded during the testing that a small window was enough to gain insight of the dog.



Figure 46: Different ways of ensuring insight

### 7.3 Colour & material

In the final version of the prototype, all the key takeaways from the testing were considered (see figure 47). The purpose of the final prototype is to demonstrate the functionality of the concept, when it comes to foldability, attachment and multifunctionality. The details of the final prototype are presented in chapter 8.



Figure 47: Updates from version 3 to final version

The exact aesthetics of the carrier, regarding final shape, colour and material were examined with digital sketches and image boards. When deciding the colours of the carrier, the team studied the existing products in Thules' product catalogue and tested 6 colours (see figure 48). Some colours are more “popping” while others are more discrete. The team evaluated the alternatives against the moodboards and decided to go for two colours per persona that matched their image (see figure 49 and 50).



*Figure 48: Colours from existing Thule products*



Figure 49: The colours chosen for persona “the adventurer”



Figure 50: The colours chosen for persona “the city person”



## 8 Final Concept

*In this chapter the final concept is presented (see figure 51) and explained in detail. Parts such as attachment solution, folding mechanism, material selection and openings are presented. A final testing of the prototype is done as well as an evaluation to see if the user needs are fulfilled.*



*Figure 51 - Final Version of the Works-Like Prototype*

### **Folding mechanism**

The folding mechanism is released by pulling a flap, as demonstrated in figure 52.





*Figure 52: Folding sequence from above*

The folding sequence from a side-view is presented in figure 53.



*Figure 53: Unfolding sequence from side*

**Front pocket**

The front pocket offers storage for items such as dog passports, leash, treats and other items that the owner would like to bring. The pocket works both when the carrier is folded and unfolded (see figure 54).



*Figure 54: Placement of front pocket*

## Openings

The carrier has big openings on both sides which enables easier entrance for the dog and allows the carrier to be used on either side of the car. The openings are made of mesh fabric that provides the owner with an overview of the dog while driving. Both openings can be covered with black fabric to give the dog privacy and give coverage from the sun. When the sides are opened they can be attached to the front with a built-in magnet (figure 55 bottom picture).



*Figure 55: Openings*

## Handle

A handle enables the user to carry the carrier when it is folded. If the user wants to carry it while it is unfolded, there is a handle on the back panel that can be used (figure 56). The purpose of this handle is also to help the user fold or unfold the carrier.



*Figure 56: Handles for carrying*

### **Locking**

Two clips secure the carrier when folded so it can safely be carried (figure 57).



*Figure 57: Locking*

### **Rear seat pillow**

The carrier is designed with a flat bottom surface so it can be used in the home as well. In the car, a specially designed rear seat pillow (see figure 58) will level the angle of the seat. It can be attached to the carrier with velcro.

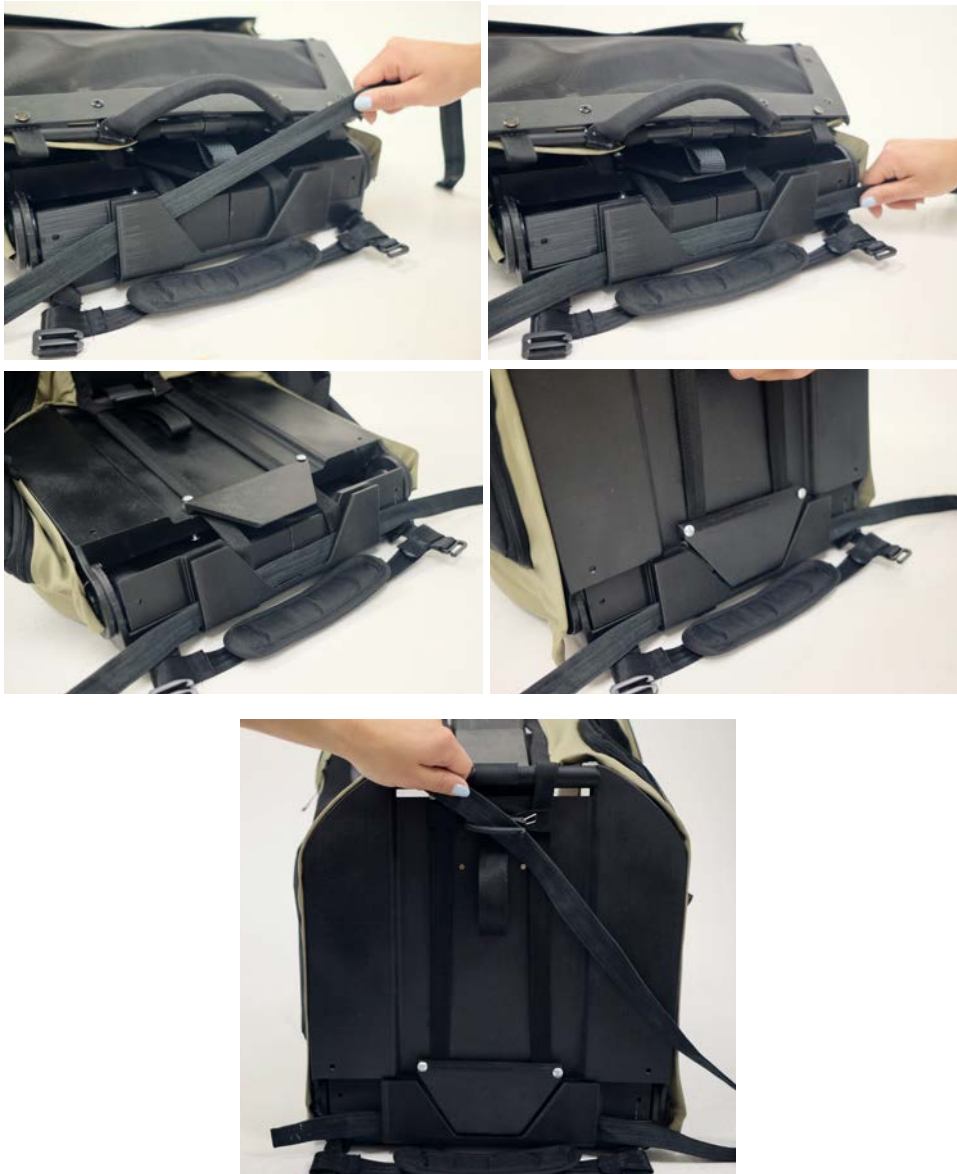




*Figure 58: Rear seat pillow*

**Seat belt attachment**

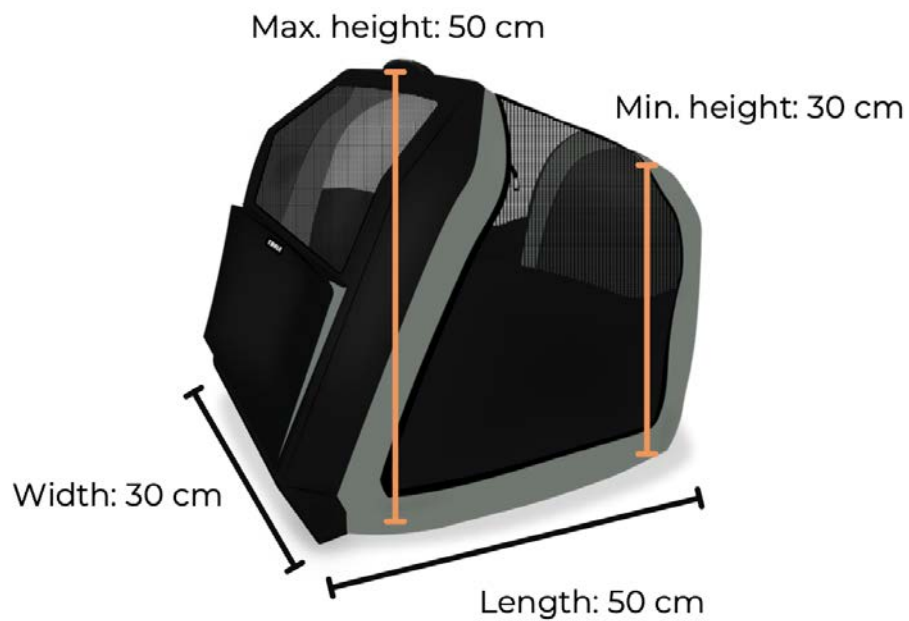
In figure 59 the seat belt attachment is presented step by step. Starting with the attachment of the lower part of the belt and then the diagonal part.



*Figure 59: Seat belt attachment step by step*

### Dimensions & weight

The final weight of the carrier is 4.2 kg and the dimensions are presented in figure 60.



*Figure 60: Final dimensions*

### Final testing

A home-related test was performed with the last version of the prototype and was done as a semi structured observation, with a dog in size S-M with its owner present (see figure 61). The owner was instructed to place the dog in the carrier without having seen it before. The goal with the observation was to identify potential improvements regarding management and usage of the carrier in home or other non-car-related situations.





