

Design studio - ocean industries - 2017 - Lasse Thomasgård

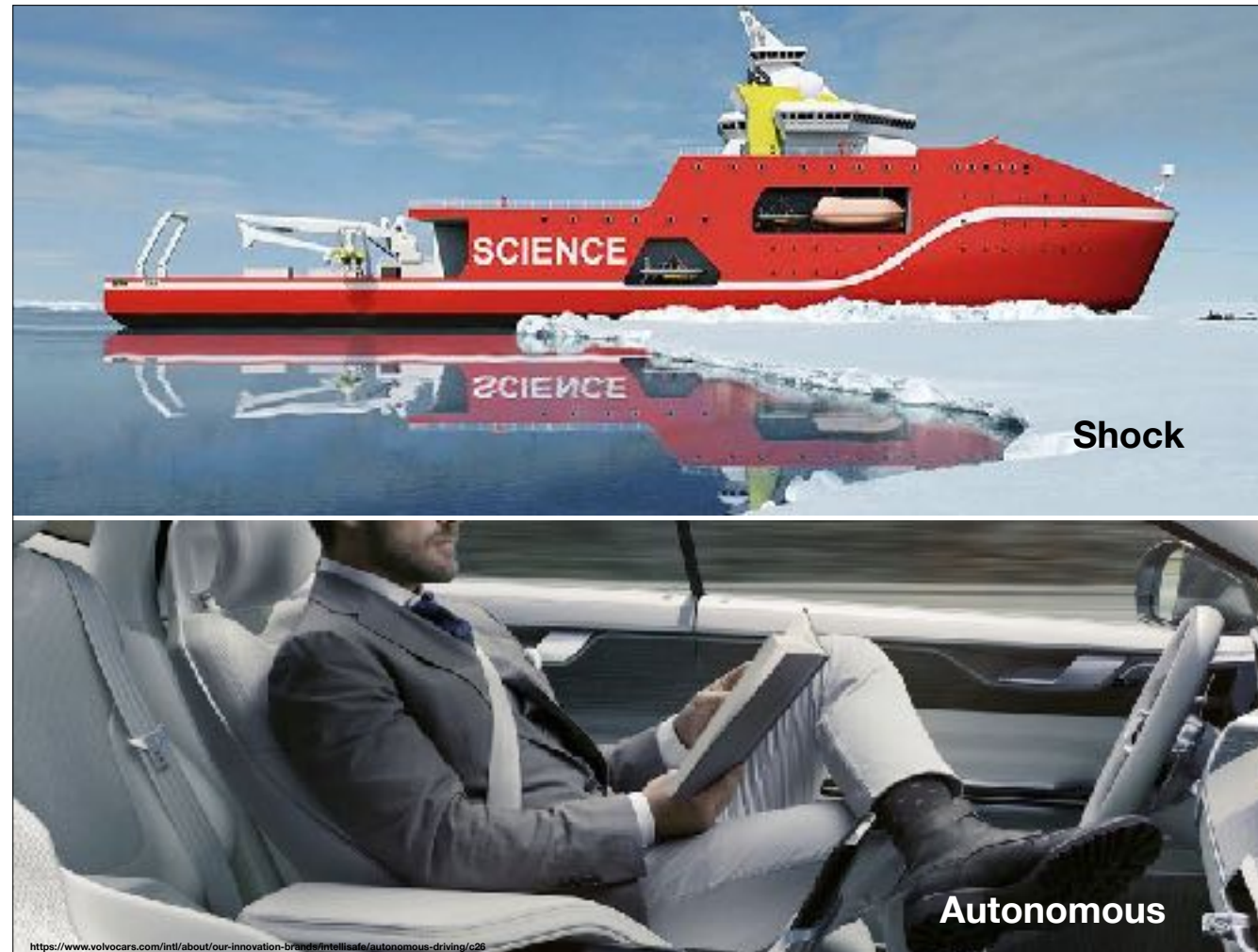
Hi, My name is Lasse Thomasgård and I will now present for you my project this semester in the course: Ocean industries lab



Research / field trip

A field trip to the icebreaker Oden in Helsingborg, gave me insight into how a ship and a bridge looks and works.

Since my mission this semester was to design a physical product, I did research on which objects that would be crucial to arctic navigation in the future.



A trip to Chalmers university in Gøteborg gave me the insight that ships when breaking ice can experience full stops while breaking ice and experience big shocks throughout the ship.

I learned that autonomous ships are close by, but a ship going to the arctic will have a pilot on the bridge through dangerous and unsteady conditions.

I thought these insights offered new and exciting possibilities, so I decided to design a new chair for explorer vessels going to arctic in the future.



Captains during long periods of the mission will be able to spend time on planning, observation or learning while the ship does all the steering itself.



When the ship enter dangerous seas and icy waters, the captain has to manually steer the ship and all the crew is operational.



Requirements	
Standard requirements	New features
Backrest	Sadel - support
Footrest	Side support
Height adjustment	«Comfort angle»
Lumbar support	Supporting standing
Neck support/pillow	Support against full stop
Armrest	Adjustable foot rest
Cup holder	Support handle
Sliding chairs	

These are the requirements i made for my chair:

As you can see, a pilot chair is a complex product with big amount of features

The standard requirements are the requirements a pilot chair needs to have.

The requirements in yellow is the new features I have added into this design:

The support system and the ability to work as a comfortable lounge chair when the ship drives with auto pilot, is the 2 driving insights for my design.



I made the choice of having a «customer» for my chair, both as inspiration and motivation.

The explorer vessel REV that was given to polarinstituttet by Kjell Inge Røkke became my choice, both because I find the ship interesting, but mostly because it is a futuristic explorer vessel with intentions of going to the arctic.



## Concept development

Now I will talk about the concept development of my chair.





This is the aesthetic requirements I made for my chair

It expresses Hard long lines, material meetings and exciting contrasts between shape, material and texture.

