

# Speculative Design

PGDip in User Experience Design  
CA2 Speculative Design Project

👉 Alan Dilleen N00193571

👉 Barbara Bugalska N00203452

👉 Plamena Atanasova N00200121



It's time to put the seat belt on and go.

When people begin to see what's possible, it's going to get them very excited—like we are, like we've been.

-Tim Cooke, Apple CEO interview with Bloomberg

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# Signal

 Augmented Reality

 GPS

 Lenses

# Augmented Reality (AR)





# Augmented Reality

Is a system that:

☞ combines real and virtual objects in a real environment

☞ aligns real and virtual objects with each other

☞ runs interactively, in three dimensions, and in real time



## Augmented Reality

allows people to process the physical and digital simultaneously, improving our ability to: rapidly and accurately absorb information, make decisions, and execute tasks quickly and efficiently.

Porter and Heppelmann, 2021

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# How does AR work?

Three key AR technologies

👉 **Display** Head attached, Hand-held, Spatial

👉 **Tracking** Users positions and orientation, 3D registration

👉 **User Interface** Tangible, Gesture, Voice

These technologies are supported by AR development toolkits and the AR cloud.

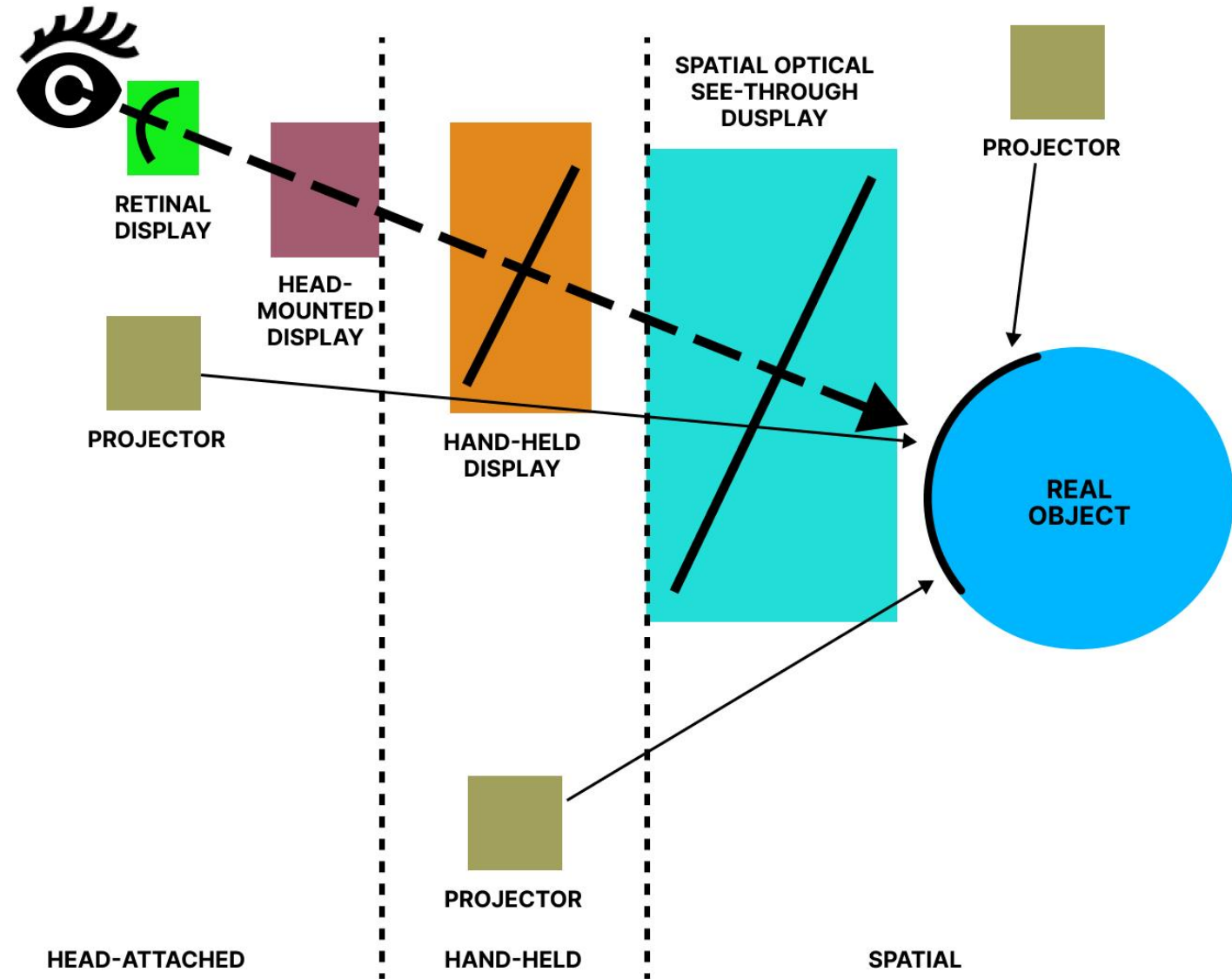


Fig. Visual display techniques and positioning, Bimber & Raskar (2006)



# Application

- 👉 Personal information systems, including navigation and touring
- 👉 Industrial and military, including design, assembly, maintenance and combat simulation
- 👉 Medical, including live overlays of ultrasound, CT and MRI scans
- 👉 Entertainment, including gaming and sports broadcasting,
- 👉 Office, including collaboration
- 👉 Education and training