Figure 61: Testing of final prototype in home

During the testing, the dog seemed very curious about the carrier and was relaxed throughout the process, according to the owner. Reflections from the owner were that the carrier was convenient to manage and the openings were easy to find and open. The key takeaways from the home-related test were the following:

*Key takeaways from home-related test:*

- An attachment point inside the carrier to connect the leash
- It fulfils its purpose of a calm place for the dog in the home

### Evaluation of User Needs

A final evaluation of how well the concept fulfils the user needs is presented below, with an explanation of *how* they are fulfilling the needs in the right column.

**Table 5. Fulfilled User Needs**

HUMAN	How?
The solution provides an overview of dog	Window in front and sides
The solution enables cleaning	Has removable bed on floor
The solution is foldable	Has folding mechanism
The solution is time efficient	Fast folding solution & belt attachment

The solution is easy to handle	Ergonomic handle, Easy fold
The solution is easy to transport outside car	Ergonomic handle, Foldable
The solution enables entrance from several sides	Two big openings
The solution is multifunctional	Home / Bring to new places
The solution is easy to install / remove	Intuitive belt attachment solution
The solution protects from dirt	
The solution offers fastening solution	Belt attachment
The solution does not damage the car	
The solution fulfils standard dimensions	Dimensions by Board of Agriculture
The solution can be handled in an ergonomic way	Handle positioned to get balance
The solution offer storing space	Pockets
<b>DOG</b>	
The solution offers pleasant temperature	Mesh fabric on front / sides
The solution is comfortable	Soft bed on floor
The solution enables standing/lying /sitting position	Dimensions for XS-S dog
The solution offers ventilation	Mesh fabric on front / sides / openings
The solution offers light input	Mesh fabric on front / sides / openings
The solution provides coverage from sun	Fabric to cover mesh
The solution enables easy walk in / out	Big openings on sides
The solutions offers a safe environment	Robust structure, Webbing strengthening
The solution is a “safe spot”	Can be covered for privacy

# 9 Discussion

*This chapter will discuss the final concept in comparison to the theoretical framework and context. It will reflect over how the design approach affected the results, as well as the selected methods. Finally, a conclusion of how the project fulfilled the research questions will be presented.*

## 9.1 Positioning the result

The project resulted in a foldable transportation solution for the rear seat of the car, suitable for dogs in the size XS-S. Besides the main function of the concept - to transport a dog in the car - it could also serve as a calm place for the dog in the house, or as a calm place while visiting new places.

In comparison to the requirements and regulations from the Swedish Board of Agriculture, the concept fulfils the safety requirement that states that: *'The dog must be secured in the car (...)'*. This is fulfilled because the carrier can be attached with the seat belt. However, the attachment solution needs to be further developed to be approved. The attachment solution should rather be seen as a conceptual solution with potential to fulfil the safety requirements in the future, than a solution that guarantees safety.

When evaluating the final concept in comparison to the user needs, it fulfils both the human and animal needs as well as the requirements from the Swedish Board of Agriculture. By using an animal - human centred design approach both of the users have been involved throughout the process, in different ways depending on the phase.

## 9.2 Reflection

### **Design process**

An important aspect when designing products for dogs is how the behaviour can be very different between individuals, depending on their background, learning habits and genetics (Nagel & Reinhardt, 2005; Jensen, 2011). Even if the carrier would be designed completely from a dog's perspective in the best possible way, many other aspects play a major role when it comes to how the dog experiences the product. Instinctively the dog might not like to be placed in a carrier and transported in a car. It is therefore the owners responsibility to train the dog and ensure that the transportation and interaction with the carrier is a positive experience. Testing the prototypes with unknown dogs would not give sufficient information about what they think of the product. Having the owner present for interviews is just as important, to get information about the animal's background and past experiences.

As Martin Bates recommends in the ACD approach, a good way of making sure that the animal behaviour is understood is to consult experts like ethnologists. Due to the time limit of the project, this principle was not explored. Instead the team relied on talking to the owners, as well as their own experience of having dogs while growing up. The experience with dogs while growing up might have contributed to an ability to understand dog behaviour during testing. Still, this is not enough to fully understand the dog from an ACD approach and an improvement would have been to involve an expert while observing how the dog interacted with the product.

### **ACD approach**

When reflecting over the design process, it is necessary to raise some critique towards the ACD approach. It was created by Holly Martin Bates during her education within product design at Glasgow School of Art in 2016/2017, meaning she is not an expert within the area. It is based on research from experts within animal behaviour and design thinking, but the approach has not been applied on a real project. The team could not find any other project that has been using Martin Bates ACD approach and can therefore not confirm nor deny if the approach has been successful in the past. In comparison, the HCD approach has been applied for many years. Already in 1978 it was being used by IDEO, a successful global design and innovation company (IDEO, 2022) who still uses the approach.

Looking at the history of both approaches, the ACD could be seen as less credible and the use of it in this project could be seen as an evaluation of how it works when being partly applied on a real project.

### **Selected methods**

Different methods were selected from an HCD and ACD approach during the four different phases of the Double Diamond. Methods from an ACD approach were selected from Martin Bates' framework and from an HCD approach methods were selected to fulfil the four activities: idea generation, prototyping, testing, observation. One method that the team used to generate ideas during the Develop phase was brainstorming. The brainstorming was done in three different categories - attachment, foldability and multifunctionality. The decision for selecting these three areas was because they were considered to be the most crucial areas to primary solve for the concept. However, if an aspect such as *safety* or *comfort for the dog* would have been selected as a brainstorming category, it might have resulted in a completely different final concept. Safety and comfort for the dog are found in the user needs, and would have been potential areas to diverge the project from.

The decision to create a foldable pet carrier came from the observations and interviews during the Discover phase, where it was recognized as one of the main human needs. Both foldability and attachment comes from human needs, leaving less room for the involvement of the animal user in an early stage of the project. The animal needs were applied on the concept in a later stage, which can be debatable from an ACD approach.

Another method to evaluate is the Concept Screening Matrix that was used during the concept selection stage. A quote from Ulrich & Eppinger is a fitting starting point for the reflection:

“Although we present a well-defined process, the team, not the method, creates the concepts and makes the decisions that determine the quality of the product” (Ulrich & Eppinger, Product Design & Development)

Just like the quote states, it was the team and not the method that made the decision when selecting what concepts to continue with. Even by using a concept selection method like Concept Screening, it is still the team that scores and ranks each concept, based on how they believe it fulfils the user's needs. Because of this,

the selection tools should rather be seen as a tool to help the designers choose a direction to continue in, but not as a tool to find the best concept.

It is difficult to create a perfect combination of methods that equally fulfil both human and animal needs, and in some cases that might not even be the desired. A dog carrier is a product bought by a human and used by a dog, but with the purpose to protect both of the users in the event of a car crash. Understanding in what different ways the users will interact with the product is important for the user needs to be put into the correct context.

### **Evaluation of user needs**

When evaluating the final concept against the user needs, there were two needs that could be improved: “the solution protects from dirt” and “the solution does not damage the car”. The team thought about these needs but decided to not implement them in the works-like prototype because of time limitations. Examples of how this could be improved in a future version of the concept could be to design the bottom part of the carrier with soft material and no sharp corners. To protect the car from dirt, a solution could be to have a built-in blanket in the carrier that can be taken out when the dog is entering the car.

The approach motivated the team to discuss every design decision from the perspective of both the human and the dog and resulted in an understanding if the decision was beneficial for both users. For example, deciding the position of the windows resulted in fulfilling both the needs of the dog and the human. The need of the dog was stated as “The solution offers view” and the need of the human was stated “The solution offers a good overview”, resulting in windows positioned in the height of the dogs eyes in sitting position, but was extended to the top of the carrier, to allow the owner an overview from the front seat, the seat next to the carrier and from outside the window.

Even if the concepts fulfil most of the user needs in some way, there is still room for improvement on many of them. For example, “the solution offers pleasant temperature” could be further improved by adding an electric air-conditioning function that some cages on the market already have. All of the needs should be looked over again and further implemented if possible in the next version of the concept.

## 9.3 Conclusion

The final concept is a dog carrier for the rear seat of the car, for a dog in the size XS-S. The concept is based on the user needs from both human and dog, as well as the regulations and legislations from the Swedish Board of Agriculture. In this chapter, the research questions will be answered based on the findings from the process.

### HOW DOES AN ANIMAL-HUMAN CENTRED DESIGN APPROACH AFFECT THE DESIGN PROCESS OF A DOG CARRIER?

The animal-human centred design approach has fulfilled its purpose when it comes to allowing the designers to make design decisions based on both human and animal needs. Since the project used a combination of the two approaches, it can not be evaluated how well the approaches worked individually. However, it can be said that by using parts of the ACD approach and following Martin Bates framework of methods, the animal perspective was not lost during the development phase. To answer the research question more specifically, the methods selected from an ACD and HCD (see figure 62) approach will be evaluated below.