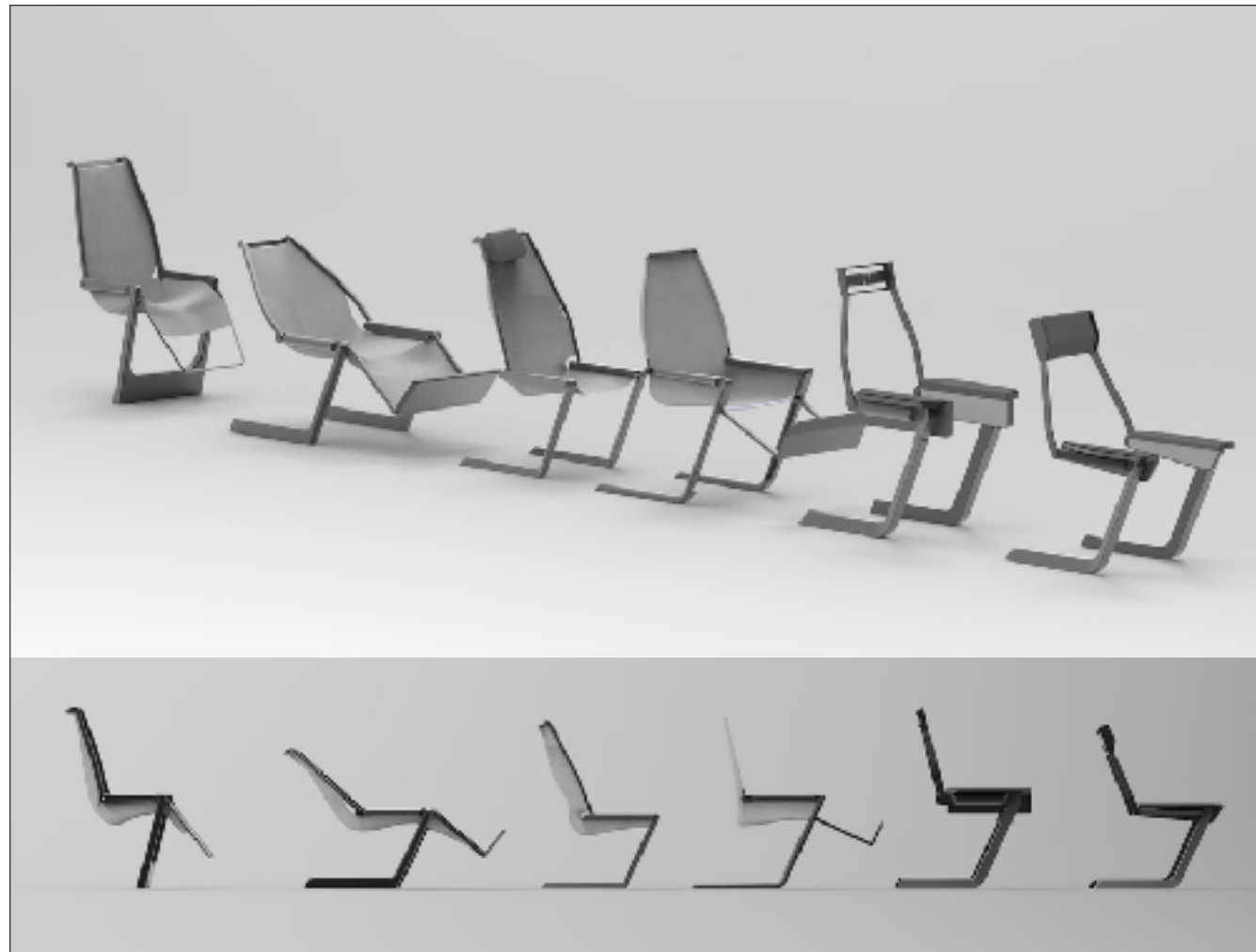


It was extremely hard to sketch ideas for a chair that would have to solve a lot of requirements, but after a lot of rounds, I ended up working further on a frame with a suspended 3d knitted fabric seat with rotatable joints that can be altered.



I have worked with cad models parallel with sketching all semester to easy test out and assess concepts. This has been helpful to evaluate and ensure that the mechanics and all the functions will work.

It was also crucial concerning the fact that a chair is a 3 dimensional object requiring attention from all angles.



Because of the complexity a pilots chair contains, I have made several iterations before the final product.





Finished product

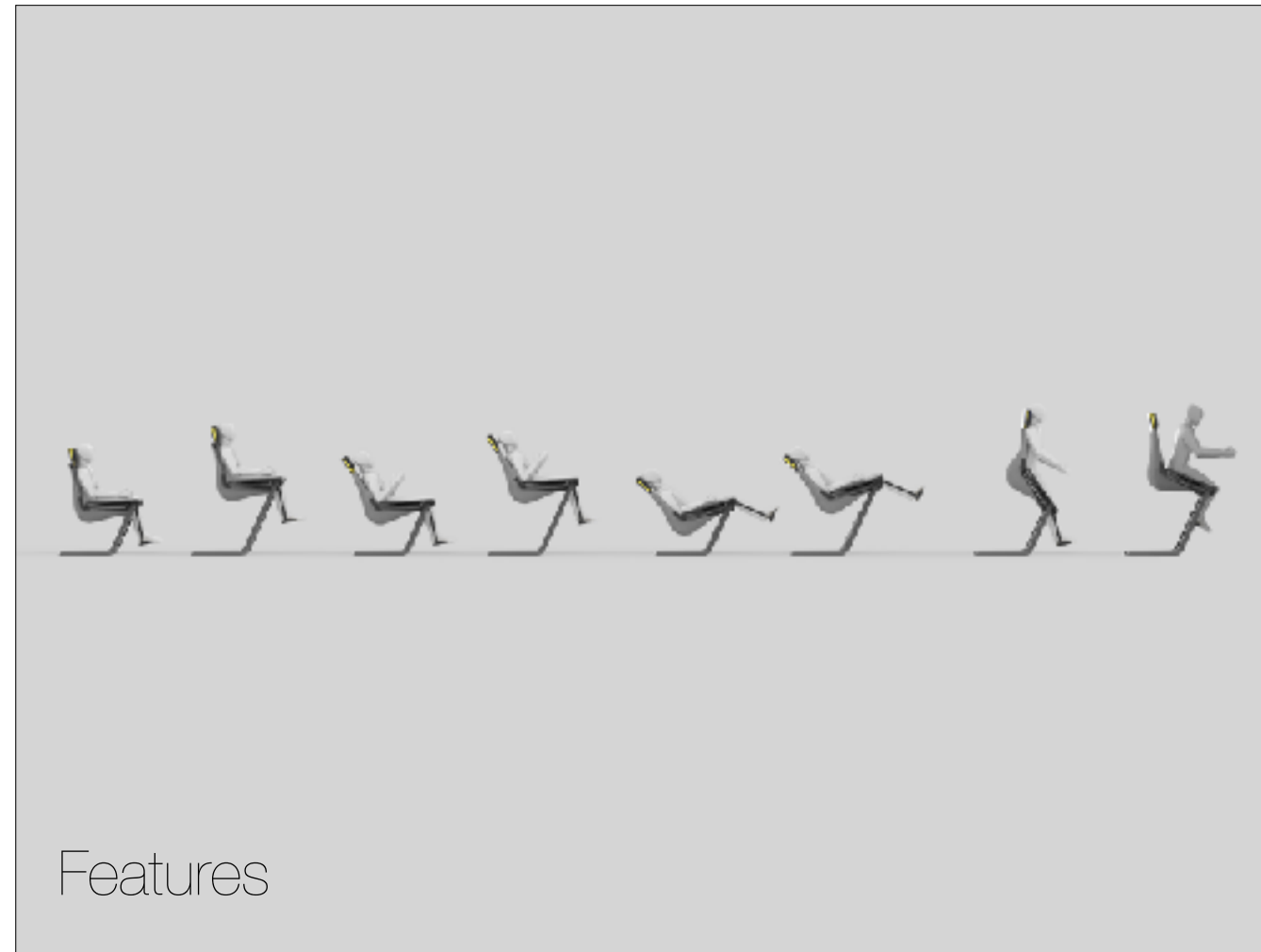
This is the finished product.



This is the chair I have designed and called: Boreal.

It is a pilots chair especially designed for explorer vessels going to the arctic.

Animasjon - roterende stol



Now I am going to talk about all the features that is found within the design of the chair.