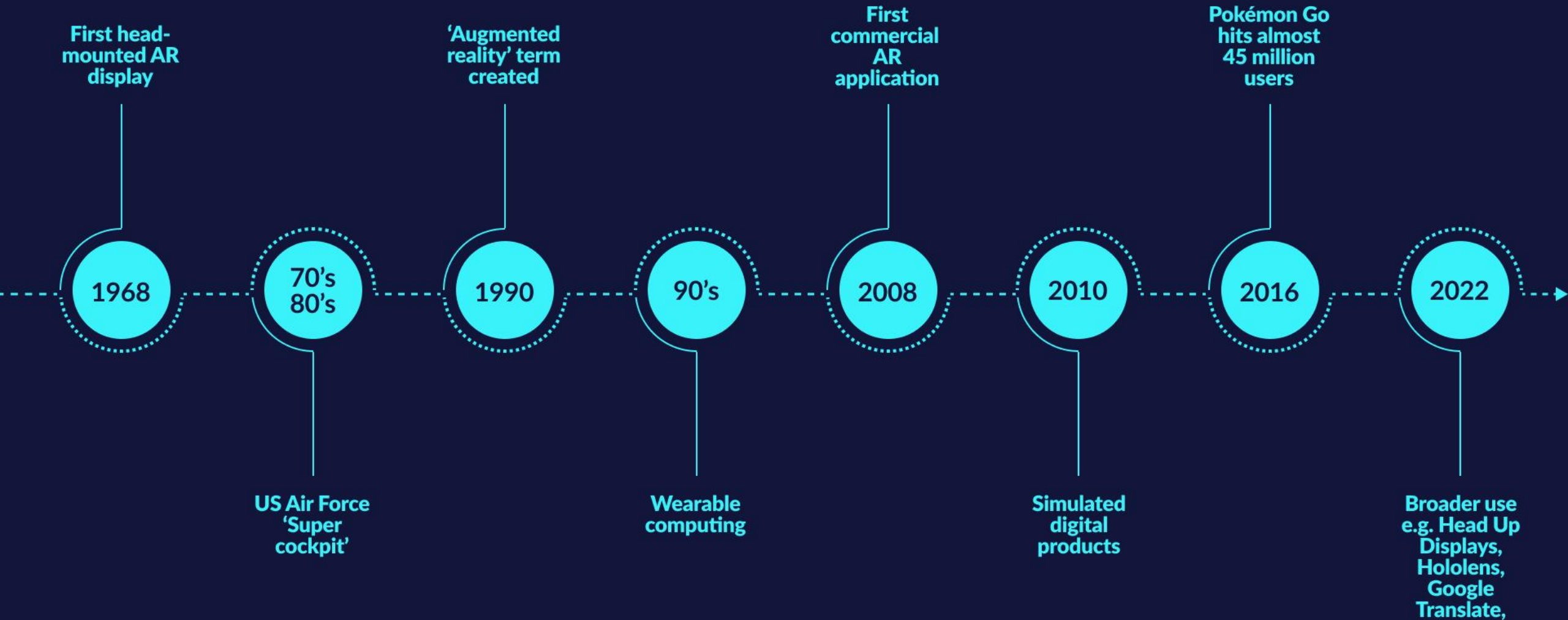


# Limitations

- Portability
- Tracking calibration
- Depth perception
- Overload and over-reliance
- Social acceptance



# A Brief History of AR



Source: Javornik (2016), van Krevelen & Poelman (2010)

In 10–15 years from now, complimented with advancements in technology, Augmented Reality will be a normal part of how we work, learn and connect.

- Bernard Marr

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# Global Positioning System (GPS)



# GPS

Global Positioning System - is a satellite constellation supporting highly accurate **positioning**, **navigation** and **timing** (PNT) measurements worldwide.

It is available for use by anyone worldwide.



GPS supports applications worldwide that need a precise position, reliable and safe navigation, tracking and monitoring an object's movement, surveying and mapping an area, or timing within a billionth of a second.

Source: (Hexagon, n.d.)

