

# Design Evaluation Report

## *Executive Summary*

Since the first months of the academic year 2017 / 2018 we have been challenged to find an innovative and modern idea for the future of the Automotive Industry.

The first step I followed in this process was to find a problem that applies to most metropolitan drivers. As I lived in a big and crowded city I realised there were many issues such as finding parking spots and getting stuck in heavy traffic. Such issues prevent most citizens from buying more than one car and forces them to acquire a small and practical city car.

Unfortunately city cars do not suit other environments - and usually they are not the cars people dream of.

This situation led me to imagine a car that could be used in the city, on tracks and off-road. Cars that are able to cover all these fields at the same time do not excel in any of them.

My goal was to design a vehicle that could face the best competitors for each category: city, race and safari.

Being inspired by phone apps and game patches I came up with the idea of a car that can be adapted to the customer's needs making it the best in every environment.

To achieve this I looked into what parts needed to be changed in the three categories in order to find a fast and efficient way to switch from one type to the other.

I took a city car as a base for the design. The other parts would be added afterwards.

Today new apartments are built with underground garages solving one of the problems but still not allowing us to buy more than one car.

I thought to include in these garages, industrial robots that would allow us to change the car configuration in minutes. By means of an app or a touch pad in our houses we would be able to choose to drive a race car, go on a safari or go shopping.

In the last few years thanks to technology, drones and many other devices have become cheaper and affordable to all of us. This could be the same for industrial robots.

I tried to apply this idea to different brands in the first stage of the design process. I began with Mini, Volkswagen and Renault as their models are very popular in cities. However I was not inspired by the design outcomes and I continued looking for a brand. In the end Range Rover was my final choice as a brand of luxury and desirability. My decision was enhanced by the lack of a city car model in the Range Rover brand leaving freedom to my creativity. After this choice I researched the Range Rover DNA, studied the evolution of the other models and applied these principles to my design.

I was not looking for a futuristic design but for a modern design, something beautiful that would not shock but impress. With three key words in mind - Fun, Presence and Continuity - I came up with many design ideas. I designed a car that unified all these three inspiring elements. To help me improve my design I chose to model it with Automotive Clay.

Before Christmas I created a timetable to plan the entire process from the design to its presentation. Thinking about the package and the passengers' disposition and after a small foam model to work on the proportions I built the orthographic views. This helped me to have the buck for the clay ready before the Christmas break.

Then I added clay on the buck and started working on the proportions on a 3D model. In this process I noticed for example that the front and the rear were too short and flat. Keeping the car as short as possible but at the same time aesthetically pleasing I moved the front forward and started sculpting it. The second step was to find the best proportions and reflections for the side. I achieved this with the help of Dynoc. I corrected the surfaces before using a mirror and saw possible outcomes for the front and rear.

At this point, I had to find a final front design. Meanwhile working on the clay I began sketching different ideas. I faced several issues in the intersection of the three surfaces: top, side and front. The problem was to have a line continuing from the side to the front without creating twisting surfaces. Once the best compromise was found I looked for other imperfections to be treated. For instance, I tried to make the roofline higher to give more headspace to the rear passengers. I quickly went back to my original line, which was more dramatic and aesthetically appealing. The next change to my first design involved the rear, which was too short, and the C pillars, which were too vertical. I made the rear longer and gave the C pillars a new angle. With the final proportions on the rear I finalised its design and went back to working on the front. Finally I had to deal with the intersection between the wheel arches and the body of the car. I could not reach a nice line because I wanted the arches to make a perfect circle from the side view. Thus, I needed to change some lines on the side of the car to create a better intersection. Once all the surfaces on one side were set I was able to mirror them. The result was what I expected since I had been using mirrors at each step of the process.

Leaving the clay for a moment I worked on the wheels. I followed some key lines on the car: very curvy and with many circular elements. Well they were round... More seriously, I intended to get the philosophy of my design in order to create continuity in every spoke. Paying attention that the wheels suited the overall design of the car, I made some renderings on Photoshop, printed and applied them to the side of the clay. The wheels were then made on Alias Autodesk and sent to be 3D printed.