In this picture you can see the different positions from a: typical office chair position to lounge chair to a standing position,



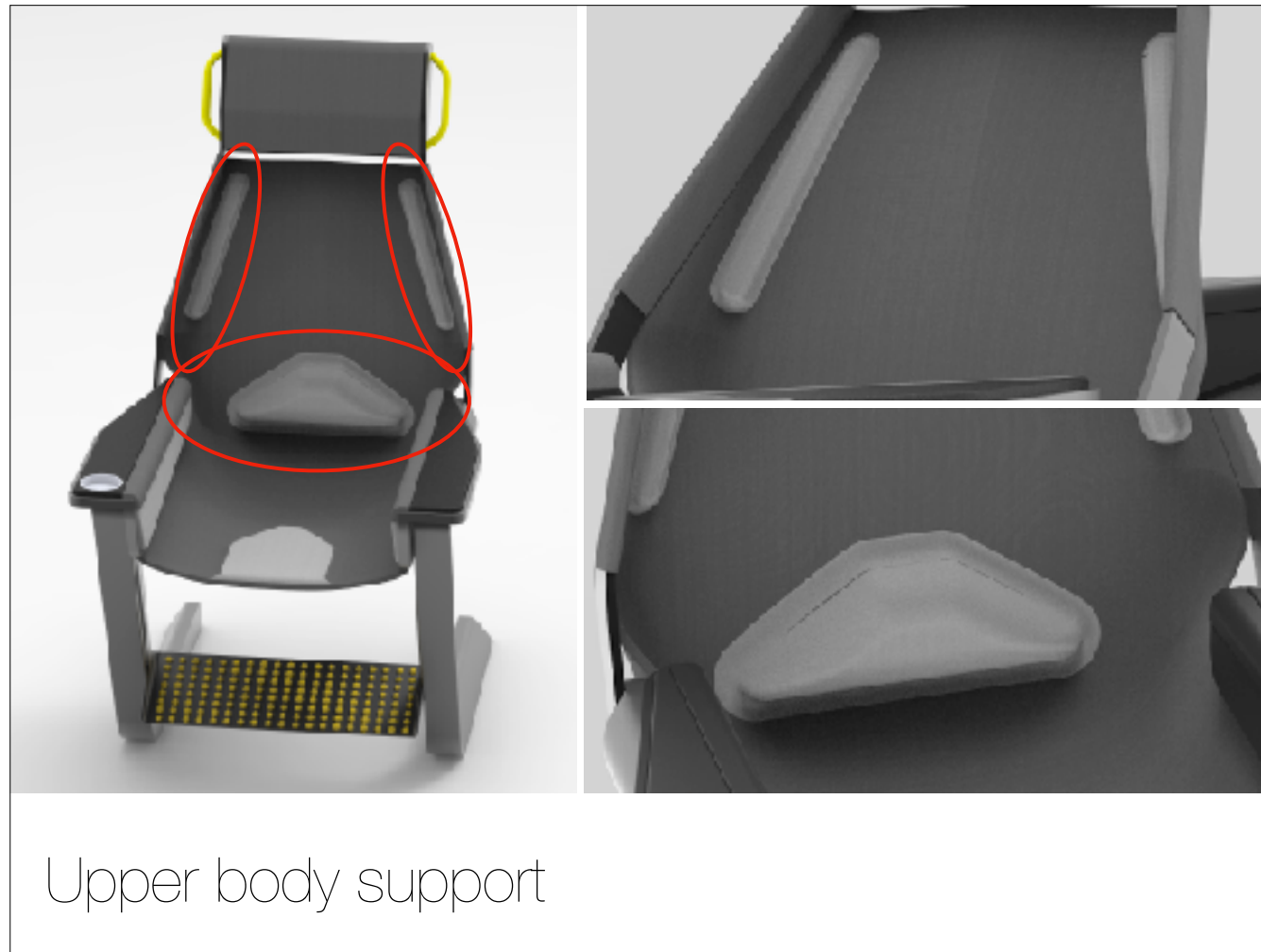
Fabric seat

The fabric seat is the most radical part of the design.

I want to use 3d knitting to include different abilities like: stretch and stability. Support will be added by implementing air pockets within the fabric.

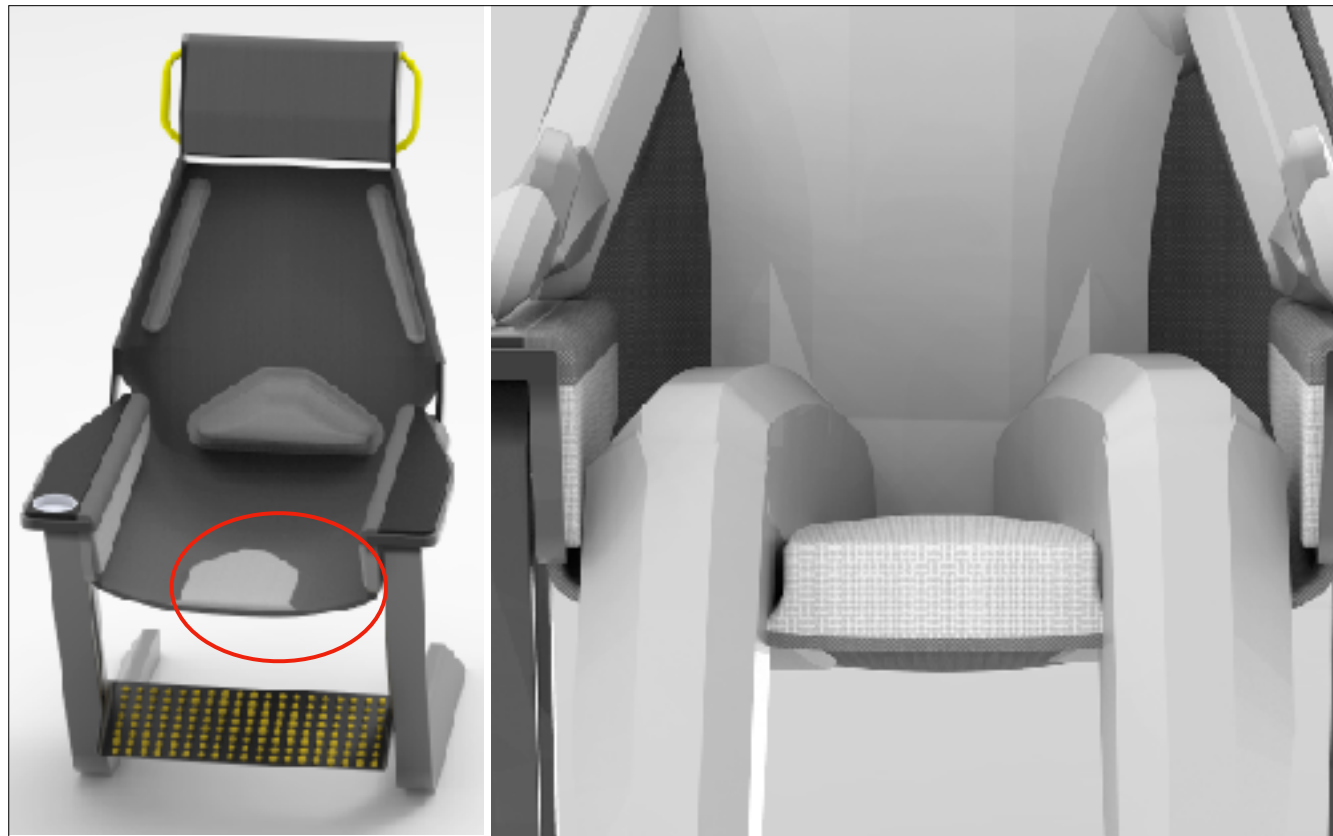
The upper right picture shows an air mattress from a company called : Therm a rest, which uses air pockets inspired from how airplane wings are made. The structure allows the mattress to go from only millimeters to 20 cm thick air pockets.





The air pockets are found in 3 places on the chair and the support on the upper body are for sideways support and lumbar support.