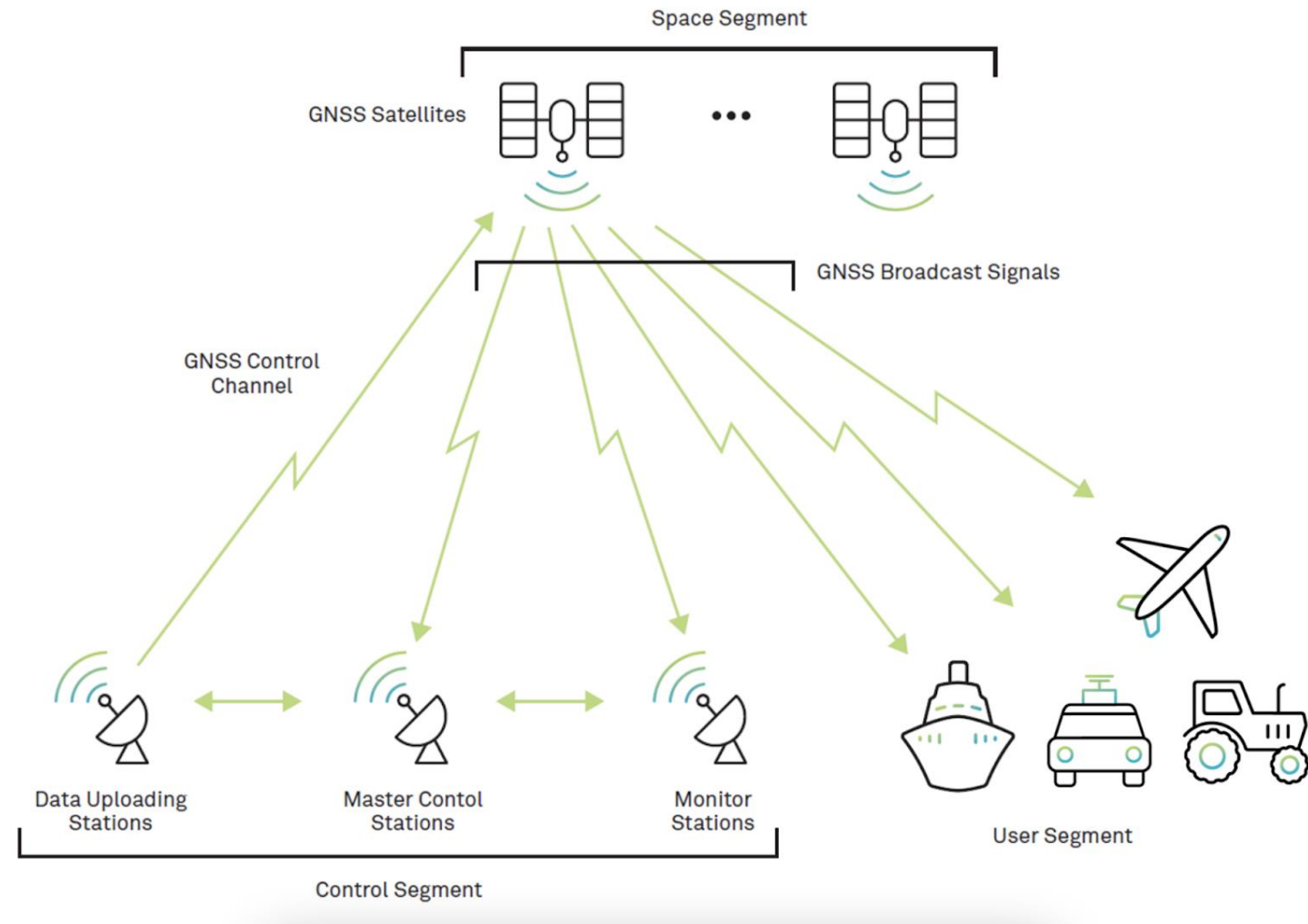
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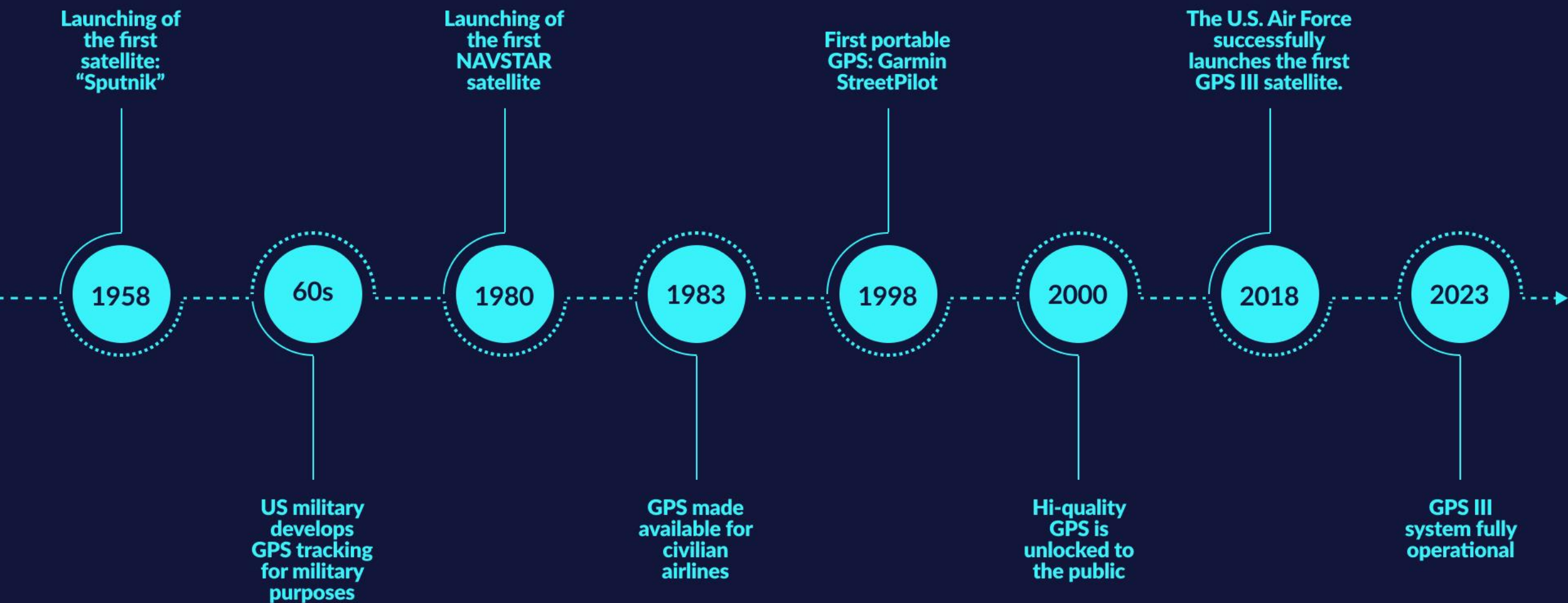
# How does GPS work?