Back on the clay model I worked on the final touches and graphics. To find the best solution for the graphics on the bonnet and on the roof, I took a picture of the model as a reference and made several attempts on Photoshop. Once I reached continuity on these elements as well, I worked on the front lights giving shape to the characteristic asymmetry.

Finally I was able to add fillets and radius to all the sharp edges and complete the process of the clay. At this stage I took many pictures of the model to work on more detailed renders and find various design proposals for the rear and the front lights.

After I had enough references for my development the clay was used to create a fibreglass model. The last sticky point was to find the right paint colour. I wanted the design to look classy and modern with a colour that highlighted its lines without resorting to grey. In the end I chose a satin pearl white that fitted perfectly my expectations and I found a name that could fit as perfectly the car philosophy.

Meanwhile, I changed the package drawing since the car became slightly bigger, giving more space to the passengers and I finished working on the final renderings improving the design one last time.

### ***Detailed Description - Specifications of the design outcome***

When you want to stay a fashion icon even in the automotive industry you need to know how to renew yourself. After Jeep, Land Rover is undoubtedly the world specialist of SUV but the arrival of increasingly numerous new competitors forces the brand to complete its range of products. This is why I designed Carte Blanche.

Carte Blanche is a small electric hatchback, 4250mm long, 1800mm wide and 1400mm high. These contained dimensions put the car in the same category as the Volkswagen Golf. It would be the first electric Range Rover and the brand's smallest car. This would open a new market segment to the brand. Aiming young metropolitan people, the car is fully customisable by means of the garage. The customer profile is a restless 20-30-year-old citizen with various passions and ideas for the weekend but constrained to work in the city.

The garage, equipped with four robots, one at each corner, allows the customer to add or remove parts of the car. Either using a touch pad in the house or the phone app, the customer can convert the hatchback into a race car or an off road. The car is based on a carbon fibre chassis that stays the same for all three modes. The other parts such as wheels, bumpers, suspensions... are changed and stored by the robots. This concept would allow the brand to create new parts for new or existing modes, or simply to fit the customer nature. Like software updates and game patches, this system of changeable parts is a way to ensure a certain income and to be consistent with a sustainable development: upgrading products and reducing waste.

For truly exigent customers the garage can be equipped with a Cleaning System. The Cleaning System stores rain water and uses it to wash the car daily.

Carte Blanche, equipped with four electric motors, one for each wheel, can change its performances in each mode. More power for the racing one and a longer battery life for the off road version. The batteries placed at the bottom of the car can be wirelessly charged in the garage. To keep up with a sustainable philosophy the paint of the vehicle is thermochromic. Thus, the car will be white during summer and black during winter to dissipate or absorb heat in a very efficient way.

The evocative name of this car reflects its personality. It implies a certain freedom, the gift of doing anything one wants and taking action. The car was created following this spirit: allowing the driver to fit his desires and fulfil his or her dreams.

The design aims to give a smile and a sense of happiness. The car is pure and plays on surfaces and a few key lines. Like I have been taught every good design needs to be recognised by three lines only. On Carte Blanche we can find these lines on the shoulder, shaped as a wave, and on the bottom of the car where two parallel lines join to create a perfect half circle. The car is cheerful but remains present on the road thanks to the use of circles and round shapes. The general proportions are dramatic and eye-catching: the long bonnet and the small side window give the car a more aggressive look.

All the car lines and surfaces play on the philosophy of continuity. They all join and flow around the car with harmony.

Carte Blanche plays on asymmetry on the front, reminding the Range Rover Discovery, while highlighting the brand badge. As a symbol of modernity, the front is covered by many small oled screens that allow to change the car personality and to display welcoming or farewell images. The small screens between the front lights, that appear as one from a distance, can open and close to cool down the electric engines. While in movement, the

image displayed is a grid, formed by a pattern of several R. Range Rover elements can be found in the lights and at the bottom of the front with the typical trapeze.

On the side of the car, the bottom lines appear from a vertical element, that could remind the Range Rover Vogue. This element helps the air coming from the brakes to flow and escape on the side of the car.

The wheels are designed following the same lines we can find on the front bumpers and on the side, giving a sense of consistency. The thread of the tires follows the same philosophy. The small size of the side windows are compensated by the large glass roof in order to provide light and comfort to passengers.