Figure 62. Selected methods from an ACD & HCD approach

#### Observations

The fly-on-the-wall observation was selected as a method to fulfil both the ACD and HCD approach, since it can reveal the true behaviour of the users. From an ACD approach, the outcome of the observations should be to get behavioural insights. This was fulfilled since the team could observe the relationship between

dog and owner when entering the car. Thus, the team thought the method fulfilled its purpose and that it provided useful information that contributed to the creation of different user scenarios. The places that were selected for observation were outside a dog day care and an agility training. An improvement would have been to observe other places to see if different destinations have an impact on the relationship between dog and human.

#### *Personas & User Journey*

From an ACD approach, using personas and storyboards is beneficial since it can help define who the user groups are and their key characteristics. The team thought these methods fulfilled its purpose since it ensured that both of the users were thought of during the process. The personas were used throughout the brainstorming and concept development process and served as a basis for discussion with the supervisors at Thule. The dog persona made it easier to make design decisions since it was based on a specific dog, and not on all dogs. The team also created physical prototypes of their dog personas in cardboard to demonstrate their dimensions. This is not something Martin Bates mentioned, but something that the team found to be useful during the prototype and testing phase. By having the cardboard dogs, the team constantly got reminded of the dog as a user and could set up testing scenarios without having a real dog present.

#### *Prototyping & Testing*

A conclusion made from testing the prototypes with both of the users was that it mostly gave insights from a human perspective. This was due to the fact that the testing was done in a situation that was new to the dog. The dog had never encountered either the car or prototype that was used during the testing, which caused the dog to be stressed and nervous. This could have been interpreted as the dog not liking the carrier at all, which would not have been an accurate evaluation of the carrier. Our suggestion on how to understand the needs of the dog as well, is to let an owner and dog test the prototype in their natural environment for a longer period of time. By doing this, the dog can get used to the prototype and associate it with something positive before being observed. This would make the testing easier and would allow the designers to evaluate the situation in a more accurate way.

Since the design process is a combination of two different approaches, it was a trade-off on how much of each could be applied during the process. Involving both the HCD and ACD equally was difficult since the team had more access to humans than dogs during the development phase. An important improvement that would



have been beneficial from an animal perspective would be to involve a dog more during the development phase, preferably by having a dog around all the time. This would have contributed to a better understanding of the animal perspective and might have changed the output of the project.

#### HOW SHOULD THE SOLUTION BE DESIGNED TO IMPROVE THE HUMAN AND DOG EXPERIENCE DURING TRANSPORTATION IN CARS?

- What affects the experience from a dog perspective?
- What affects the experience from a human perspective?

This research question can be answered with information from the Discover phase. To understand how humans and dogs experience transportation in cars, the team conducted interviews and observations, which led to insights about the situation. The experience from a human perspective, was that many people feel more comfortable when they have an overview of their dog during a car ride. Being able to talk to and see the dog while driving was a big reason why people decided to place their dogs in the rear seat of the car. This was implemented into the final design by placing a window in the front of the carrier, so the owner will be able to see the dog while driving. Big openings on the sides that extend to the roof provides more visibility of the dog.

The experience from a dog perspective was a bit more difficult to understand since the dog could not communicate their true needs. To understand how they experience the situation, the team had to rely on observations and interviews with the owner. The main factor that affected the dog experience was previous training and past experience of travelling in the car. Having a positive association with car ride would make the dog appreciate the transportation, and through that also appreciate the carrier. Something that could improve the experience in the car could therefore be to use the carrier in the home as a doghouse. This way the dog would get familiar with the product before using it in the car. This was implemented in the final design as a multifunctionality feature, ensuring that the carrier could easily be removed from the car and was easy to bring to new places. More specifically, making it foldable and adding ergonomic handles that would facilitate transportation of the carrier outside the car. Other design features that were implemented to improve the dog experience was mesh windows for ventilation, sun cover and soft bed inside the carrier.

## HOW SHOULD A NEW TRANSPORTATION SOLUTION BE DESIGNED TO PROVIDE SAFETY FOR BOTH DOG AND HUMAN?

- What does safety in a car mean for dogs respectively humans?
- What design features are required to meet the safety standards?

When it comes to safe transportation of dogs in cars, there are certain regulations that need to be fulfilled. Many countries in Europe have legislations that require an animal to be restrained either by a harness or a carrier while travelling in a car. Keeping the animal secured is an important safety aspect, not only for the animal but for the human as well. Loose items in a car can be dangerous in a collision, since the force turns them into projectiles that cause injury to the passengers (National Auto Collision Centre, 2022). In conclusion, safety in a car means keeping the dog restrained both for the safety of the animal as well as for the human. The design decision that was made to improve the safety was to not place any zippers or openings on the front part. To spread the load in the event of the crash, it was decided to have two attachment points for the seat belt.

The design features that are required to make the carrier safe were not easy to determine. Since the different prototypes could not be crash tested during the development phase, the final concept should be seen as a solution that has potential to be safe in the future. The design decisions that were made in order to make the carrier safe were based on a crash study from Centre For Pet Safety as well as a comparison with other products on the market. The conclusions drawn were based on the team's knowledge about load impact and force distribution. Their knowledge within this area is based on their educational background in Mechanical Engineering with Industrial Design, through courses in mechanics. An improvement would have been for the team to make the design decisions about safety together with experts within the area.

# References

ADAC (2021), 'Dog Transportation-System in comparison' 10 April, *Allgemeiner Deutscher Automobil-Club*, Available at: <https://www.adac.de/rund-ums-fahrzeug/ausstattung-technik-zubehoer/ladungssicherung/tier-transport-auto/> (Accessed: 20 April 2022)

Centre for Pet Safety (2020), 'CPS Certified', *Centre for Pet Safety*. Available at: <https://www.centerforpetsafety.org/pet-parents/cps-certified/> (Accessed: 6 April 2022)

Centre for Pet Safety (2020), 'Who is CPS?', *Centre for Pet Safety*, Available at: <https://www.centerforpetsafety.org/who-is-cps/> (Accessed: 6 April 2022)

County Administrative Board of Stockholm (2022), 'Animal Care', *County Administrative Board of Stockholm*, 2022, Available at: <https://www.lansstyrelsen.se/stockholm/other-languages/english/animals/animal-care.html> (Accessed: 2 February 2022)

County Administrative Board of Stockholm (2022), 'Transportation of animals', *County Administrative Board of Stockholm*, 2022, Available at: <https://www.lansstyrelsen.se/stockholm/other-languages/english/animals/animals-in-business-contexts/transport-of-animals.html> (Accessed: 2 February 2022)

Designcouncil (2022) 'What is the framework of innovation?', *Designcouncil*, 1 April, Available at: <https://www.designcouncil.org.uk/news-opinion/what-framework-innovation-design-councils-evolved-double-diamond> (Accessed: 30 January 2022)

Hanington, B. Martin, B (2020) 'Universal Methods of Design' Rockport Publishers (p.22, 152, 154)

Herbel, J.; Aurich, J.; Gautier, C.; Melchert, M.; Aurich, C. (2020) 'Stress Response of Beagle Dogs to Repeated Short-Distance Road Transport', *Animals*, Available at: <https://doi.org/10.3390/ani10112114> (Accessed: 19 May 2022)

IDEO (2022), 'History', IDEO, available at:

<https://designthinking.ideo.com/history> (Accessed: 26 May 2022)

Incarsafetycentre (2022), 'What is ISOfix & does my car support it?', *Incarsafetycentre*. Available at: <https://incarsafetycentre.co.uk/safety-centre/what-is-isofix> (Accessed: 23 February 2022)

Jensen, P. (2011), 'Hundens språk och tankar', *Per Jensen & Natur & Kultur*. (p. 55, 56, 159-165)

Kattenburg (2016), 'Behaviourist Vs. Ethologist', *The Nest*, Available at: <https://woman.thenest.com/behaviorist-vs-ethologist-21297.html> (Accessed: 19 May 2022)

Inkwood Research (2022), 'Sweden Pet Food Market Forecast 2022-2028', *Inkwood Research*, Available at: <https://www.marketresearch.com/Inkwood-Research-v4104/Sweden-Pet-Food-Forecast-30758723/> (Accessed: 30 May 2022)

Martin Bates, Holly (2022), 'A designer with an interest in research, the social sciences and animals.', Holly Martin Bates, Available at: <https://hollymartinbates.squarespace.com/about> (Accessed 25 February 2022)

Kurgo (2022), 'Dog Travel Statistics', *Kurgo*, Available at: <https://www.kurgo.com/dog-travel-statistics> (Accessed at: 2 June 2022)

Mim Construction (2022), 'Crash report' *Mim Construction*, Available at: [https://www.smartdog.ee/doc/crash\\_report.pdf](https://www.smartdog.ee/doc/crash_report.pdf) (Accessed: 5 May 2022)

Nagel, M., Reinhardt, C.V. (2005). *Stressade hundar*. Västerås: ICA bokförlag. (ss. 56-57)

