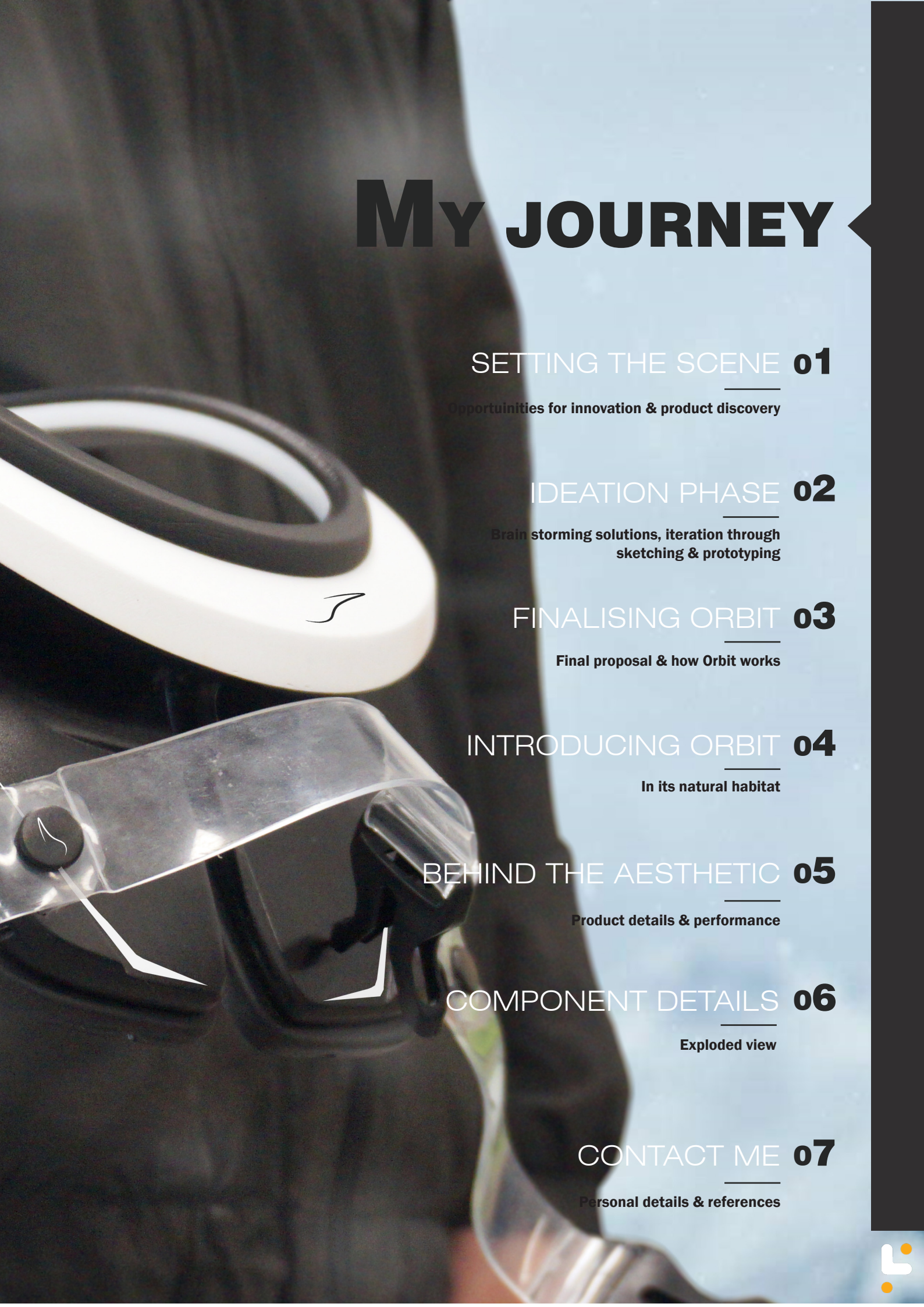

ORBIT



My journey

10 million+ people worldwide ski and snowboard every year

The **head** and **neck** are involved in over **20%** of all injuries in skiing and snowboarding.

Wearing an **open-faced helmet** does **not increase** the risk of suffering an injury in the **neck area** as it mainly covers the top and sides of the head.

The **weight** of the helmet on children aged 11 years and under can cause a **more fatal neck injury**. The weight behind this could end up causing an injury to the neck as well as the head.

Neck injuries, such as **whiplash** and **concussion** can take **3 months** to recover from. For broken bones, **surgery** is required and is expensive.

01.