GPS includes three main segments:

- 👉 **Space segment** - over 30 satellites in orbit broadcast radio signals to control and monitoring stations on Earth and directly to users
- 👉 **Control segment** - ensures GPS satellites are healthy, orbiting correctly and have accurate atomic clocks on board. These stations are integral to the overall health and accuracy of the GPS constellation
- 👉 **User segment** - includes everyone relying upon GPS satellites for PNT measurements. Many applications use GPS for high precision positioning and accuracy around the world.



# A Brief History of GPS Tracking



Source: (Hampton, 2017)

In 10-15 years from now, GPS receivers will be able to collect location data from multiple global navigation satellite systems at once and use that info to provide drop-dead accurate tracking (GPSIIIF).

Source: (Hodgkins, 2019)

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# Smart Contact Lenses



# Smart Contact Lenses

A new generation of contact lenses built with microelectronics.

Two major companies currently working on the development of AR smart contact lenses are:

👉 Mojo Vision

👉 InWith

Source: (Winkler, 2021)

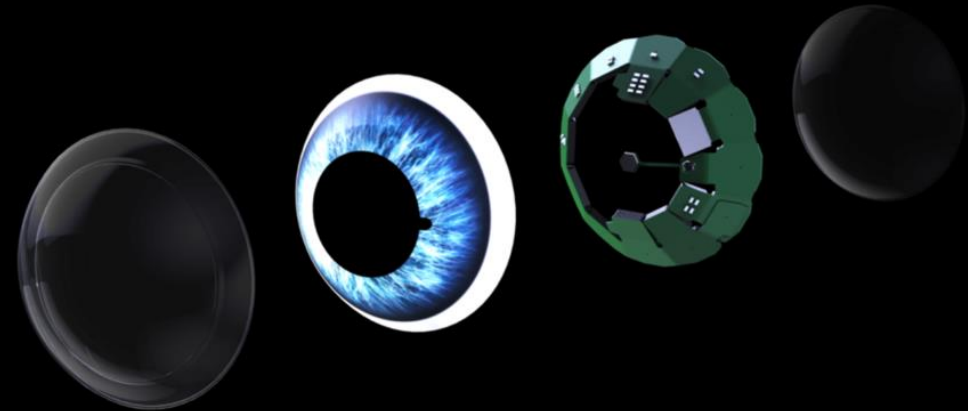


# Mojo Lens

Founded by veterans from Apple, Google, Microsoft and Amazon.

Mojo Vision have put 14K pixels-per-inch microdisplays, wireless radios, image sensors, and motion sensors into contact lenses that fit comfortably in the eye

They are working with the FDA in the US to get approval for their smart contact lenses.