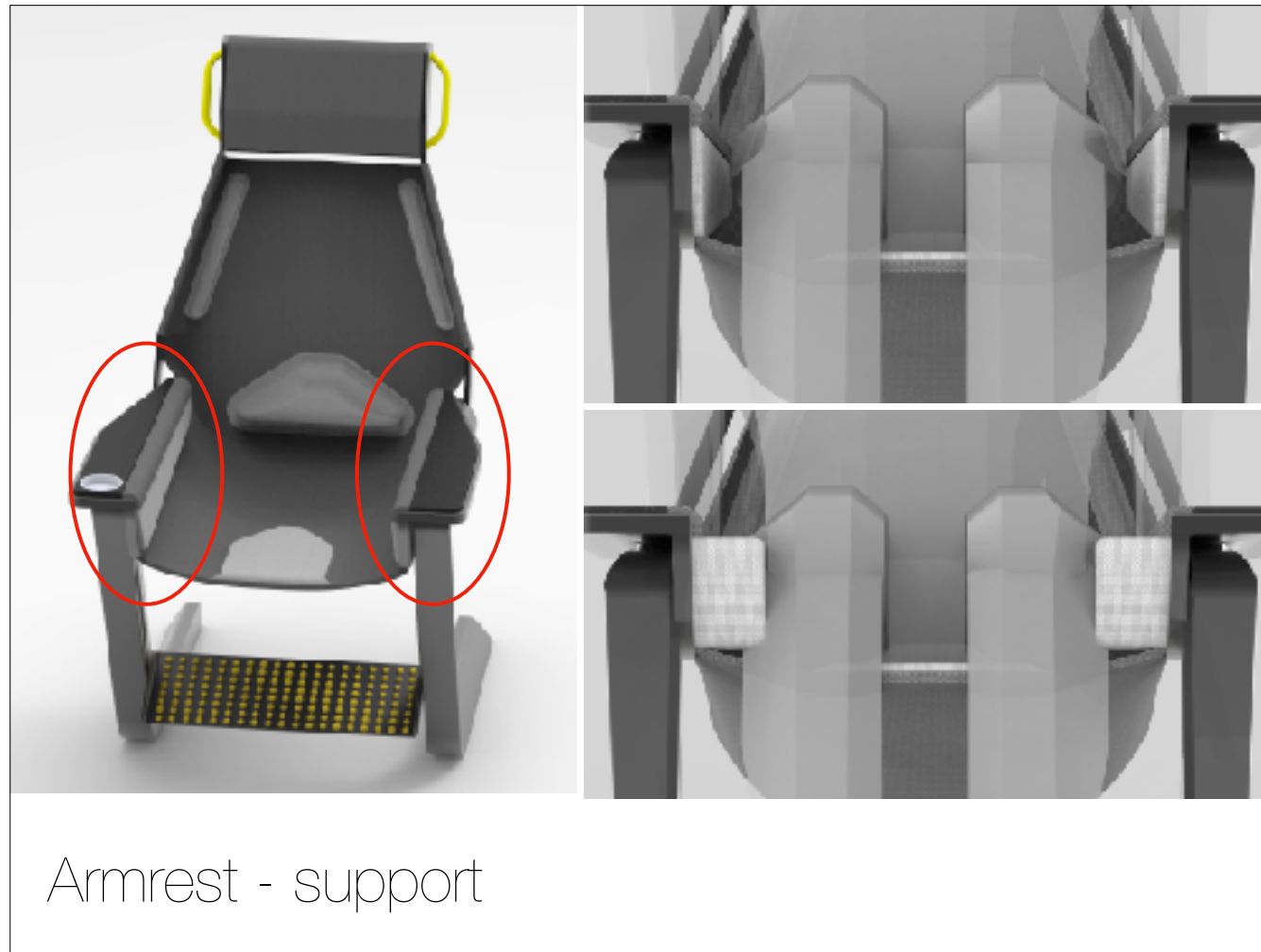
These air pockets can be inflated or deflated when needed.



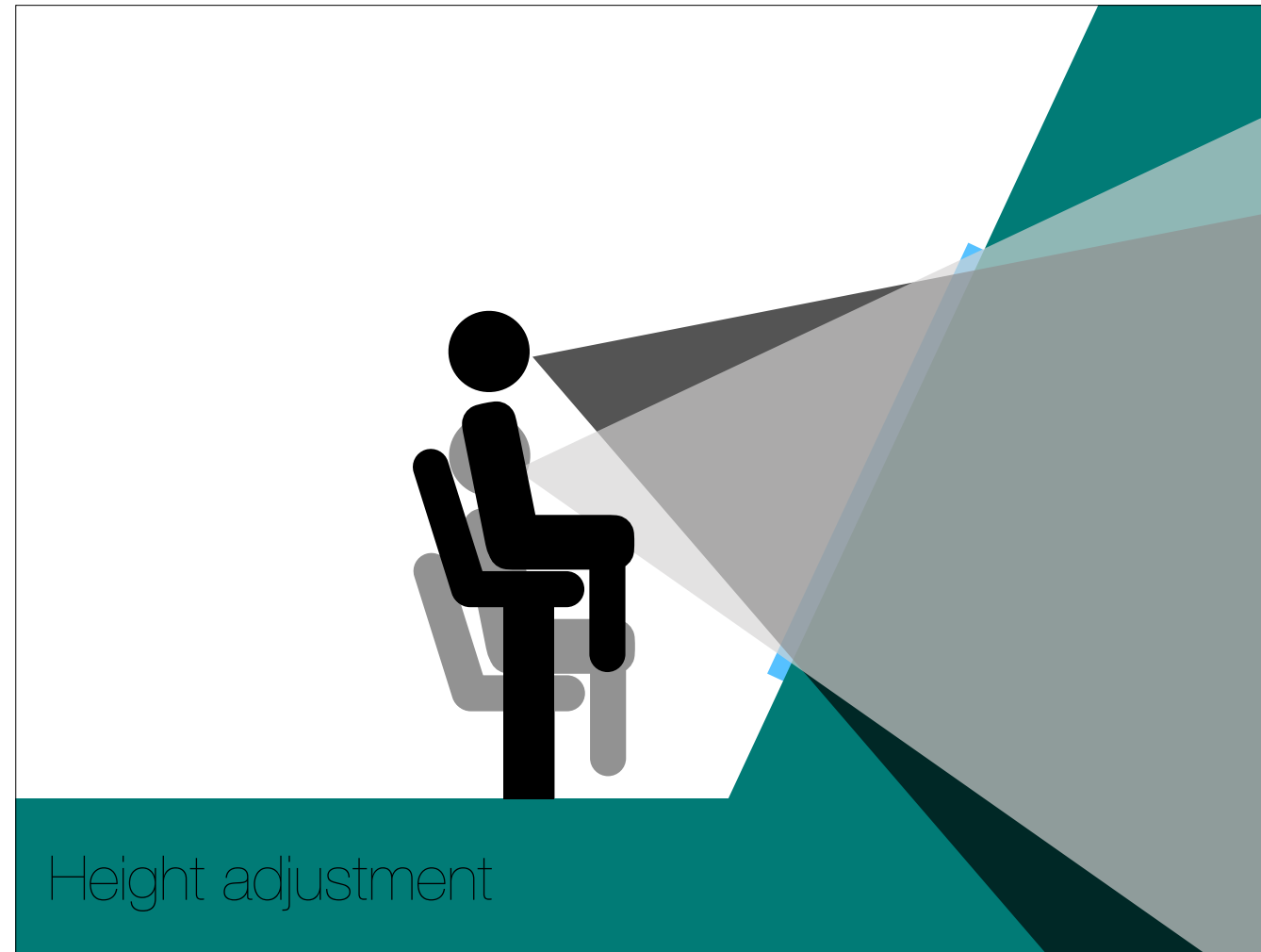
sadel support

The sadel support is crucial to keep the body backwards in the seat and hold the body into place in case of a full stop.

The sadel support can also be used if the pilot wants to be standing slightly leaning forward.



The side support on both side of the pilots thighs will help keep the body steady from sideways motion and when combined with the saddle support you will be completely «locked in».



Since pilots wants to see what`s happening right in front of the ship while breaking ice, I had to include height adjustment.





Height adjustment

This is done by telescopic legs.



Adjustable footrest

The footrest can easily be adjusted to the pilots needs.