Casual skiing -

User is enjoying skiing at this moment in time. They are not expecting a incident to occur at any time period, therefore not preparing for a fall and all movements will be sudden.

02.

Incident -

Sudden incidents could be due to loss of control or collisions Via other riders on the slopes. Speed, weight, weather conditions and other riders are all potential factors towards a life changing incident.

03.

Impact -

Whether falling to the side or on their front, potential objects can restrict movement with a followed momentum, and at high speeds if the impact is to the head, the neck could be in a life threatening condition due to an extensive movement from impact.

SETTING THE SCENE 01

Helmet & goggles -
The latest technology is included within the latest helmets and goggles on todays ski market. Used to protect the head and eyes respectively.

Neck support -
No existing neck support for skiers wearing an open faced helmet.
*Opens **new** product market and proposal outline*

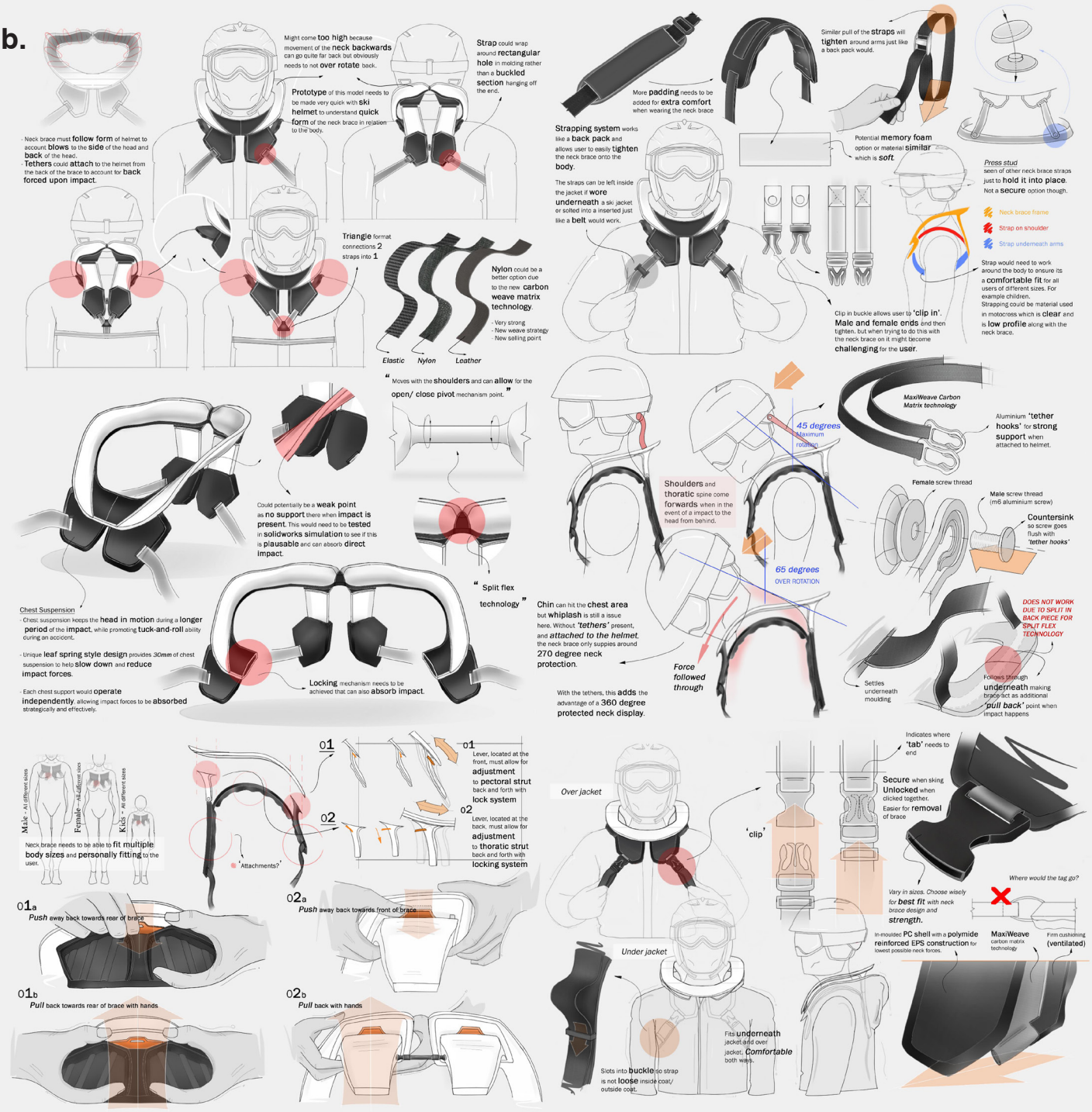
Elbow support -
Rarely used within skiing. Majority are strapped around the elbow area with velcro as a fastening feature. Normally worn when beginning to ski and with the less experienced riders

Gloves -
Used a lot of the time when skiing due to cold weather conditions. If there was an incident where the rider does fall over and are close to other riders, gloves also protect hands and fingers from impact and abrasion damage.