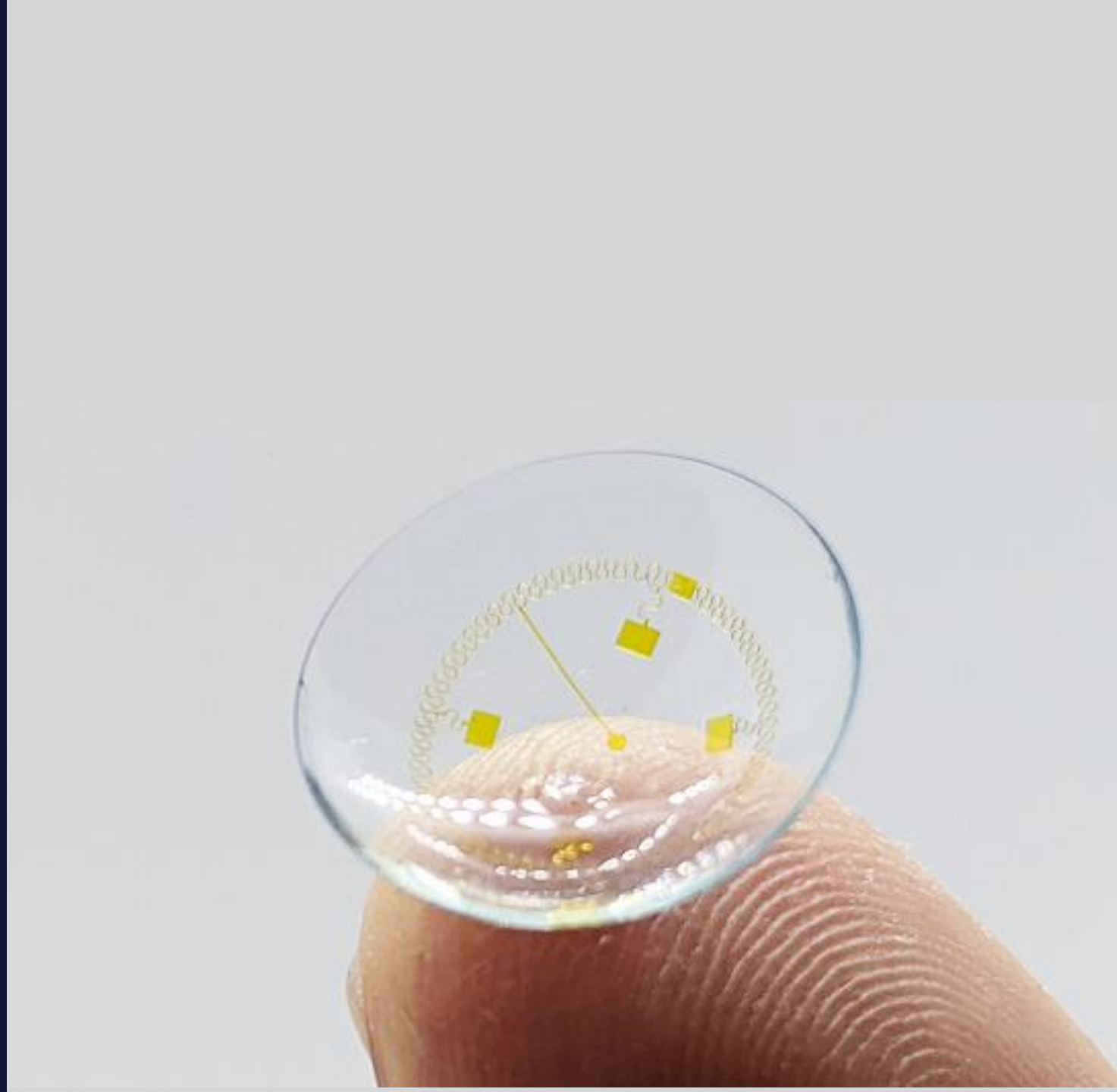
# InWith Lens

Working with Bausch and Lomb.

Combining highly biocompatible materials with 3D-flexible microelectronics embedded into molded hydrogel devices (“smart biology”).

The augmented lens will have the ability to harvest energy from the blinking of the eyes.

Source: (InWith Says It's Developed World's First Soft Electronic Contact Lens, 2022)