National Auto Collision Centre (2022), 'The dangers of loose items in a car during an accident', *National Auto Collision Centre*, 2022, Available at: <https://nationalautocollisioncenters.com/the-dangers-of-loose-items-in-your-car-during-an-accident/> (Accessed: 3 April 2022)

Nationalföreningen för trafiksäkerhet (2022), 'Isofix och bas med stödben', *Nationalföreningen för trafiksäkerhet*, 2022, Available at: <https://ntf.se/konsumentupplysning/barn-i-bil/montering/isofix/> (Accessed: 5 February 2022)

Nationalföreningen för trafiksäkerhet (2022), 'Hund i bild', *Nationalföreningen för trafiksäkerhet*, 2022, Available at: <https://vast.ntf.se/nyheter/hund-i-bil/> (Accessed: 20 March 2022)

Norman, Donald (2013), 'The Design Of Everyday Things', Revised and Expanded Edition

Orvis (2021), 'Does your state require dogs be harnessed in the car?' 30 July, *Orvis*, Available at: <https://news.orvis.com/dogs/does-your-state-require-dogs-be-harnessed-in-the-car> (Accessed 3 March 2022)

Pets That Travels (2022), Dogs in Cars: Laws from Around The World, Available at: <https://www.petsthattravel.com/dogs-in-cars-laws/> (Accessed 2 May 2022)

RISE (2022), 'Crash testing of components and system', *Rise Research Institutes of Sweden*, Available at: <https://www.ri.se/en/what-we-do/services/crash-testing-of-components-and-system> (Accessed: 27 April 2022)

Sharp, Preece, & Rogers (2019) 'Interaction Design, Beyond Human-Computer Interaction' (p.269, 273)

Svenska Stiftelsen för Industridesign (2022), 'Funktionsanalys', Available at: <https://svid.se/guider-och-verktyg/metoder/funktionsanalys/> (Accessed: 24 March 2022)

Swedish Board of Agriculture (2022), 'Transportation of dogs', Available at: <https://jordbruksverket.se/djur/hundar-katter-och-smadjur/hundar/transportera-hundar> (Accessed: 2 February 2022)

Sveriges Riksdag (2019), **Djurskyddsförordning (2019:66)**, Available at: [https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/djurskyddsforordning-201966\\_sfs-2019-66](https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/djurskyddsforordning-201966_sfs-2019-66)

Statista (2022), 'Cars Still Dominate the American Commute', *Statista*, May 12, Available at: <https://www.statista.com/chart/18208/means-of-transportation-used-by-us-commuters/> (Accessed: 19 May 2022)

Sakerhund (2017), 'Så mycket väger din hund om du krokar', *Sakerhund*, Available at: <https://www.sakerhund.se/sa-mycket-vager-din-hund-vid-en-krock/> (Accessed: 19 May 2022)

The Highway Code (2022), 'Rule 57 of the Highway Code', *Highway Code Uk*, Available at:  
<https://www.highwaycodeuk.co.uk/rules-about-animals-other-animals.html>  
(Accessed: 20 March 2022)

The American Society for the Prevention of Cruelty to Animals (2021) 'New ASPCA Survey Shows Overwhelming Majority of Dogs and Cats Acquired During the Pandemic Are Still in Their Homes', *ASPCA*, 26 May, Available at:  
<https://www.asPCA.org/about-us/press-releases/new-aspca-survey-shows-overwhelming-majority-dogs-and-cats-acquired-during> (Accessed: 19 May 2022)

Thule (2022), 'Homepage', *Thule*, Available at: <https://www.thule.com/sv-se>  
(Accessed: 25 May 2022)

Thule Group (2020) 'Thule Group Annual Report 2020', *Thule Group*, 2020, Available at:  
[https://www.thulegroup.com/sites/default/files/files/Thule\\_Group\\_%28publ%29\\_Annual\\_Report\\_2020.pdf](https://www.thulegroup.com/sites/default/files/files/Thule_Group_%28publ%29_Annual_Report_2020.pdf) (Accessed: 25 January 2022)

Volvo Cars (2022), 'Specifications', *Volvocars*, Available at:  
<https://www.volvocars.com/se/bilar/modeller/xc60/specifikationer/dimensioner>  
(Accessed: 13 March 2022)

World Health Organization (2013), 'Seat belt law by country', Available at:  
[https://gamapserver.who.int/gho/interactive\\_charts/road\\_safety/seat\\_belt\\_law/atlas.html](https://gamapserver.who.int/gho/interactive_charts/road_safety/seat_belt_law/atlas.html) (Accessed: 13 March 2022)

Zetterström, Frida (2014), 'How are dogs affected by transport?', First Cycle, G2E. Uppsala: SLU, Dept. of Biomedical Sciences and Veterinary Public Health. Available at: [https://stud.epsilon.slu.se/6693/7/zetterstrom\\_f\\_140904.pdf](https://stud.epsilon.slu.se/6693/7/zetterstrom_f_140904.pdf)  
(Accessed: 2 February 2022)

Eppinger, D., Ulrich, K (2019), *Product Design and Development*, McGraw Hill Education

# Appendix

## A.1 Work distribution

During the three first phases of the project, *Discover*, *Define* and *Develop*, both of the students contributed equally to the process. Since these phases required a lot of decision making and discussion, both of the students were involved in all of these steps. During the last phase, *Deliver*, the students decided to divide their work between focusing on the final prototype and writing the report. The work distribution during the different phases are presented below in figure A.1.

<b>Discover</b>	<b>Define</b>	<b>Develop</b>	<b>Deliver</b>
<i>User research</i>	<i>Mood Board</i>	<i>Ideation</i>	<i>Report</i>
Nikolina 50%	Nikolina 50%	Nikolina 50%	Nikolina 70%
Desiree 50%	Desiree 50%	Desiree 50%	Desiree 30%
<i>Market research</i>	<i>Personas</i>	<i>Prototyping</i>	<i>Prototype</i>
Nikolina 50%	Nikolina 50%	Nikolina 50%	Nikolina 30%
Desiree 50%	Desiree 50%	Desiree 50%	Desiree 70%
	<i>Function Analysis</i>	<i>Testing</i>	
	Nikolina 50%	Nikolina 50%	
	Desiree 50%	Desiree 50%	

Figure A1: Work Distribution during the different phases of the project

## A.2 Project plan and outcome



Fig A2: Project Plan

The planned project plan sen in Fig A2 shows the different phases in the Double Diamond process together with time planned for presentation and report.





Figure A3: Performed activities

The performed activities shown in Figure A3 correspond to the activities in the planned project plan until *Concept refinement*. These first steps, *Discover*, *Deliver* and *Develop*, did not include real scale prototyping and testing - which were the steps that needed more time than planned - and could therefore be performed as planned. *Deliver* needed to be postponed in order to correspond to visits in Hillerstops, where the final prototype was built. However, this did not affect the outcome of the project as the team had planned for some delay.