The rear is characterised by two big round red lights as a tribute to old exhaust and the main lights are just formed by a pure and classy laser line.

Finally the design of Carte Blanche can be summed up in three words: Continuous, Classy and Pure.

### ***Critical Appraisal of the Design Development and Realisation***

Carte Blanche design evolved throughout the clay process. This allowed me to make quick changes and experiments on lines and surfaces. As a matter of fact, in this process the car improved every day reaching a quality level higher than expected.

Although the final outcome is very pleasing, I could not avoid several difficulties and errors in the development. The first misstep in the development was not having a clear final front design before initiating the clay model, but just an abstract idea with key elements. Such a choice was made to begin the clay model early, knowing that this advantage would have allowed me to make more changes in the future. As a designer I prefer to work on 3D models to visualise a possible outcome. Some sketches and evolutions of the front were made during the clay process. In the end a final front was found, keeping the initial essence of having a big screen. The Range Rover DNA was kept in every stage of the design process trying to innovate or restyle the brand identity to fit a much smaller car.

When I created the calendar of the project I miscalculated the workload of several tasks. Some were planned early on purpose to motivate me, others were just too optimistic.

My will to reach perfection in my design at every little step made me lose time.

I could not achieve everything I wanted. For example I did not have enough time to work properly on the interiors of the car. Even if the project was more dedicated to the exterior, working more on the interior would have been fulfilling. This loss of time can be seen as well by the lack of a cad model. I think models on Alias Autodesk are the perfect way to enhance and sell a design. The models can be set in different environment giving the feeling the car could really exist. Before the fibreglass was painted I tried to use the technique of photogrammetry to generate a Cad Model in STL file to be rebuilt on Alias later. Besides, a 3D model on a software would have helped me much when I had issues regarding the best color to choose for the car. The white model and the wrong lighting created a bad result, unfortunately useless. Considering the car was getting painted there was no time for a second attempt.

Overall I am very satisfied with the way I managed the time at my disposal. The model is outstanding and is exactly how it needed to be. In the end it is not a cad model or a sketch that will be seen on the road but a touchable 3D car, and that in my opinion is the result that counts.

### ***Critical Appraisal of the Design Outcome in relation to the Product Design Specifications and Personal Design Manifesto.***

Compared to the Product Design Specifications we wrote at the beginning of the year, Carte Blanche's direction stays the same. The car is still aimed at young people, even though the final design looks more refined and less childish than the first sketches. The idea of continuity and fun stays in its spirit, together with the will of realising dreams. The design outcome reflects by all means what Range Rover would be if it realised a hatch back. Even though most elements are a tribute to different models of the brand, and this makes it immediately recognisable, sometimes I feel some graphics could be removed and left to the original model. The element on the side for example, the one next to the front wheel, was added to find a easy solution for the interruption of the bottom lines. In the first sketches these lines had to create a semicircle exactly as they do at the back. Visually this solution would have slowed down the car. Blending the negative surface to the positive would have been awkward and the solution of the vent was the best one. There are some parts that are exaggerated in the model that would not be possible to apply to a production car such as the stance and the wheel arches that do not give enough space for the suspensions. The last remark on the design is that the typical Range Rover rear spoiler is missing.

My personal Design Manifesto was divided in different paragraphs but they all ended talking about happiness and the realisation of dreams. This is exactly what Carte Blanche is all about. A car that does not pressure you to make the wrong choice since they are all correct. Maybe it will not change a life completely overnight but it offers the opportunity of an escape. An escape from everyday obligations, an escape to a fresh mountain or to a hot racetrack. With Carte Blanche there will be no regrets about the car type that needs to be bought because they are all in one. Sometimes the loss of happiness lies in the routine, and in the prospect of there being no close changes. This kind of car and this kind of garage give the possibility of not to getting bored so easily. In the manifesto the theme of envy and prosperity were touched as well. A new status symbol will be created, men and women, dreamers that have an easier way to realise their dreams. (I don't know about this)

Finally Carte Blanche will not realise all dreams but it will allow, at last, to make some decisions with the heart and not the head. With passion and not reason.

Thank you

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