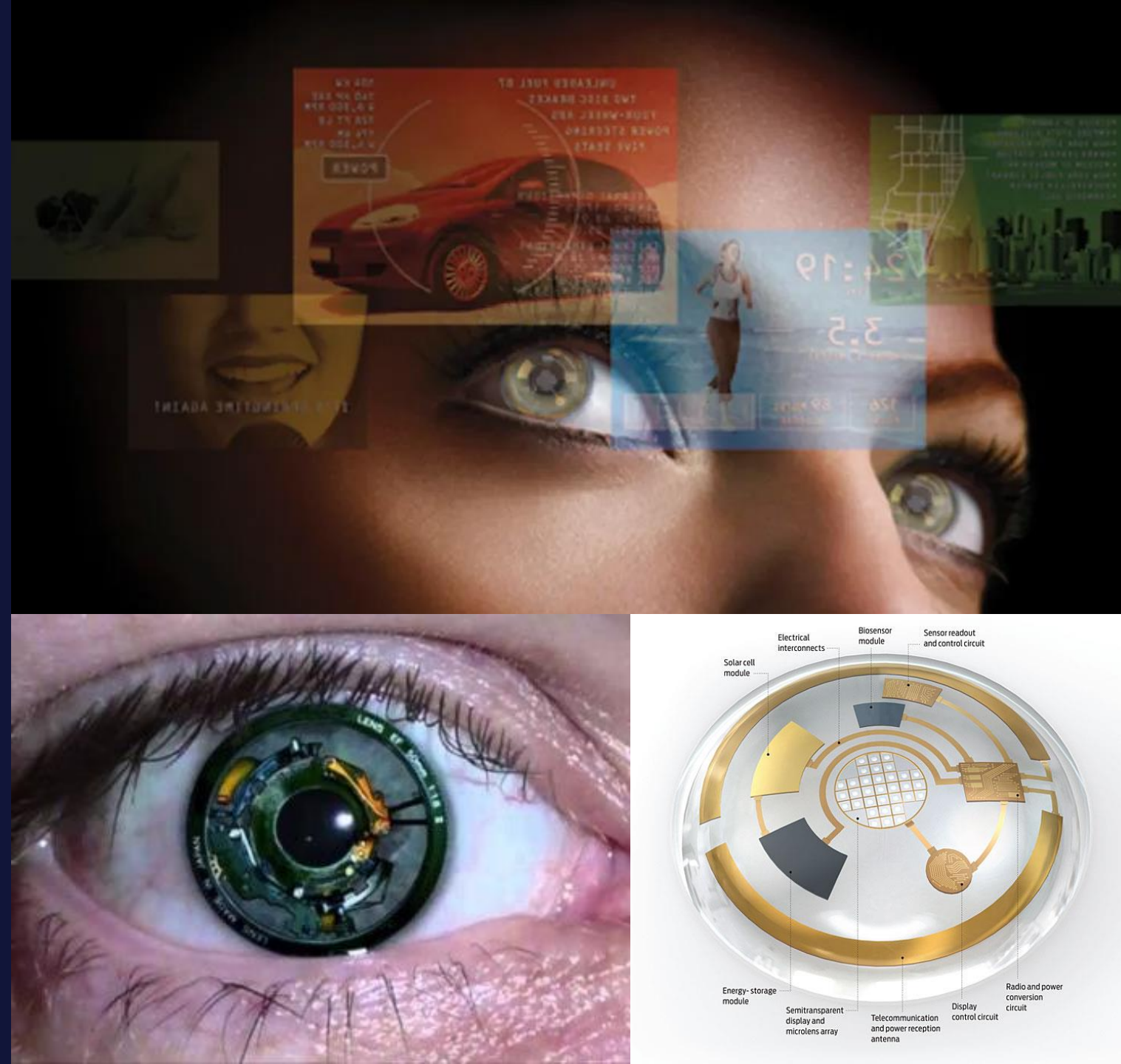


# How do Smart Contact Lenses work?

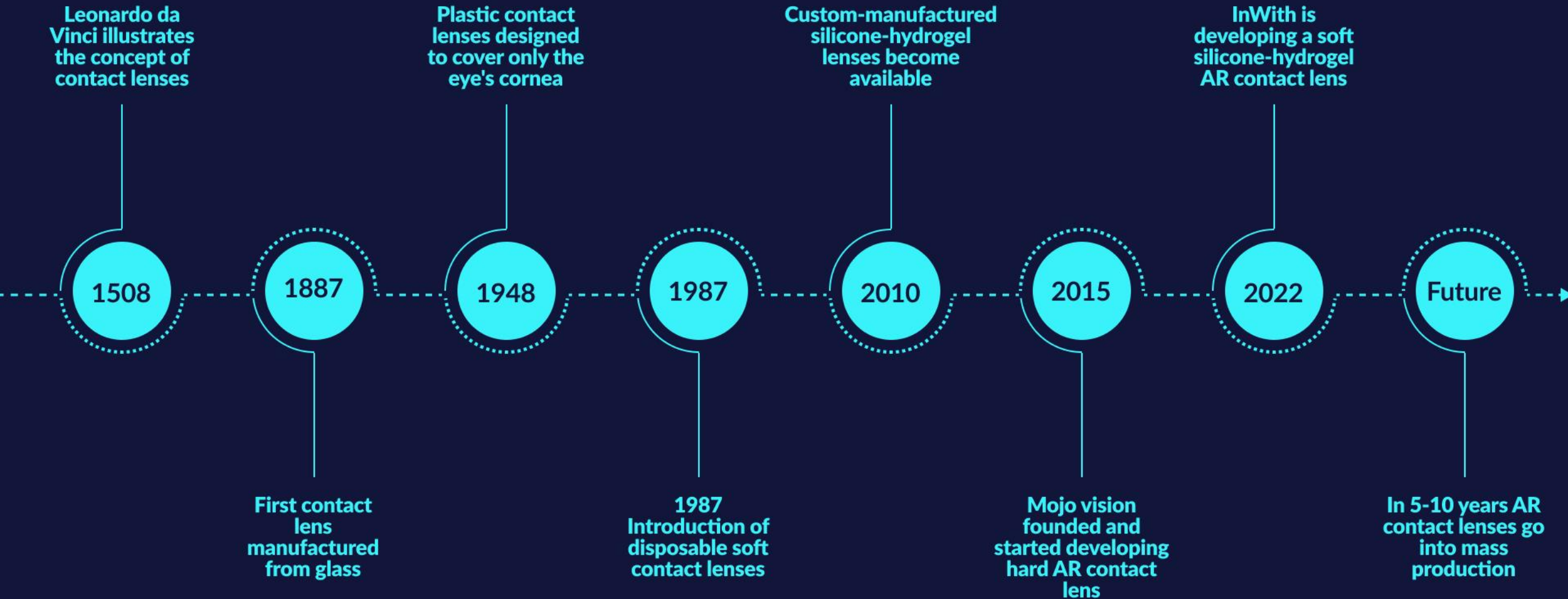
Smart contact lenses bring wearable technology to a new level

- ☞ The **display** projects directly on to the retina
- ☞ An **antenna** is used to send and receive data
- ☞ The interface is controlled by **eye movements**
- ☞ **Bio-safe batteries** enable all-day wear

Source: (Lakshmi Santhi & Sai Kumar, n.d.), (Parviz, 2009), (Pandey et al., 2010)



# A Brief History of Smart Contact Lenses



Source: (A Brief History of Contact Lenses, n.d.)

In 10–15 years from now, smart contact lenses will go into mass production providing a lightweight augmented reality experience without the need to wear glasses or a headset.

Source: (Apple Augmented Reality Lenses after 2030: Kuo, 2021)

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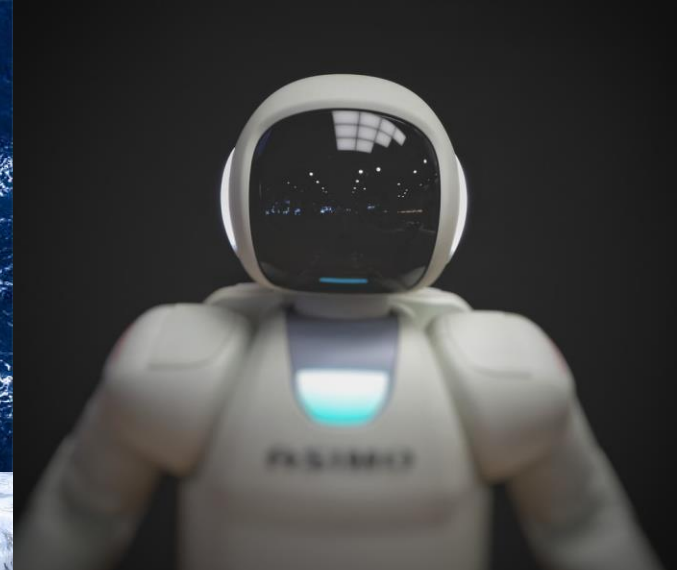




# World

- 👉 Carbon tax has made air fares more expensive
- 👉 AI and automation have caused a major displacement of workers
- 👉 Climate change has drastic effects on populations and resources
- 👉 There are rapid advancements in renewable energy
- 👉 People store and manage their personal data on their terms
- 👉 Self driving cars are widespread

Source: (European Parliament, 2017), (Symons & Bass, 2017)





# Need For Nature

People have an inherent, biological need for nature. The benefits of nature have a profound impact on our physical and mental wellbeing.