## A.3 Personas

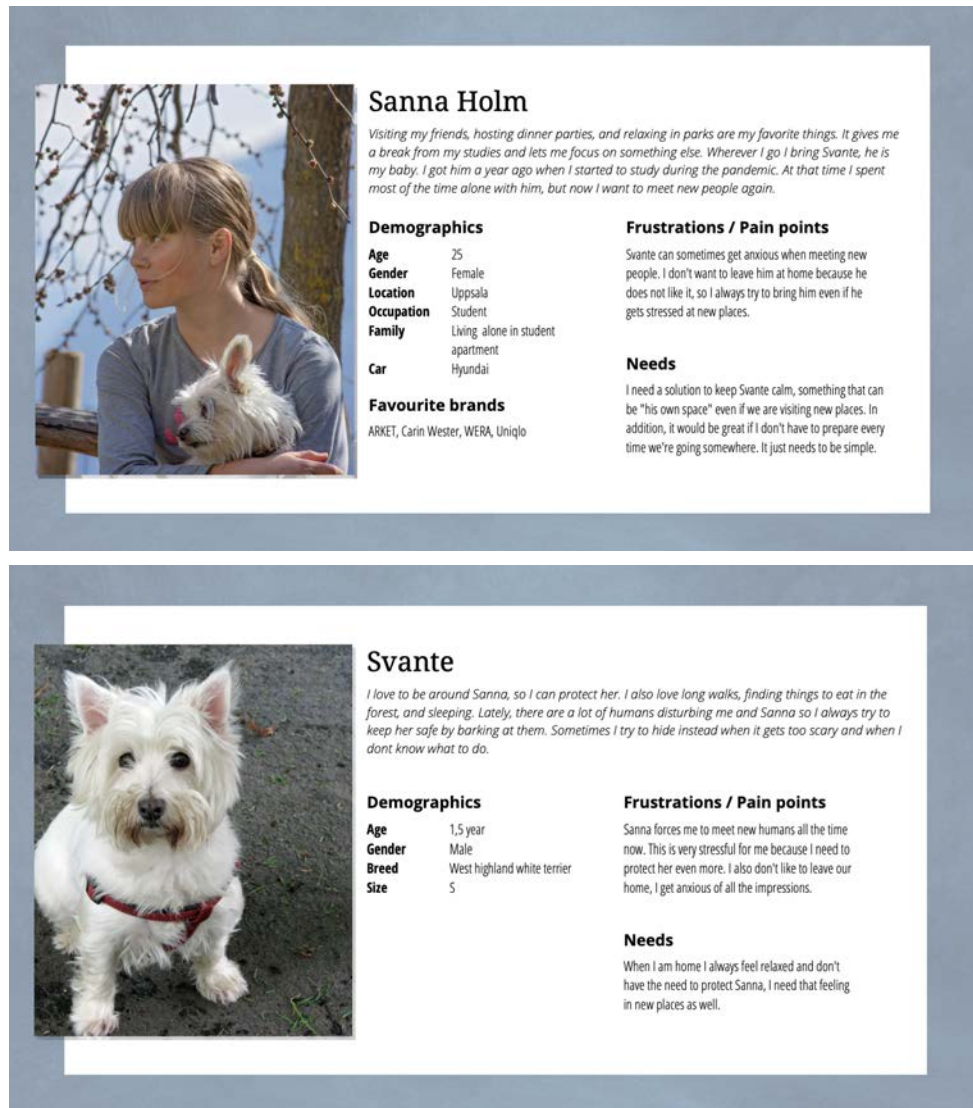


Figure A4: The dog and human city persona

## A.4 Crash Study

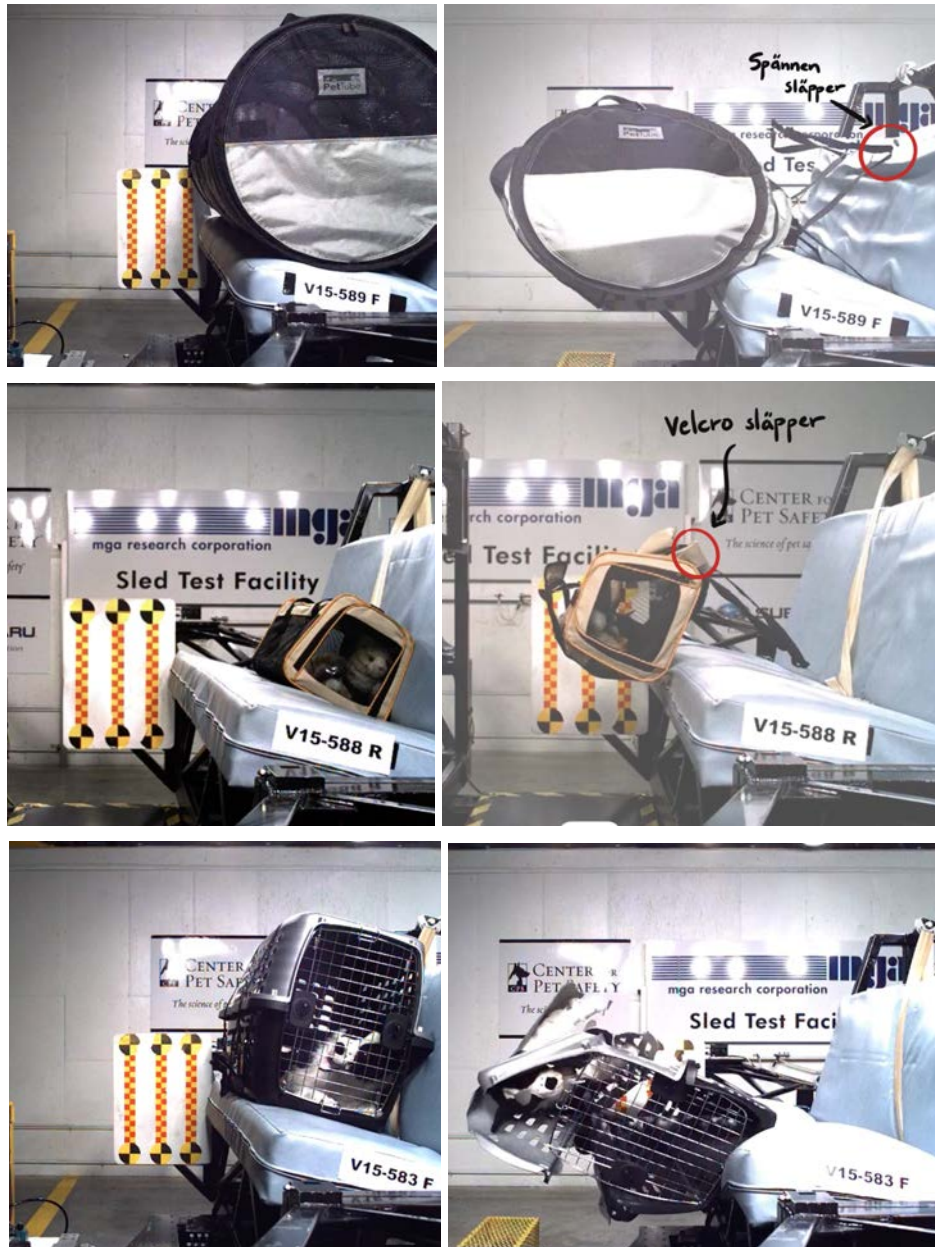


Fig A5: Crash Study analysis (Centre For Pet Safety, 2020)

## A.5 Fly-on-the-wall observations

**Location:** Höje Hund & Park AB, dog garden.

**Method:** Fly-on-the-wall, observations from the car.

**Process:** Visit the dog park when it's time for pick up. Observation will be carried out from our own car, with a view over the parking, for approximately 2 hours. Observe the owner and the dog when the dog is walking towards the car and when the dog is entering the car/carrier without any direct involvement with the activities or people under research.

**Goal:** Understand the true nature of the dog and the owner in a real-life scenario. Identify if there are any differences between the behaviour of the owners with regards to what dog they have.

### **Guiding framework:**

Observe:

- The weather condition
- The behaviour of the owner
- The behaviour of the dog
- How the owner acts when placing the dog into the car/carrier
- How the dog acts when being placed into the car/carrier
- The transportation solution

### **Observation 1:**

Car: Citroën, 5 seated

Owner: Lady 60+

Dog: Size S

Observations:

- Rainy, wet on the ground
- Owner: Neutral, skilled
- Dog: Happy dog
- Has the dog on leash while opening the back door.
- The dog puts its feet on the back seat and waits until the owner carries him to the seat.
- The owner lifts the dog to the seat, removes the leash, and places it on the seat.
- Let the dog be loose in the car.

**Observation 2:**

Car: Opel, Small

Owner: women 40+

Dog: Size XS (chihuahua?)

Observations:

- Rainy, wet on the ground
- Owner: Chill, waiting for the dog to finish
- Dog: Neutral
- Lifts the dog before opening the car door
- Put the dog in the back seat and remove the leash.
- Let the dog be loose in the car.

**Observation 3:**

Car: Volkswagen, Small/medium

Owner: Women 30+

Dog: Size XL (Bernese sennens)

Observations:

- Owner: Fast
- Dog: Fast
- She opened the rear door with the dog leashed.
- The dog jumped directly to the back seat.
- Owner didn't care to take off the leash.

**Observation 4:**

Car: Medium size

Owner: 40+

Dog: Size M

Observations:

- Owner: Fast
- Dog: knew what to do
- The owner opened the luggage compartment with the dog leashed.
- The dog jumped up on its own.
- The owner removed the leash and closed the door.
- No carrier or security attachment.

**Key findings:**

- Quite a stressful situation - the owners picked up the dogs and hurried to let them into the car.
- Three out of four removed the leash after the dog had entered the car. One didn't bother to remove it.
- All four dogs were loose in the car.
- Three out of four were put in the rear seat.

**Location:** Lunds brukshundklubb

**Method:** Fly-on-the-wall, observations from the car.

**Process:** Visit the agility club at the beginning of the training. Observation will be carried out from our own car, with a view over the parking, for approximately 1 hour. Observe the owner and the dog when the owner opens the door and lets the dog out. What is happening?

**Goal:** Understand the true nature of the dog and the owner in a real-life scenario. Identify if there are any differences between the behaviour of the owners with regards to what dog they have.

**Guiding framework:**

- The weather condition
- The behaviour of the owner
- The behaviour of the dog
- How the owner acts when placing the dog into the car/carrier
- How the dog acts when being placed into the car/carrier
- The transportation solution

**Observation 1**

Car: Medium size

Owner: 40+

Dog: Size L, Nova Scotia Duck Tolling Retriever, Excited

Observations: The dog is in a cage in the luggage compartment. The owner opens the luggage compartment and rolls out a mat then puts a leash on the dog and lets it jump out. She has the luggage compartment door open a long time before taking out the dog.

**Observation 2**

Car: Small size

Owner: 40+

Dog: Two dogs, Size S

Observations: First one dog is carried inside in a cage (back of trunk), then he carries the second one. The owner takes off the leash before carrying them inside.