The seat angle needs to be adjustable to work as both a lounge and office chair.

It can also be tilted forward in combination with the saddle pillow to allow for a standing saddle position.



Seat angle

Here you have an example of the seat angle used in 2 different modes.





The backrest angle can also be adjusted.



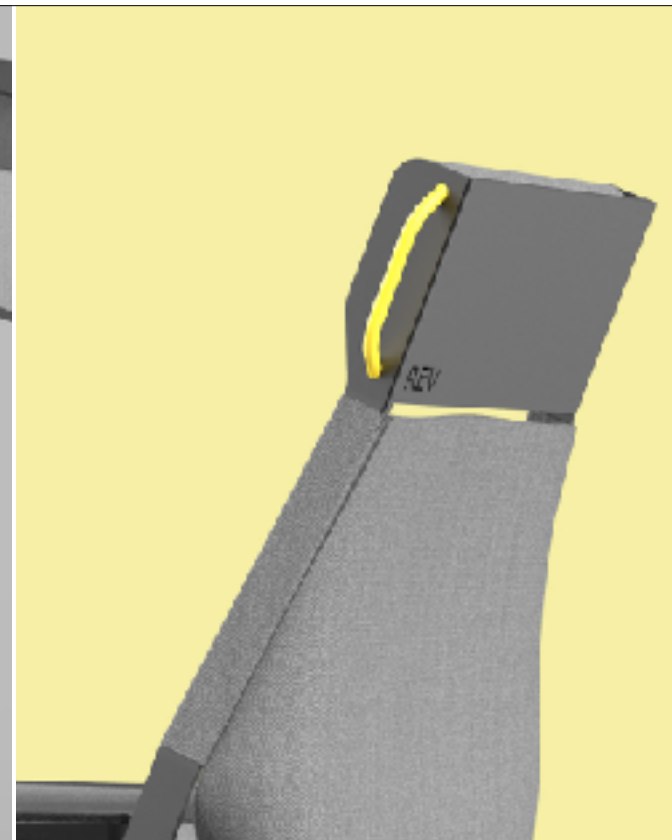
Sliding chairs

The chairs are placed on a traditional rail system found on existing pilot chairs today.

This is a standard requirement that allows the user to stow away the chair and control the ship from a standing position.



Cupholder



Support handle

The cupholder is super important, and it's therefore one of the only elements found on the armrest.

I have made a support handle on top of the chair for use during extreme conditions and general support.



Footrest

Neck pillow

Footrest with rubber pads for better friction.

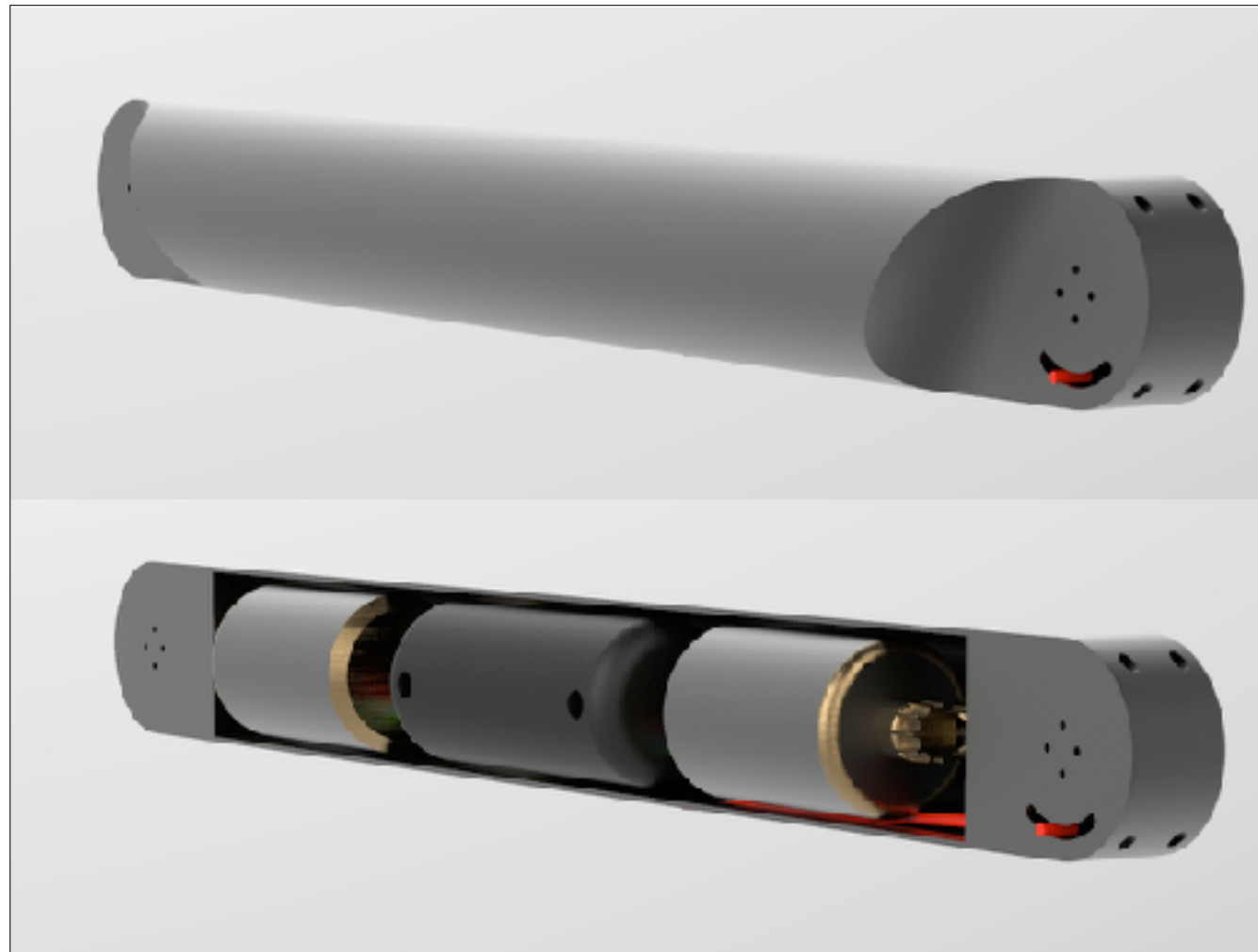
I have included a big Neck pillow in foam which is inspired by normal sleeping pillows. The pillow allows a lot of different positions and it also support both lounge and office mode.



Now I will Talk about all the mechanical components and what parts that make all the functions work..