Spending time outdoors:

- 👉 Improves sleep quality,
- 👉 Reduces levels of stress hormones in the body,
- 👉 Protects against mood disorders and depression
- 👉 Lowers anxiety.

Source: (5 Health Benefits of Being in Nature, 2020)



# Hiking

Hiking has boomed in popularity in recent years. Millennials and Gen Z contributed to it enormously.

They prefer **experiences over material things**, hence their affinity for hiking around the country or the world versus, say, buying a house.

Source: (McManus, 2021), (What's Next in Travel: The Rise of Gen Z, Adventures and Conscious Dining, 2020)

The majority of Millennials and Gen Z prefer to spend their money on experiences over things.

Nature Experiences are the top trending holiday category globally among GenZ





# The Dark Side of Hiking

Hiking stimulates all sorts of things within us that are good and positive and foster health and wellbeing.

But it also carries many challenges and dangers. Many people are **unprepared and inexperienced** in navigating **unknown terrains**.

That leads to all sorts of problems, where the most common is people **getting lost**.

Source: (Heaney, 2022), (Kenny, 2018), (Climbers Warned to Prepare Properly after Rise in Rescue Incidents, 2021)



Mountain Rescue Ireland dealt with a total of 408 incidents in 2021, which resulted in 21 fatalities.

Finding lost or hurt people in the wild, rugged Irish mountains is no easy task.

Climbers warned to prepare properly after rise in rescue incidents

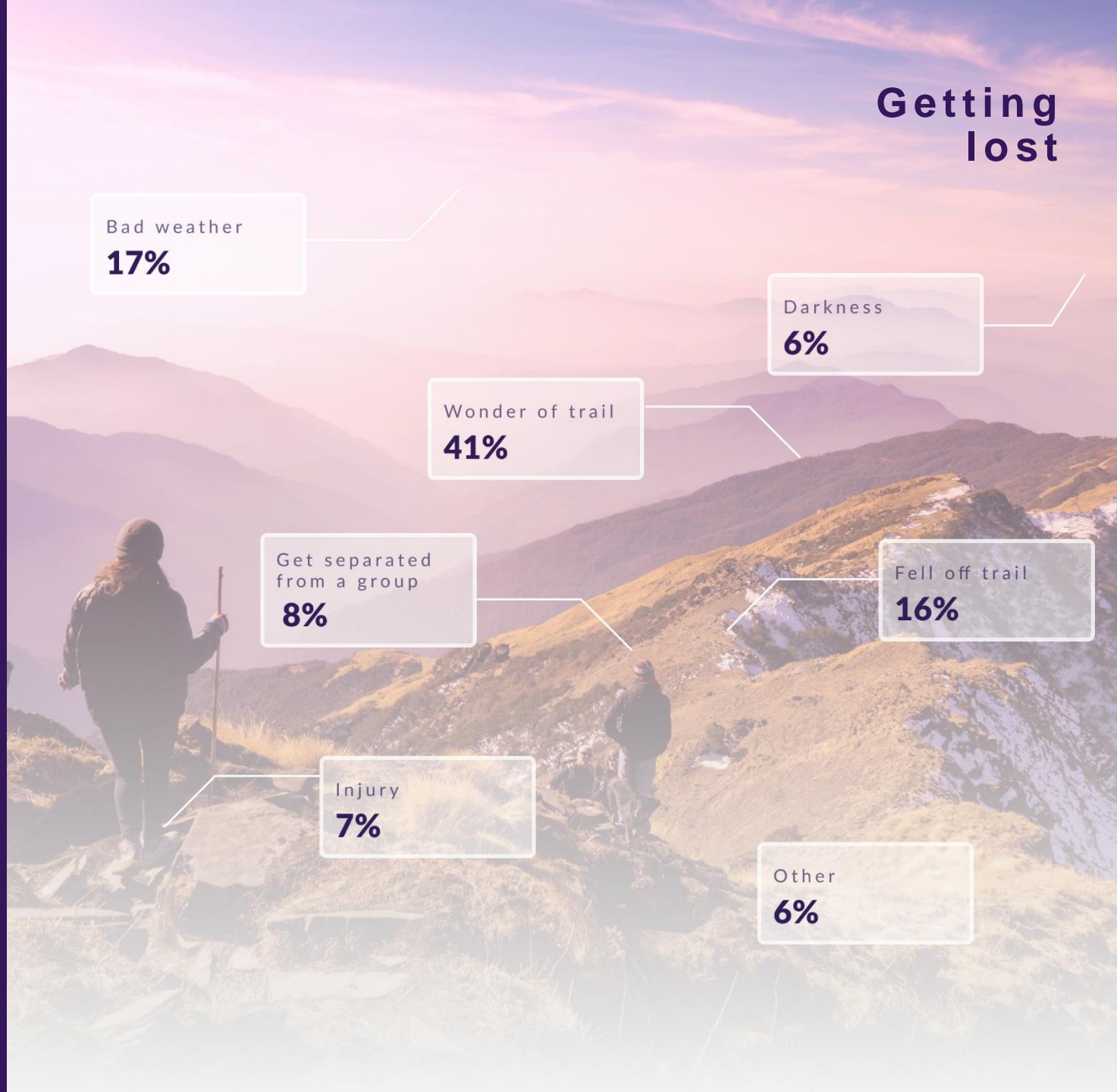
# Problem

According to research, **wandering off trail** is the number one reason, ahead of injury and bad weather, that **adult hikers require search and rescue**.