Knee support -
Rarely used within skiing but more so than elbow supports due to knees taking a lot of weight and pressure through changing of direction and time duration spent on lower body. Majority are strapped around the knee area with velcro as a fastening feature. Normally worn when beginning to ski and with the less experienced riders.

2a.

2b.


Might come too high because movement of the neck backwards can go quite far back but obviously needs to not over rotate back.
Strap could wrap around rectangular hole in molding rather than a buckled section hanging off the end.
Prototype of this model needs to be made very quick with ski helmet to understand quick form of the neck brace in relation to the body.
- Neck brace must follow form of helmet to account blows to the side of the head and back of the head.
- Tethers could attach to the helmet from the back of the brace to account for back forced upon impact.
Triangle format connections 2 straps into 1.
Nylon could be a better option due to the new carbon weave matrix technology.
- Very strong
- New weave strategy
- New selling point
Elastic
Nylon
Leather
More padding needs to be added for extra comfort when wearing the neck brace
Similer pull of the straps will tighten around arms just like a back pack would.
Strapping system works like a back pack and allows user to easily tighten the neck brace onto the body.
Potential memory foam option or material similar which is soft.
The straps can be left inside the jacket if wore underneath a ski jacket or soften into a inserted just like a belt would work.
Press stud
seen of other neck brace straps just to hold it into place. Not a secure option though.
Neck brace frame
Strap on shoulder
Strap underneath arms
Strap would need to work around the body to ensure its a comfortable fit for all users of different sizes. For example children.
Strapping could be material used in motocross which is clear and is low profile along with the neck brace.
Clip in buckle allows user to 'clip in'. Male and female ends and then tighten, but when trying to do this with the neck brace on it might become challenging for the user.
"Moves with the shoulders and can allow for the open/ close pivot mechanism point."
Could potentially be a weak point as no support there when impact is present. This would need to be tested in solidworks simulation to see if this is plausable and can absorb direct impact.
"Split flex technology"
Chest Suspension
- Chest suspension keeps the head in motion during a longer period of the impact, while promoting tuck-and-roll ability during an accident.
- Unique leaf spring style design provides 30mm of chest suspension to help slow down and reduce impact forces.
- Each chest support would operate independently, allowing impact forces to be absorbed strategically and effectively.
Locking mechanism needs to be achieved that can also absorb impact.
45 degrees
Maximum rotation
MaxiWeave Carbon Matrix technology
Aluminium 'tether hooks' for strong support when attached to helmet.
Shoulders and thoratic spine come forwards when in the event of a impact to the head from behind.
Female screw thread
Male screw thread (m6 aluminium screw)
Countersink so screw goes flush with 'tether hooks'
65 degrees
OVER ROTATION
Chin can hit the chest area but whiplash is still a issue here. Without 'tethers' present, and attached to the helmet, the neck brace only suppies around 270 degree neck protection.
Force followed through
DOES NOT WORK DUE TO SPLIT IN BACK PIECE FOR SPLIT FLEX TECHNOLOGY
Settles underneath moulding
Follows through underneath making brace act as additional 'pull back' point when impact happens
With the tethers, this adds the advantage of a 360 degree protected neck display.
Male - All different sizes
Female - All different sizes
Kids - All different sizes
Neck brace needs to be able to fit multiple body sizes and personally fitting to the user.
'Attachments'
01
Lever, located at the front, must allow for adjustment to pectoral strut back and forth with lock system
02
Lever, located at the back, must allow for adjustment to thoratic strut back and forth with locking system
01a
Push away back towards rear of brace
02a
Push away back towards front of brace
01b
Pull back towards rear of brace with hands
02b
Pull back with hands
Over jacket
Under jacket
'clip'
Indicates where 'tab' needs to end
Secure when sking Unlocked when clicked together. Easier for removal of brace
Where would the tag go?
Vary in sizes. Choose wisely for best fit with neck brace design and strength.
In-moulded PC shell with a polymide reinforced EPS construction for lowest possible neck forces.
MaxiWeave carbon matrix technology
Firm cushioning (ventilated)
Fits underneath jacket and over jacket, Comfortable both ways.
Slots into buckle so strap is not loose inside coat/ outside coat.

