- Louis Farnsworth
  BA Hons Product Design

- Achievements
  DIIP 2019 (Shortlisted - TBA)
  RSA 2019 (Shortlisted - TBA)

- Aspirations
  Product Designer/ Graphic Designer

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

ORBIT

Ensuring 360 degree neck protection to skiers at all ages and abilities

10+ million people enjoy snow sports every year. Although they can be safe, unexpected injuries may occur with improper preparation, varied snow conditions or poor judgment.

Protection and safety for skiers is very well established now helmets are an item required to wear on the head, and clothing is similarly improving. Every day accidents happen, and, in some cases, the neck becomes vulnerable where the skier could end up experiencing life-threatening injuries resulting in paralysis and death.

The innovation opportuinites became apparent when thorough research was undertaken into injuries within snow sports online, reading into case studies.

On average, 'the head and neck are involved in over 20% of all injuries' within skiing and snowboarding; This allowed a further insight into the helmet and how the impact to the head could also lead to a injury to the neck.

The further in-depth insight ensured that 'wearing a helmet does not increase the risk of suffering an injury in the neck area'. This is where the origins of 'Orbit' begin.

As younger individuals are taking part in sports and the ability of skiing and snowboarding advances rapidly, children are more at risk of a neck injury. '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. It was important that all ages and abilities would be considered within this project proposal.

After conducting these insights, as 'Orbit' would be a safety/ medical brace to prevent a neck injury, it was also important to understand the direct impact a ski brace would have in regards to medical care and money.

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

This allowed me to confirm that realistically there was a need for neck protection to prevent these factors from happening.

Tackling these issues lead to a survey to try and understand whether today's market and skiers would wear and buy neck protection when taking part in skiing activities and also to understand why there wasn't exisiting neck protection/ support available for this sport.

It became apparent that skiers would be interested in wearing neck support, but only if it was proven to function correctly and physically,

whilst creating low profile and lightweight properties which would still allow users to ski properly and not restrict movements.

Through the process of ideation, braining storming using post-it notes was a great process to quickly develop a understanding of the project proposal and quickly overcome problems identified and raised early on, this process allowed me to be open minded and explore different paths and opportuinites thatcould resolve the issues upon neck protection.

High quality sketches were then generated which displayed detailed and accurate thinking. This allowed for a clear visualised product experience from a early stage which enabled crucial development to features and properties before taking a idea to CAD.

3D printing was a great service to allow a convertion from a CAD model into hands-on, full size prototypes. This allowed for successful user feedback and usability to a fully proposed design where the mechanisms were functional and mechanical.

This allowed for innovative solution ‘Orbit’. Orbit offers its protection by limiting the movement of the head in the event of a crash. It does this by countering the extreme movements of the neck by allowing it to not extend over a certain stretch the neck is not used to from generalised, daily rotational movements. These extreme movements of the neck that could result in a life threatening injury are as follows: Hyper Extension, Lateral Extension, Coupled Axial Loading and Hyper Flexion. Orbit prevents this by obsorbing the impact to the front of the head into the back of the brace and spreading the force across the back and shoulders.

With an impact to the front, two tethers attach onto a helmet. In the unfortunate event of an impact to the back of the head. the two tethers, made from a maxi-weave nylon will straighten out and ensure the neck doesn’t over rotate to 65 degrees. The tethers are the correct length to allow this, but also allow riders to move their head left and right to check over their shoulder.

The chosen materials aid Orbits hard wearing and rigid functionality, whilst equipting the highest quality visual appearence and weight. Fibreglass reinforced polymide is the material used for the main, solid components, which offers excellent functional strength ensuring great protection for riders.

The added comfort is obtained through the soft PU foam padding located on surfaces that make contact with the body and helmet. The padding is well ventilated to avoid the user resulting in being in a uncomfortable state or getting too hot.

Throughout the product, adjustable features are present which supports riders in ensuring the optimum and perfect fit for any body structure. For a secure fitting, a press stud and elastic strapping system is used to keep the brace in place, where it should be.