### **Observation 3**

Car: Medium size

Owner: 60 +

Dog: Lagotto, Size M

Observations: Opens trunk, opens the carrier (metal), takes the leash, carries out the dog.

### **Observation 4**

Car: Medium size

Owner: Man, 50 +

Dog: Husky, Size L

Observations: Owner opens the trunk, dog jumps out from a metal carrier.

**Location:** Zoogiganten in Lomma

**Method:** Fly-on-the-wall, observations from the car.

**Process:** Visit the dog park when it's time for pick up. Observation will be carried out from our own car, with a view over the parking, for approximately 2 hours.

Observe the owner and the dog when the dog is walking towards the car and when the dog is entering the car/carrier without any direct involvement with the activities or people under research.

**Goal:** Understand the true nature of the dog and the owner in a real-life scenario. Identify if there are any differences between the behaviour of the owners with regards to what dog they have.

### **Guiding framework:**

- The weather condition
- The behaviour of the owner
- The behaviour of the dog
- How the owner acts when placing the dog into the car/carrier
- How the dog acts when being placed into the car/carrier
- The transportation solution

**Observation 1**

Car: Volvo, 5 seated, bigger model

Owner: 50 +

Dog: Cocker spaniel, Size M

Observations: Opens the trunk, then opens the carrier door vertically. Dog jumps in, the owner releases the leach and closes the door.

**Observation 2**

Car: Citroën, 5 seated, Medium

Owner: 40+

Dog: Size XS

Observations: Takes a soft bag from the rear seat and puts it on the shoulder. The dog sits inside the bag all the time.

**Observation 3**

Car: Honda Civic, Small/Medium

Owner: 30+

Dog: Shiba Inu, size S

Observations: The owner opens the front door. The dog jumps directly to the front seat. The owner removes the leash and puts it on the floor. No attachment to the car.

**Observation 4**

Car: Audi, small

Owner: 40+

Dog: Golden Retriever, size L

Observations: The owner opens the front door. The dog jumps directly to the front seat. The owner removes the leash and puts it on the floor. No attachment to the car.

**Observation 5**

Car: BMW, 5 seated, medium size

Owner: 40+

Dog: size M



Observations: The owner opens the trunk and carries the dog to the compartment with the leash attached. The trunk is divided with a grid which creates a “carrier”.

#### **Observation 6**

Car: Mercedes GLC300, 5 seated, medium size

Owner: 40+

Dog: size XL

Observations: The owner opens the trunk, takes out a footstool and places it on the ground. The dog jumps into the compartment via the footstool. No carrier inside the trunk, the dog is loose. The owner takes the footstool and places it in the rear seat.

#### **Observation 7**

Car: BMW 530e, 5 seated, medium size

Owner: 50+

Dog: Labrador Retriever, size L

Observations: Opens the trunk, then opens the carrier door vertically. The owner releases the leash and the dog jumps in. Closes the door to the carrier and then the car.

## **A.6 Unstructured interviews**

Goal: Collect firsthand personal accounts of experience, opinions, attitudes, and perceptions from the user.

### **Personer**

- Marita Nordkvist - medium sized dog
- Amanda Nilsson - small dog
- Tindra Persson - small dog
- Lina Petersson - medium sized dog
- Matilda Florén - small dog

### **Intervjufrågor**

### *Dog*

- Fakta om hunden (ålder, ras, hälsoproblem m.m)

### *Transportation*

- Hur transporterar du din hund idag?
- Varför väljer du att göra det på det sättet?
- Vad är viktigt för dig vid transport av hund? (säkerhet, renlighet, överblick, smidighet m.m)
- Har du stött på en situation där det har varit problematiskt när hunden ska hoppa in/transporteras i buren?
  - Om ja, hur löste du problemet?
  - Om nej, varför tror du att det inte har uppstått ett problem?

### *Carrier*

- Om ni använder bur, vid vilka tillfällen? Finns det situationer då hunden inte sitter i buren?
- Vad är viktigt vid val av bur?
- Hur placerar du buren i bilen? (Är det innan hunden hoppar in eller samtidigt?)
  - Fäster du buren och i så fall hur?
- Hur förvarar du buren när den inte används? (kvar i bilen eller tas den in?)
- Drömbur

### **Interview 1 - Lina**

Name: Lina Petersson

Status: Sambo, delägarskap

Ålder: 26

Boende Situation: Lägenhet i Malmö, Limhamn

Hund: Shiba Inu

Storlek: 12 kg, M

bil: Golf, liten

Bur: Permanent lösning i bagageutrymmet, metall, solid

Längd på intervjun: 20 min

*Du kan väl börja med att berätta om er hund?*

Shia är 9 månader, han är en Shiba Inu. Inga hälsoproblem vad vi vet, han akut kastrerades för ca 2 månader sedan.

*Hur beter han sig mot andra hundar?*

Han älskar andra hundar, han är väldigt social som hund. Just denna rasen är väldigt reserverade, men Shia är väldigt social och det har vi jobbat jättemycket med. Han älskar att vara på dagis. Där är han måndag-fredag.

*Om vi tittar lite närmre på hur ni transporterar Shia eftersom det är det vi fokuserar på, hur transporterar ni Shia när ni ska ta bilen?*

Vi delar upp veckorna, så jag använder en lådcykel när jag lämnar och hämtar Shia på dagis. Jag har honom i lådcykeln. När Markus tar honom så använder han bilen och då har vi en hundbur som vi har köpt till bilen.

*Om vi börjar med lådcykeln. Sitter Shia fast i lådcykeln på något sätt?*

Det finns säkerhetsbälte som sitter fast i lådan som man kopplar på Shias sele så han inte kan komma loss. Sen har jag också ett kapell över lådan som gör att det blir mer inhägnat. Jag vet inte om det är ett krav men man måste ha säkerhetslina/bälte om man har hunden i en lådcykel. Det är ganska lätt för hunden att hoppa ut.

*När Markus tar sig till hunddagis men även när ni åker andra sträckor med bilen, hur ser burlösningen ut?*

Först kollade vi vad som var måtten på Shia, hur stor han blir som fullvuxen. Sen köpte vi en bur utifrån fulla mått. Då spände vi fast den i bagageutrymmet, sen är det en lucka som man öppnar.

*Spännena ni fäster i bilen, ingick de när ni köpte buren eller är det en hemmalösning?*

Nej, det är vi själva som har spänt fast med remmar.

*Varför valde ni att göra det?*

Det kändes meningslöst att ha en bur som kanske ramlar eller far runt, när syftet med buren är att han ska sitta säkert i den. Så vi ville spänna fast den. Den är ganska tung men om man måste tvärnita eller svänga snabbt kan den ramla omkull om den inte är fast. Därför satte vi fast den själva.

*Hade ni några andra alternativ, eller var det bur i bagageutrymmet som gällde? Det finns ju burar för framsätet och baksätet och även sele.*

Det finns säkerhetsbälten för hundar, precis som i lådcykeln, men vi ville ändå ha något runt honom ifall någonting skulle hända. Då känns det som att han är mer skyddad i en bur jämfört med om han skulle sitta lös med ett säkerhetsbälte.

*Vad anser du är viktigt när ni transporterar Shia i bilen?*

Att det ska vara säkert såklart. Men också att Shia ska känna sig trygg. Vi har märkt att han inte riktigt gillar att åka bil. Det funkar men han är inte jätteglad för att åka i buren. Jag tror han känner sig instängd. När man ska gå till bilen vet han direkt att han ska in och då tvärnitar han och vill inte in.

*Vad gör ni för att få in honom då?*

Vi bär in honom. Sen när han väl sitter i buren funkar det, han piper lite bara. Vi har faktiskt på senare tid, vilket inte är alls bra... men det finns ett litet utrymme vid sidan av buren där det brukar vara tomt, där har vi börjat sätta honom.

*Har ni buren kvar i bilen då?*

Ja, den sitter fast. Vi tror också att det har att göra med att den är för liten för honom. Han kan inte lägga sig ner. Sen när vi byter bil kommer vi att köpa en annan bur. Vi visste inte att Shia skulle bli så stor. Jag satte mig i baksätet en gång när vi körde för att se om han kunde lägga sig ner, men det kunde han knappt. Så vi tror att han känner sig instängd.

*Så han trivs bättre utanför buren?*

Ja.

*Hur tror du man hade kunnat skapa en tryggare miljö i en bur? Om vi säger att det inte är på grund av att den är liten, utan på grund av att det är en bur.*

Jag tror inte hundar gillar att känna sig instängda. Det finns mjukare varianter av burar i bil. Men de känns inte heller helt säkra tycker jag. Den vi har är mer robust, men den är nog inte jätteskön. Det ingår ingen mjuk matta. Det kan man ju lägga in. Någon trevligare variant som gör det lite mer tryggt för hunden.

*Har ni en annan bur i andra situationer?*

Vi testade att köpa en mjukare bur som vi hade i sovrummet, om han ville gå in i den. Men han använde inte den. Han gillar nog inte att vara inne i saker, så vi sålde den. Vi har inget annat varaktigt.