IDEATION PHASE 02

2c.

2a.

Brainstorming using post-it notes was a great process for me to develop my understanding of my brief and to quickly overcome problems that are raised early on; this process allowed me to be open minded by producing thumbnails and explore different opportuinities before producing detailed sketches defining the product.

2b.

Using Sketchbook Pro allowed me to generate high quality sketches which portrayed my thinking accurately. This made clear to me how the product experience from an early stage would be interacted with and enabled me to develop details and features which would impact the whole user experience in a positive way.

2c.

Prototyping development models in full size allowed me to get hands on feedback from potential users and develop the neck brace further to a finialised design. In addition, with the mechanisms working alongside a similar appearence to the proposed design, it allowed me to fully understand the usability and ergonomical properties within the neck brace.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FINALISING ORBIT 03


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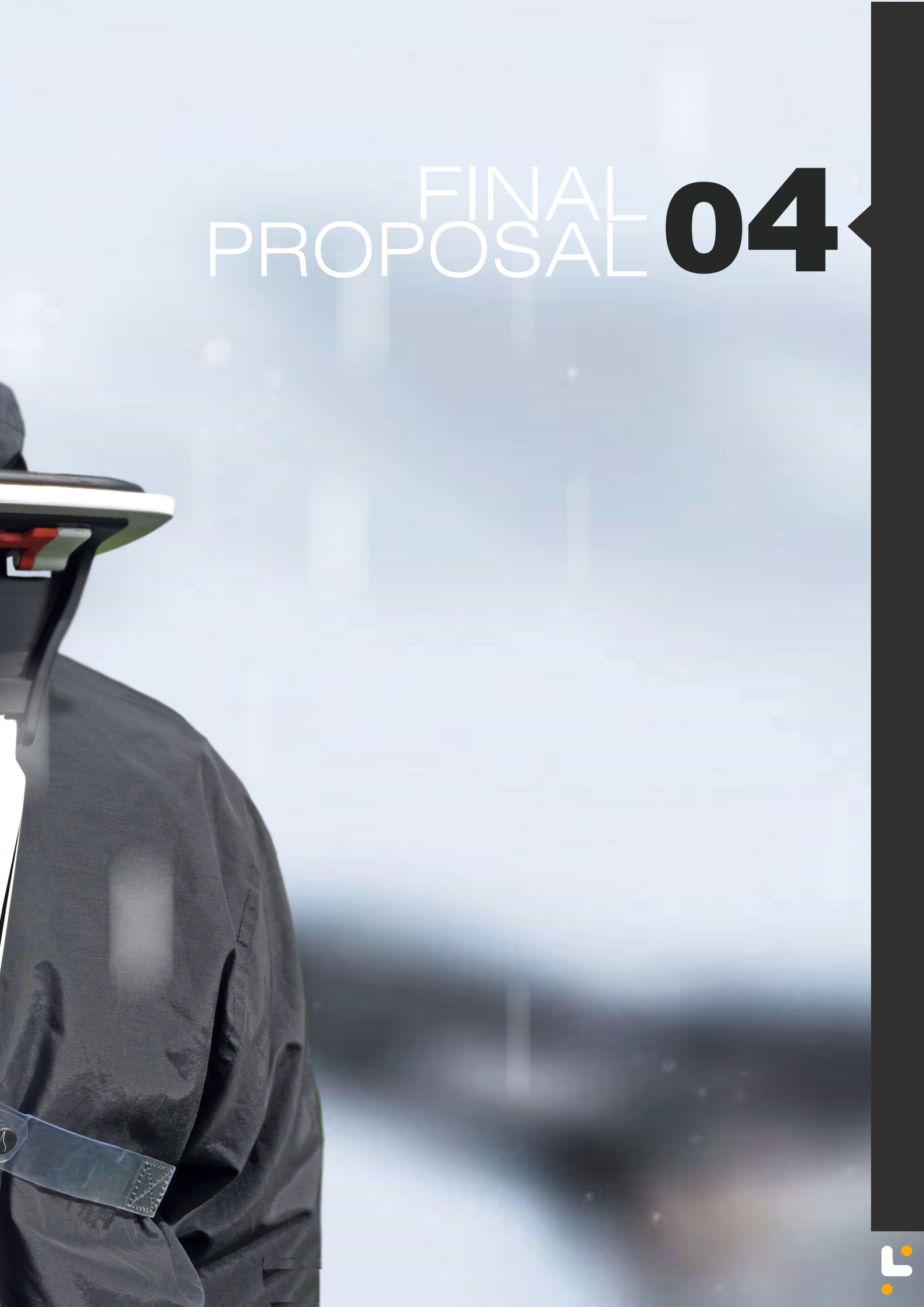
FINAL PROPOSAL 04