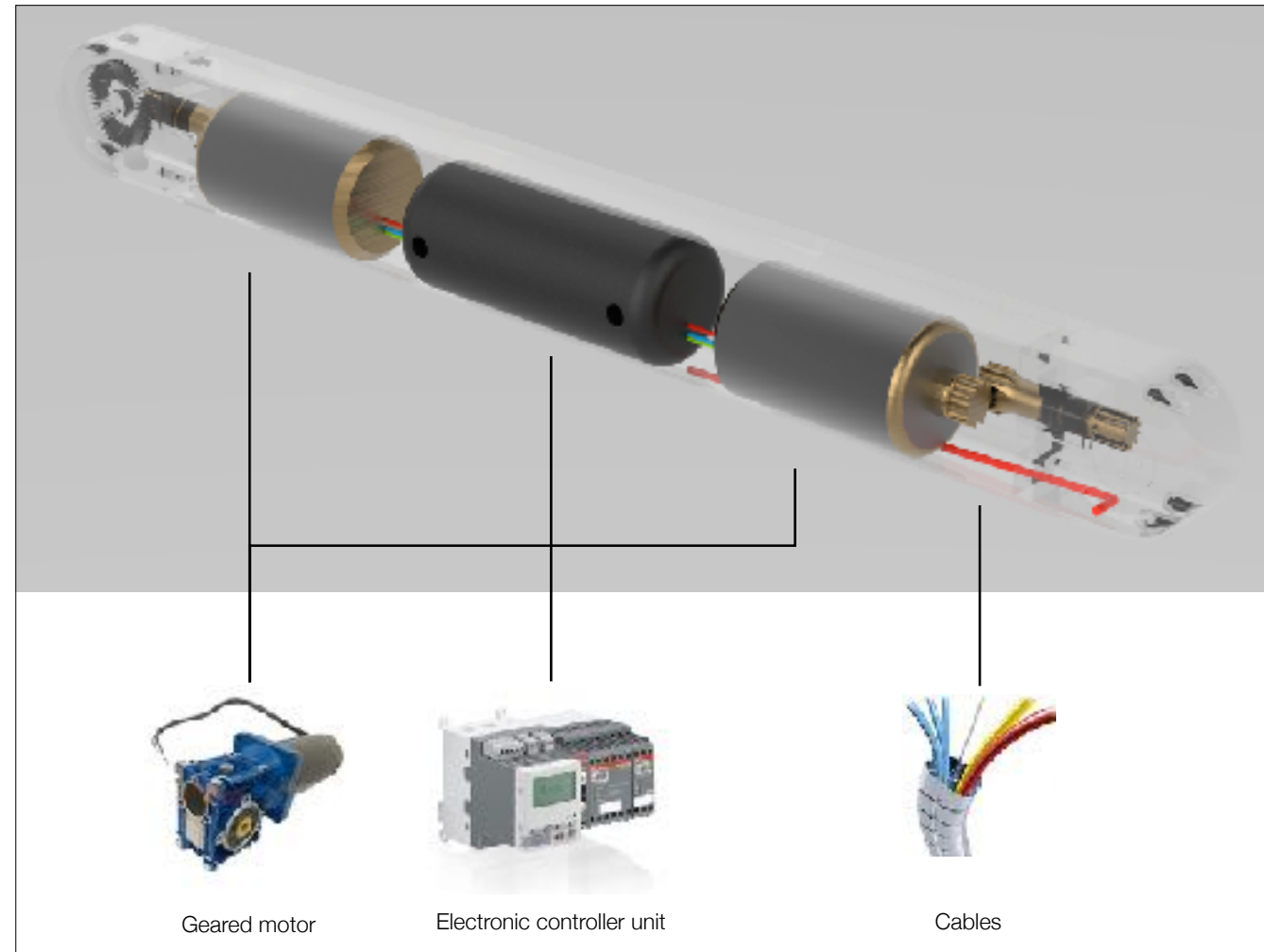


I will start talking about the mechanics on the most important part of the chair, which is found below the armrest.



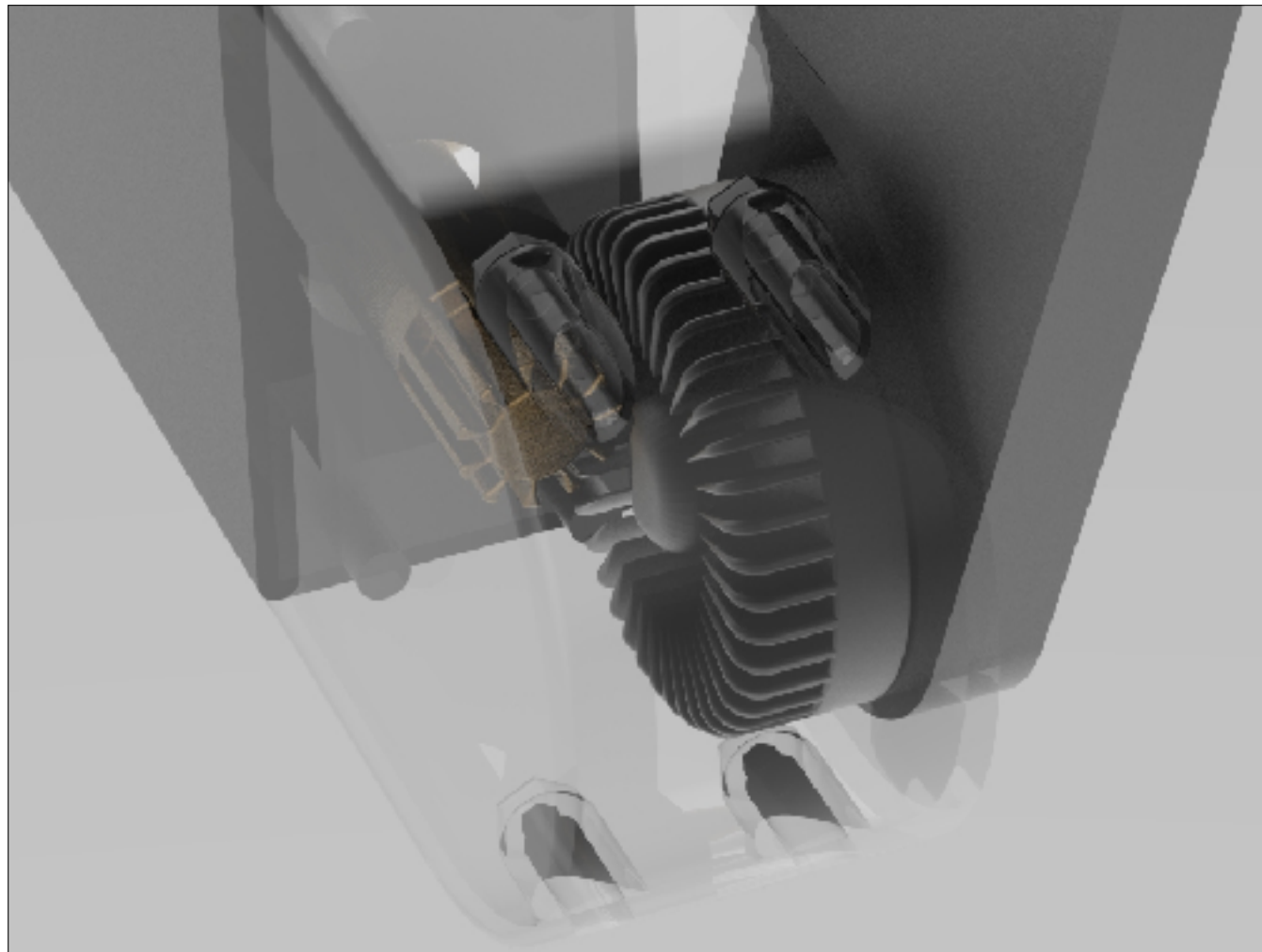
Take off the plastic cover, and you get easy access to the mechanics within.





Here you can see some thoughts on how the mechanics can be solved.

This part contains all the electronics, but also 2 strong motors that will control all the angles of the chair.



This is a illustration of how the backrest is connected and changed by gears .