*Har du stött på en situation där det har varit problematiskt när hunden ska hoppa in eller transporteras i buren?*

Nu måste vi alltid bära in honom eftersom vi har en gammal golf. Det är för högt, så han kan inte hoppa in själv. Det hade varit smart att ha en inbyggd trappa som man kan fälla ut, så hunden självmant kan gå upp.

*Är det någonting som du har önskat fanns i dessa situationer?*

Ja precis, det känns fel att "trycka in" honom, så ja en trappa av något slag saknar jag.

*Det finns något sådan i butik, en ramp.*

Jag tror inte det funkar till våran bil. Det är en förhöjning, så buren är lite längre ner i bagageluckan, sen kommer det en karm, så det är därför vi inte har kunnat ha en trappa.

*Har du någon gång känt att du behöver ta ut buren för att få plats med annat i bagageluckan?*

Nej faktiskt inte.

*Tar den mycket plats?*

Ja, den tar ändå nästan hälften av bagageutrymmet. Måste vi sen ha en större bur kommer det att ta ännu större plats, men då kommer vi förmodligen ha en större bil. Så det beror ju på vilken bil man har också. Men som när vi har rest har vi ändå kunnat packa runt och i baksätet och på buren också, men vi har aldrig behövt ta ut den.

*Om ni någon gång behöver ta ut den, är den smidigt att bära och fälla ihop?*

Den är ganska otymplig, så då blir det att lyfta ut den.

*Hur hade ni förvarat den?*

Då hade vi bara ställt undan den i förrådet. Man bygger ihop den, så det är inte smidigt att bara ta ner den och ha den på ett bra ställe.

*Du nämnde innan att det var viktigt med säkerheten vid val av bur och att det var därför ni valde den buren ni har idag. Men är det något annat du har att tillägga? Jag tänker när det gäller renlighet, överblick, den typen av faktorer. Till Exempel om det är en regnig dag...*

Vi lägger en filt i buren, så då är det den som blir smutsig. Buren är inte täckt, så man ser in. Den är väldigt luftig. Så han ser också ut. Den är lätt att sköta, det är inte mycket som kan bli smutsigt i buren.

*När Shia har hoppar in i buren, vad gör ni med kopplet?*

Vi tar av kopplet och lägger det bredvid, så han har inget koppel i buren.

*Har ni vattenskål eller matskål i buren? Har ni haft ett behov av det?*

Nej, det hade inte fått plats. Det är bara han som får plats i den.

*Har ni känt någon gång att det hade varit bra att ha en vattenskål?*

Ja, när man har kört lite längre stannar man för att han ska rastas och dricka. Det hade varit bra om han kan få tillgång till vatten hela tiden om man kör längre. Sen mat, nej det behövs inte.

*Är det något annat du har tänkt på kring transport situationen som du vill tillägga?*

Jag tänker framförallt bekvämlighet och säkerhet när man kör och svänger. Den buren vi har är väldigt hård så jag förstår om man inte gillar att åka i en bur som är hård och inte bekväm.

*Om du hade beskrivit din drömbil, hur hade den sett ut?*

Det hade nog varit... Den skulle ha varit lite högre, så han kan sitta och ligga ner bekvämt. Den ska vara robust, men även mjuk så det är behagligt. Inbyggda högtalare som kan spela musik för att ge en lugnande effekt. Nu är det bara vissa bilar, men vår bil låter ganska mycket och det låter mest där bak. En trappa som man inte behöver köpa till, utan som man bara kan fälla ner. Och en inbyggd skål som man kan ha vatten i när man kör lite längre. Jag vet inte om det finns idag, men han är lös inne i buren, så man hade kanske till och med behövt ett säkerhetsbälte inuti buren - en airbag i buren.

## **Interview 2 - Marita**

Name: Marita Nordkvist

Status: Married

Age: 57

Home: Apartment in Marbella, Spain

Dog: Nova Scotia Duck Tolling Retriever, medium - big sized dog

Weight: 20 kg

Car: Volkswagen passat

*Hur transporterar du din hund idag?*

Under kortare sträckor är han lös i bagageluckan, finns nät så han inte kan hoppa fram till baksätet. Men under längre sträckor (som när vi bilade ner till Spanien) sitter han i baksätet och är fastspänd via hans sele i bältet. Han sitter då på ett säteskydd som går upp på sidorna.

*Varför väljer du att göra det på det sättet?*

Vi har honom i baksätet när vi kör lång för att han ska vara nära oss, och för att kunna ha en överblick över honom. Dessutom kan han komma åt luftkonditionering (riktat mot mittensätet) när han är i baksätet vilket är väldigt bra vid längre sträckor.

*Hur mycket plats tar hunden upp när ni transporterar honom i baksätet?*

Hela baksätet.

*Ni känner inte att ni saknar det utrymmet?*

Nej, vi placerar alla våra väskor i bagageluckan, och när vi körde så långt var vi bara två stycken i bilen så då behövde vi inte baksätet för människor.

*Vad är viktigt för dig vid transport av hund?*

Närheten till hunden vid längre körningar. Renlighet. Vid kortare körningar har vi alltid honom i bagageluckan för det blir så smutsigt snabbt samt att han fäller mycket hår. Det går även väldigt snabbt att bara låta honom hoppa in och ut från bagageluckan på egen hand.

*Har du stött på någon situation där det varit problematiskt när hunden ska hoppa in eller ut vid transport?*

Nej, han hoppar alltid in och ut självmant. Men har varit problematiskt när vi öppnade bagageluckan och det varit mycket bilar och hundar runt omkring, då vill han direkt hoppa ut innan vi hunnit öppna luckan vilket kan vara farligt. Då hade det varit bra med något som stoppar honom från det.

*Har du idéer på vad det hade kunnat vara?*

Kanske någonstans där man hade kunnat spänna fast hunden i bagageluckan.

*Du säger att ni vid kortare sträckor inte använder en bur, varför är det tror du?*

Det har fungerat väldigt bra utan, men egentligen borde man kanske ha en. Det går så snabbt att bara låta honom hoppa in och ut när vi bara ska åka så kort.

*Är det något du hade velat ha för att underlätta transporten?*

Kanske en ramp om han skulle bli så gammal att han inte kan hoppa in av sig själv.

*Om du fick designa din drömbil, vilka funktioner skulle den då ha?*

Någon form av fläkt för att förhindra att det blir varmt samt något som skyddar från solen utifrån. Sen ska den även vara mjuk och bekväm och mysig att gå in i.

### **Interview 3 - Matilda**

Name: Matilda Florén

Status: Partner

Age: 26

Home: Apartment in Stockholm

Dog: Jack Russell Terrier,

Size: 10 kg, Size S

Car: Don't have their own car in Stockholm.

Carrier: Soft carrier, portable, no attachment for cars

Duration of interview: 25 min

### **Intervjufrågor**

*Du kan väl börja med att berätta om er hund?*

Ture är en Jack Russel terrier. Han är 10,5 år, väger 10 kg och har artros i armbåge & tå-leder.

*Påverkar artrosen Ture?*

Ja, han får ont i ryggen pga det. Går till sjukgymnast & veterinär. Får bara gå kortare rundor.

*Har ni en lösning som gör att Thule kan följa med på längre promenader?*

Han blev dålig i julas. Jag har beställt ryggsäckar, men han är lite för stor för det. Vi bär honom under armen om vi ska gå längre sträckor

*Hade ni önskat en lösning för hundtransport under längre promenader?*

Ja, vi har tittat på hund ryggsäckar men även väska över axeln. Dock är han för



tung för att bära i en väska över axeln. Ryggsäckarna är för små, han kan bara sitta i dem, inte ligga. Det finns ryggsäckar i USA, men dyrt att skicka efter.

*Hur transporterar du din hund idag? Hur kommer det sig att du att göra det på det sättet?*

Jag åker ofta tåg mellan Göteborg-Stockholm. Då har jag inget transportmedel för honom. Men i bil, pinsamt att säga, men då åker han i en bur som vi köpte på Rusta när han föddes. Det är en tygbur som har hårda ramar. Vid en krock kommer han att skada sig. Man ska väl ha krocktestade bilar. När han var liten hade han en krocktestad sele. Hundmärket MIM har krocktestade selar som vi hade när han var liten, men han mådde illa. Han åker nu i buren i bagageluckan eller i baksätet där hundburen är fastspänd. Den sitter över två säten, kortsida ut mot dörren, säkerhetsbältet runt buren. Det är en egen konstruktion.

*Från vilket håll lyfter ni in Ture i buren?*

Han går in från sidan. Han vill inte in ovanifrån för då spretar han åt alla håll.

*Har ni funderat på att köpa en bur som är gjord för baksätet?*

Den buren som Ture har är större än de som finns för baksätet. Nu bor vi i Stockholm, då åker vi inte bil lika mycket. Har inte känt ett behov, har ingen egen bil och åker inte bil lika mycket. När vi åker flera personer måste han ändå vara i bagageluckan.