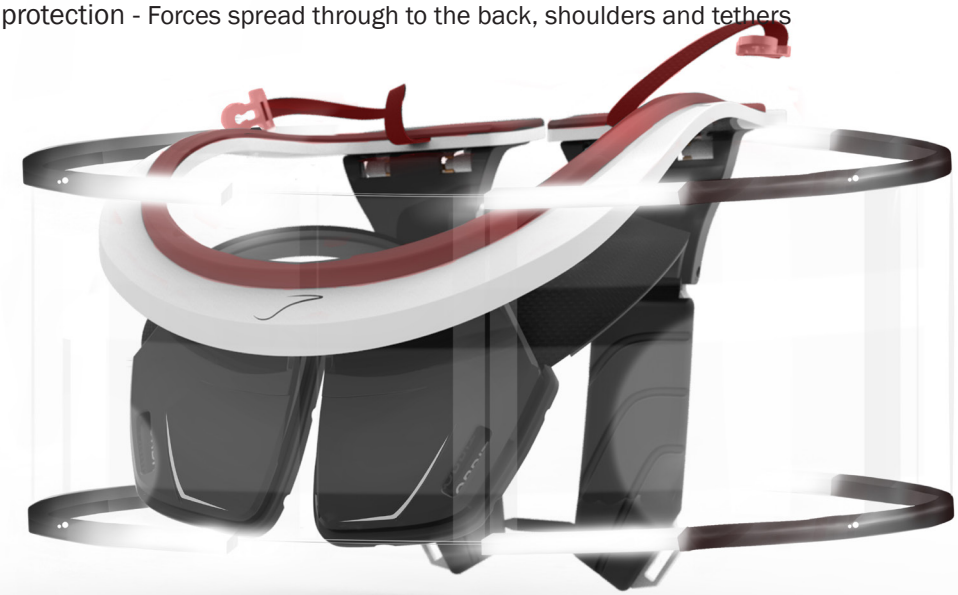
Split flex frame technology - Mimics the movements of the body

Thoratic adjustments - Foldable and fits any sized individual

Strapping system - Press stud and buckle

PRODUCT DETAILS 05

360 degree protection - Forces spread through to the back, shoulders and tethers



Impact - Hyper Extension, Lateral Extension, Coupled Axial Loading and Hyper Flexion.

Main frame padding

In-moulded, high density PU foam,with PVC vinyl wrap for easy wipe surface

Main frame

Fibreglass reinforced polymer construction for lowest possible neck forces

'Orbit' split flex fra

Ultra flexible polymer s construction mimics na movements of the bod

Pectoral strut

Fibreglass reinforced polymer for added strength when force applied to thoratic spine area

Pectoral strut padding

In-moulded, high density PU foam,with PVC vinyl wrap for easy wipe surface

Woven strap

High quality woven strap adds great strength

Strap padding

Neoprene provides and high resistance of very cold temper suited to ski condit

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COMPONENT DETAILS 06

‘Clip-in’ lever

Polypropylene lever ‘clips’ onto main chassis to stop adjustment

‘Orbit’ wedge

Hard silicone rubber fix onto top of thoratic strut. Embossed branding

M4 bolt (15mm)

Solid aluminium black bolt (countersink) used for fixing and adjustment of thoratic strut

Thoratic strut

Fibreglass reinforced polymer for added strength when force applied to thoratic spine area

Thoratic strut padding

In-moulded, high density PU foam,with PVC vinyl wrap for easy wipe surface

Silicone split flex frame

Split-frame construction allows thoratic struts to not split when straps are tightened

comfort
e to water
ratures
ions


Weldze

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Achievements:
RSA 2019 - Shortlisted (TBA)

core

DIIP 2019 - Shortlisted (TBA)

AIR

Statement:
A motivated, passionate and well-rounded product designer with a keen interest in the strategic process of a product's development and finalisation.

As a Product Designer, I'm a problem solver at heart and strive to deliver the most effective solutions at the highest standards.
I have gained a brilliant understanding of modern design language and the importance of end user needs.


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