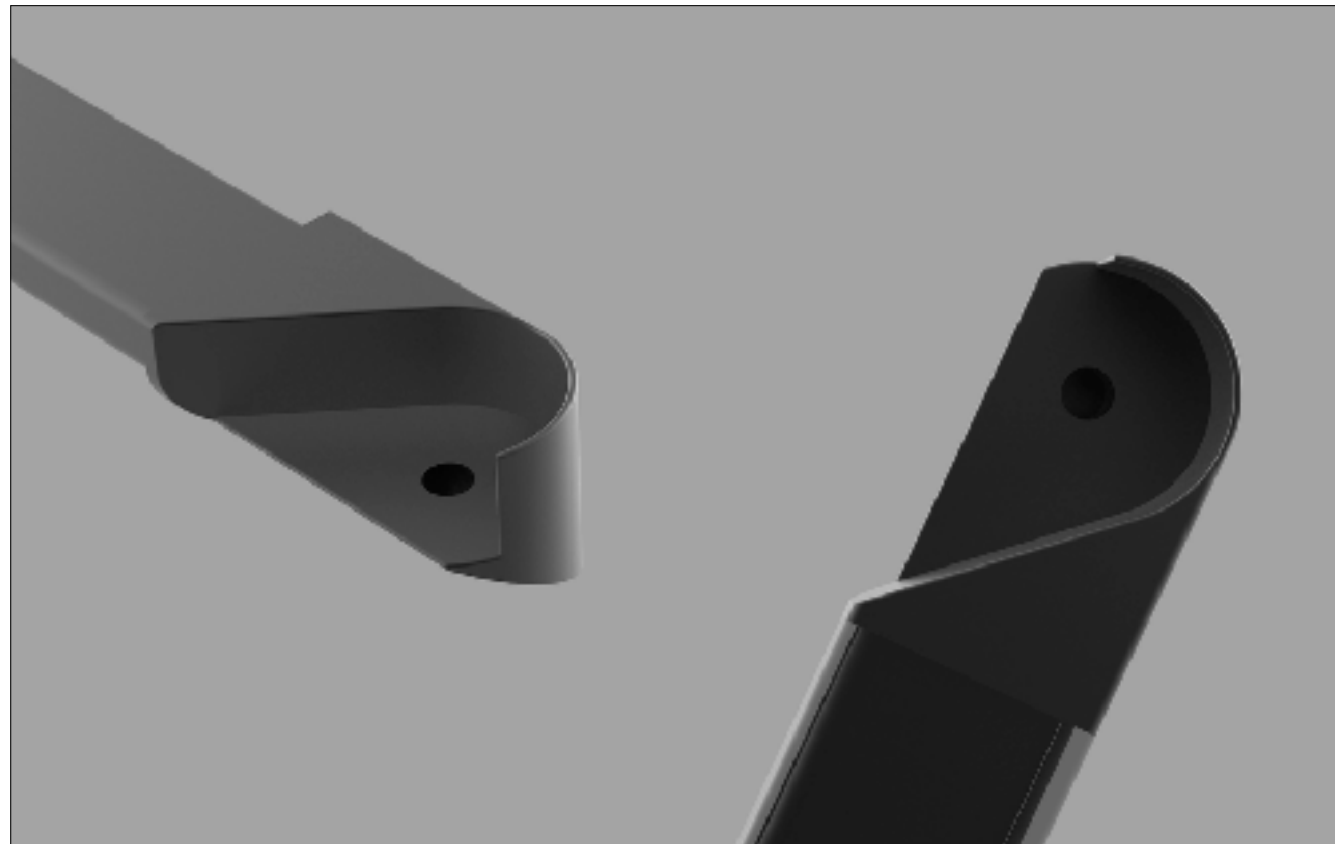


casted aluminium

This part will most likely be made from casted aluminium, simply so it can endure all the weight that will be transferred into this part.



The telescopic part that connects the armrest to the legs.

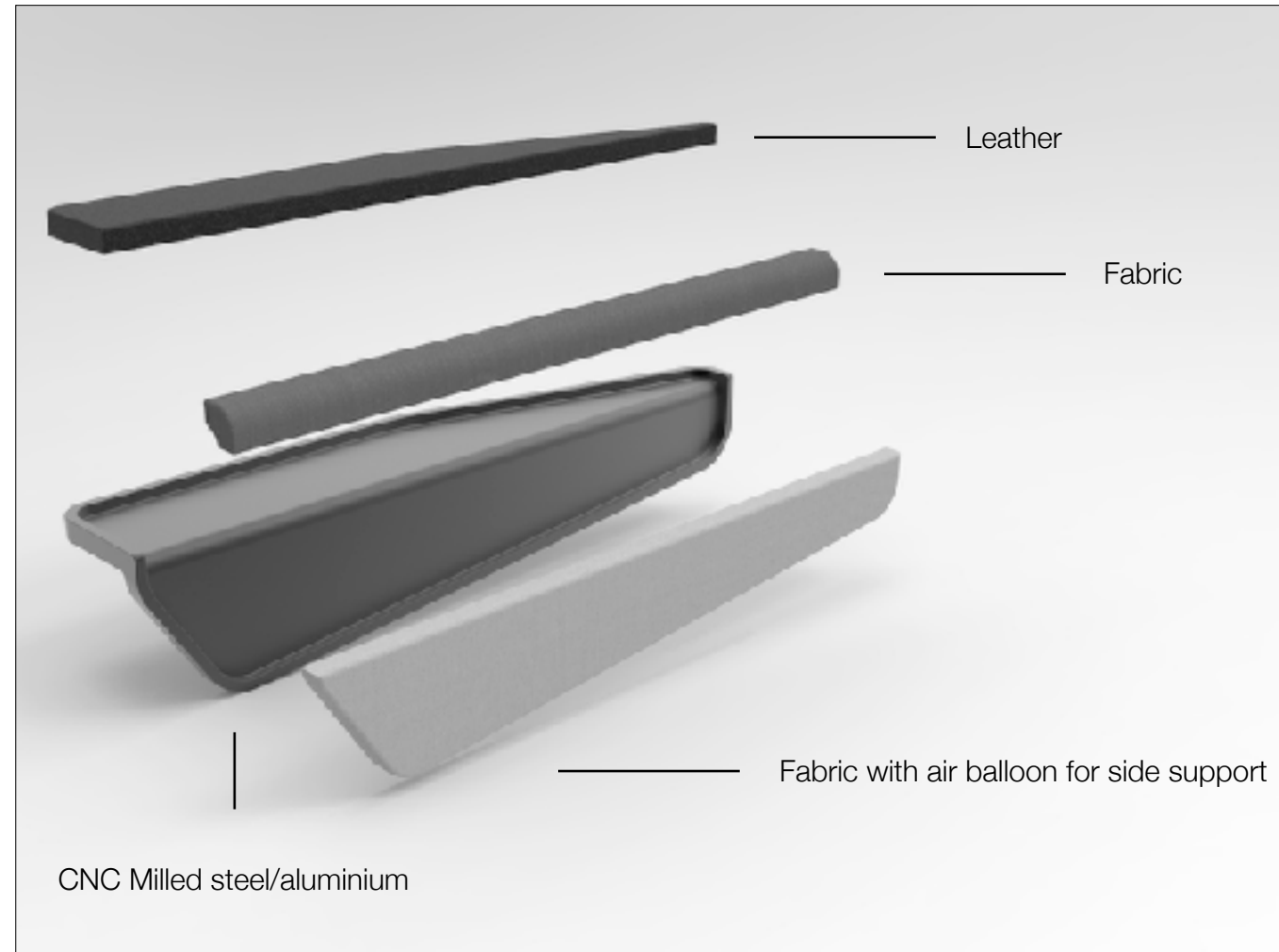


Milled steel

This part is also in milled steel for stiffness and strength



The armrest is one of the parts the user will interact the most with when sitting.



I have made a armrest in casted aluminium, where cushions in leather and fabric are slotted into the aluminum frame.