*Finns det andra sammanhang då du behöver bur?*

Buren vi har går att veckla ihop och ta med sig till kompisar. I Göteborg hade Ture en bur som korg för att han tyckte att det var mysigt. Bur inomhus måste man kunna montera bort dörren enligt jordbruksverket. En smidig grej generellt är när man är hos familj och kompisar, typ landställen, är att ha en bur som man lätt kan ta mig.

*Vad är viktigt för dig vid transport av hund (säkerhet, renlighet, överblick, smidighet m.m)?*

Vill säga säkerhet, men lever inte efter det. Han ska sitta tryggt och inte bli skadad om det skulle hända någonting. Han ska kunna ligga i den. Om den samtidigt är smidig att hantera för egen del är det superskönt. Smidigt med tyg buren som vi har är att den går att fälla ihop, framförallt om man ska samåka. Överblick en viktig sak. Jag har en tvångstanke att jag har glömt Ture. Så måste stanna och kolla om han är med. Fläktanordning hade varit bra. Har klämt fast en tolv volts

fläkt från Biltema. Ventilation är viktigt och att man kan fästa fläkten på ett enkelt sätt.

*Har du stött på en situation där det har varit problematiskt när hunden ska hoppa in/transporteras i buren?*

Nej, vi lyfter alltid in honom. Han går inte in självmant så vi trycker in honom. Han gillar inte att åka bur.

*Hur hade man kunnat underlätta för Ture?*

Buren vi har nu har inte något skönt. Den kommer med en tunn vadderad matta som han alltid trycker bort. Det hade varit bra med en tjockare vadderad matta. Tygburar han har är ganska mörk, som jag inte tror han gillar. Gallret är svart och det är täckt på ena sidan, så ganska mörkt att gå in.

*Hur förvarar du buren när den inte används?*

Oftast står den i bilen, men den går att fälla ihop som ett platt paket, så kan ställa den var som helst. Hade den inte gått att fälla ihop hade jag haft den som en korg. Man orkar inte springa upp på vinden hela tiden.

*Något övrigt du har tänkt på gällande transport?*

Att lättare kunna ta med honom på promenader, ryggsäck konceptet verkar rimligt då. På stan hade en axelväska vara bra. Inget finns i Tures storlek.

*Har ni med ture på restauranger?*

Ja, i stockholm får man ha med hundar överallt. Han är med överallt där han får, och ligger då på en filt i koppel. En bur hade varit smidigt när han var mindre, men nu ligger han bara och sover.

*Om du fick designa din dröm-bur, vilka funktioner skulle den då ha?*

Buren ska vara ljus och öppen. Bra ordentlig liggyta. Enkelt sätt kan bära med sig den, över axeln eller på ryggen, för att kunna ha andra användningsområden. Trygg såklart. Ture är oftast smutsig, så hade varit bra med trappa. Har kollat på det för sängen.

#### **Interview 4 - Amanda**

Name: Amanda Nilsson

Status: Sambo

Age: 24

Home: Apartment in Helsingborg

Dog: Whippet, 10 months old

Weight: 15 kg

Height: 50 cm

Car: Toyota Sedan

*Hur transporterar du din hund idag?*

I baksätet, vi har en bur (från Dogman) som han åker i. Buren är egentligen inte tänkt för en bil, den är mer som ett tält som enkelt fälls upp & sidorna kan öppnas med dragkedja. Vi har den i baksätet och den täcker två säten (även mittensätet) och vi spänner fast den med hjälp av två bältet vilket är en egen konstruktion.

*Varför väljer ni att göra på detta sättet?*

Vi har en Toyota sedan, en gammal bild med en liten baklucka och därför får det inte plats någon bur där bak. Vi har inte gjort så mycket research på transportburar och kunde inte hitta någon för baksätet i butik, därför kom vi på en egen lösning.

*Hur tar hunden sig in i buren?*

Han kan hoppa upp i sätet, och om han inte vill så lyfter vi in honom. Vi låter honom landa på sätet och sedan går han själv in i buren.

*Smutsar han inte ner sätet då?*

Jo, men vi har lagt en filt för att täcka det första bilsätet han klättrar på.

*Vad är viktigt för dig vid transport av hund?*

Att det ska vara säkert, även om det kan låta lite motsägelsefullt nu när jag precis beskrivit vår lösning haha. Men även att den ska vara väldigt smidig. När jag tänker på transportburar tänker jag bara på permanenta stålburar, men för oss är det viktigt att den kan fällas ihop och läggas i baksätet väldigt enkelt, eller tas in. Exempelvis på nyår då vi skulle bort till några kompisar, då följde även Valter med. De hade en katt och var lite stökigt, därför tog vi in transportburen så han fick ligga där ifred vilket var bra för han blev lugnt.

*Hur förvarar ni buren när den inte används?*

Just nu är den i lägenheten så han kan gå in och lägga sig där ibland, vi använder den även för ensamträning just nu. För att han ska bli lugnare och inte skälla när han är själv låter vi honom gå in i buren och vila där. Men annars förvarar vi den i bilen, uppfälld. Om det skulle behöva åka en tredje person i bilen fäller vi bara

ihop den genom att trycka på två knappar så den blir platt och lägger den i bakluckan.

*Ser du andra användningsområden utanför bilen?*

Det hade varit väldigt bra om den är ihopfällbar då den fyller fler syften då, man kan ha med sig hunden när man ska på fest / middag / behöver inte be om filt när man kommer fram utan hunden känner sig trygg i buren.

*Vid vilka tillfälle kör ni bil med honom?*

Om ska iväg och besöka någon, till någon kompis till exempel. Men vi är inte i behov av hunddagis än (sambon pluggar hemma mycket, föräldrar, vänner m.m). Annars kör vi om vi ska på någon hundkurs eller ska göra en vandring längre bort.

*Ser du någon förbättringsmöjlighet med den buren du har nu?*

Ja, just nu är det bara två av fyra väggar som går att öppna, jag hade velat ha att fler som går att öppna om man måste ställa den på ett specifikt håll. Det finns en öppning på toppen, men för oss fyller den ingen funktion för han vill bara hoppa ut om den är öppen.

*Finns det något annat ni använder buren till?*

Ensamträning. Vår tidigare hund hade väldigt svårt att vara själv och tyckte det var jobbigt att åka bil. Även när det kom människor över blev hon ibland stressad och vi önskade att vi hade lärt henne att vara i en bur så hon bara hade kunnat gå undan i och vara ensam. Därför köpte vi denna bur direkt när vi skaffade Valter, för att det skulle bli hans favoritstället. När han var liten blev han lämnad själv i den för att lära sig att vara ensam. Vår förra hund gick inte att lämna själv i bilen då hon blev otroligt stressad, men Valter ligger bara och sover lugnt i sin bur när vi lämnar honom.

## **Interview 5 - Tindra**

Name: Tindra Persson

Status: Sambo, delägarskap

Ålder: 24

Boende Situation: Lägenhet i Helsingborg

Hund: Pomeranian

Vikt: 2 kg

Höjd: 20 cm mankhöjd

Bur: Mjuk väska

*Hur transporterar du din hund idag?*

Först hade vi en mjuk hund väska med handtag som vi använde för att spänna fast med bältet. Men den gick sönder och efter det har vi bara låtit henne sitta i någons knä eller direkt på passagerarsätet. Hon hoppar in av sig själv i bilen eller så lyfter vi upp henne om hon inte orkar.

*Är det ingen risk att hon springer runt i bilen om hon är lös?*

Nej, Enya älskar att åka bil och hon lägger sig ner direkt och somnar på sätet.

*Finns det någon anledning att ni valt att ha henne i passagerarsätet och inte i baksätet?*

Jag vill ha koll på henne, samt att jag tycker det blir trevligare och mer sällskap av att ha henne här fram.

*När ni hade tygburar, hur förvarar ni den när den inte användes?*

Vi tog med den in i lägenheten där hon kunde sova och använda den som hennes ”safe space”. Även när vi besökte kompisar tog vi med den och lät henne vara där.

*Vad hade du tyckt om en hopfällbar bur i baksätet? Som kan fällas ihop och förvaras i bilen när man behöver använda baksätet som sittplats för människor?*

Det hade jag absolut velat ha. Jag hade kunnat tänka mig att köpa någon bilbur, men tycker att gallerburarna är alldeles för klumpiga och tar för mycket plats. Därför hade jag velat ha en mjuk. Jag vill inte heller att den ska vara permanent i bilen och att det ska bli ett projekt att installera den.

*När ni inte använde tyg buren i bilen, vad använde ni den då till?*

Det smidiga med tyg buren var att den var som en väska. Vi hade med den när vi skulle bort någonstans så Enya kunde gå och lägga sig och bara få vara. Det blev även som en korg, hennes ”safe spot” hemma hos oss.

De har ingen bil så det är inte prio ett att införskaffa det - speciellt om de ska åka längre, men åker de kort inom Helsingborg så.