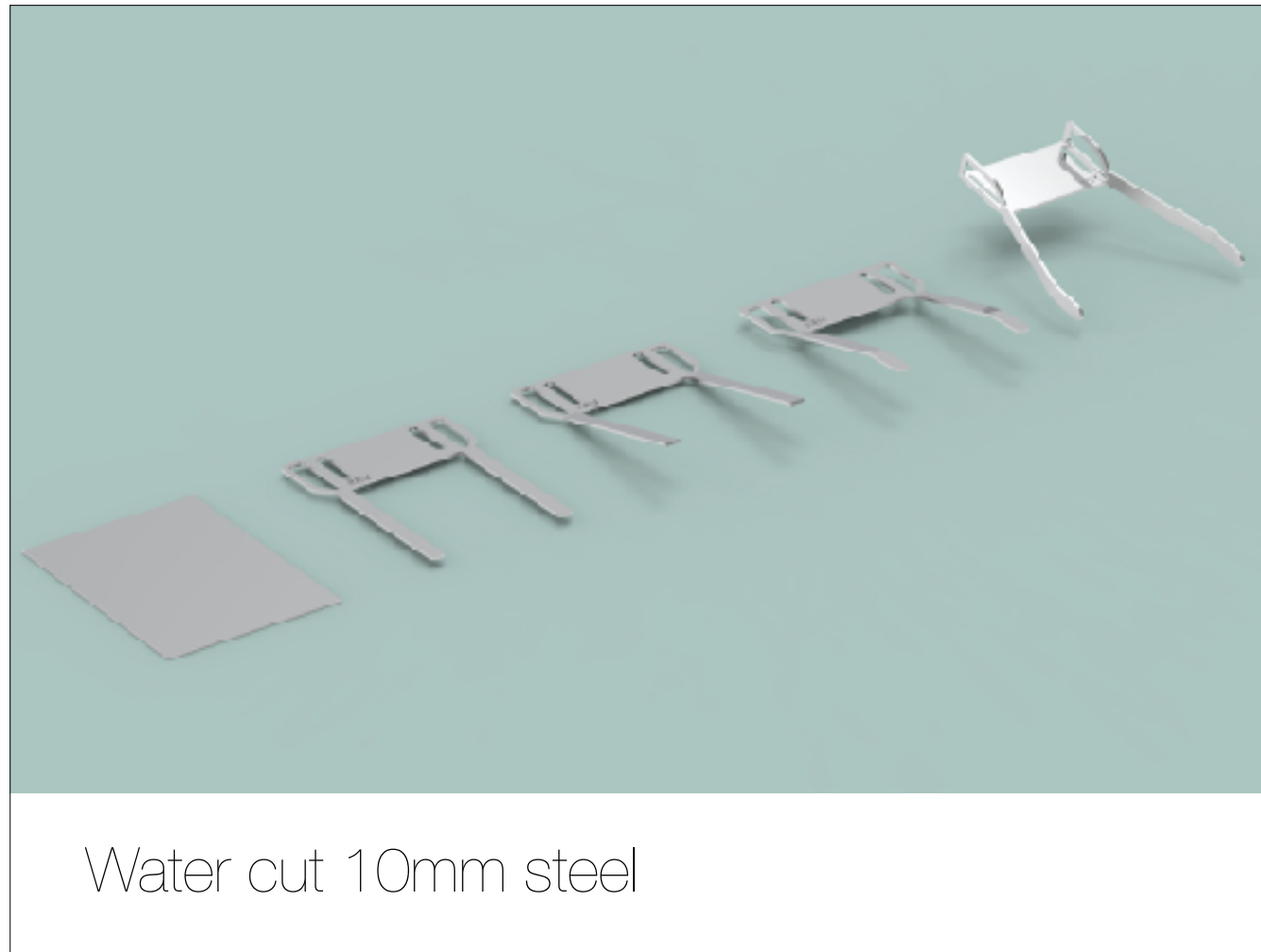
I have used leather on the top which is in direct contact with the arms, and on the side panels that are faced on the body I used fabric, for comfort and stretch to work with the inflated pillow inside. .





The backrest:

I wanted to make an exciting and rich design, and one of my intentions was to use different shapes and thickness on the separate parts of the design.



Water cut 10mm steel

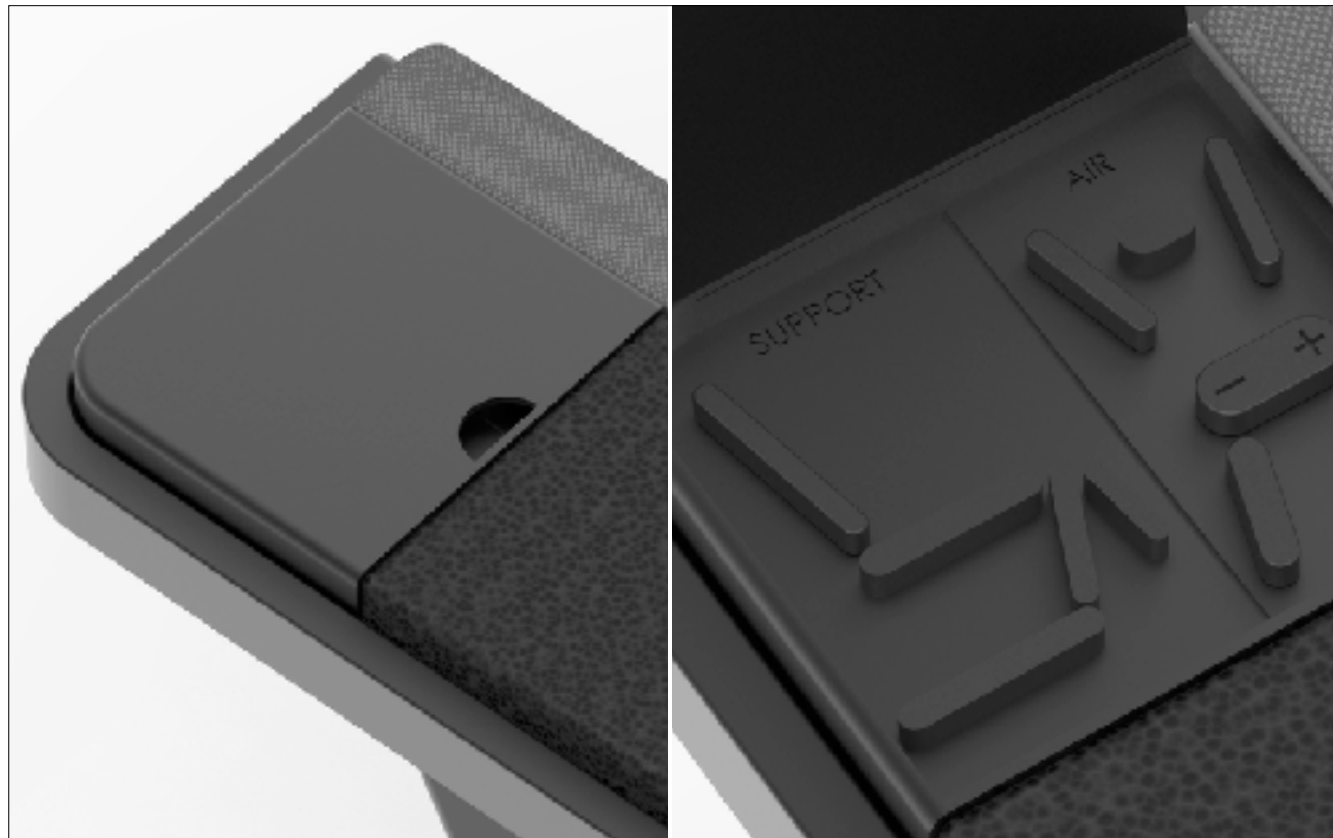
The backrest is made from water cut steel. And by bending it into shape, it gets both strength and stability

the footrest is also made in this manner.



bent extruded steel profile

The contrast between the thin watercutted steel and the wide extruded profiles in the legs, gives the design richness.



Controller

I haven't worked a lot with the controller of the chair, but this is an illustration of how it could look like.



Thank you

Thank you :)