It's hard to say how many people have never been found...

Therefore, a good navigation and location system is a must to let people enjoy nature and keep them safe.

Source: (Safe & Found, n.d.)



# Persona & Problem Statement



# Persona

"Fill your life with experiences, not things. Have stories to tell, not stuff to show."

name

**Adam**

age

**35**

family

**Single**

occupation

**Product Director**

location

**Dublin**

tech skills

usage

skills level

professional

## Goals

- Enjoy hiking, and don't be afraid of getting lost.
- Do not expose your relatives to unnecessary stress and reassure them about your safety during outdoor activities
- Reduce the need for emergency services to a minimum
- Release everyday life stress and improve well being.

## Pain

What current problems does he have?

- Mountain rescue service is exceptionally expensive.
- He wants to explore unknown mountains but is reluctant because his mother is constantly worried about his safety after her eldest son goes missing and loses his life in the mountains.

What consequences are caused by this?

Feeling stressed and pressured worrying about the worst-case scenarios and not being able thoroughly to enjoy the outdoors.

## Gain

What would be a great outcome/success for him?

Using advanced navigation and location technology allows for a seamless outdoor experience, keeps people safe and does not use rescue services unnecessarily, which are limited and expensive.

How might he measure success?

- Successfully navigates any terrain and climb any mountain peaks in all weather condition.
- Always return home safely.
- Never use a rescue team.

## Likes

- Hiking
- Climbing
- Traveling
- Technology

## Motivations

- Safety
- Enjoyment
- Health
- Social

introvert

intuition

thinking

perceiving



When I go hiking in the mountains,  
I want to navigate with confidence,  
So I can have a good time and come back home  
safely.

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# ARHIKE

Advanced Navigation & Location System

Powered by **iLens**

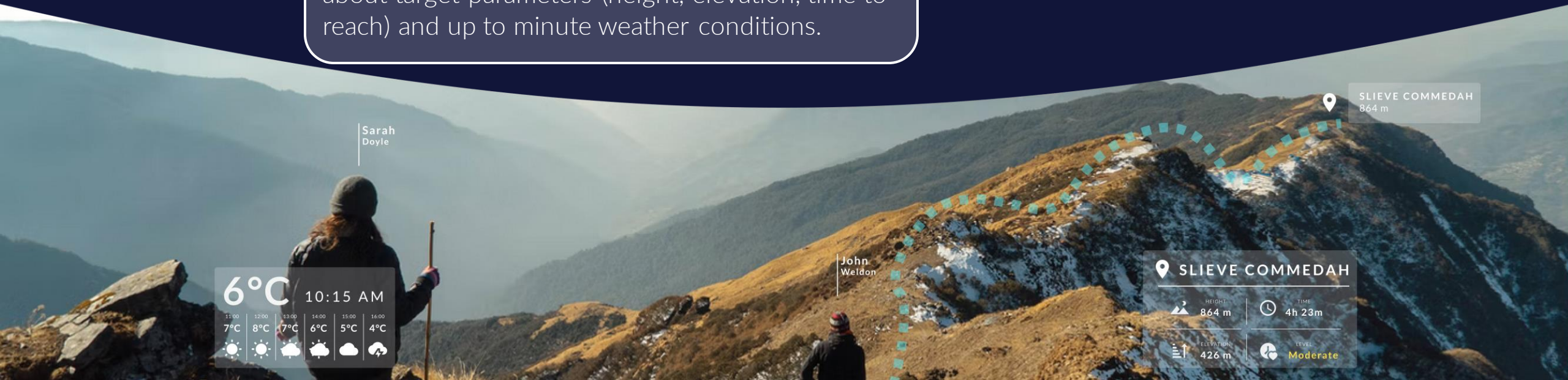
# What Is It?

Advanced navigation and location system for hikers and mountain rescue teams. It uses augmented reality, smart lenses, and drop-dead navigation systems to allow people to explore mountains without the risk of getting lost.

The lenses can be controlled via an app or with the users' eyes with build-in eye tracking in each lens.

It tracks the user's location, provides a clear path to selected targets, and keeps users informed about target parameters (height, elevation, time to reach) and up to minute weather conditions.

In addition, it tracks users' progress over time and provides recommendations for suitable hikes.



6°C 10:15 AM

11:00	12:00	13:00	14:00	15:00	16:00
7°C	8°C	7°C	6°C	5°C	4°C

Sarah  
Doyle

John  
Weldon

SLIEVE COMMEDAH

HEIGHT 864 m	TIME 4h 23m
ELEVATION 426 m	LEVEL Moderate

SLIEVE COMMEDAH  
864 m

# Who Makes/Sells It?

Smart contact lenses are in mass production. They provide a lightweight augmented reality experience used in almost every aspect of human life.

Apple dominate the market in smart lenses. However, other companies like Google, Microsoft, Samsung and Tesla are just behind them.

A private company creates AR Hiking software; however, data is stored on third-party cloud services and is accessible to insurance companies. Users must agree to share their data with their insurance company; otherwise, they are not covered in case of an accident.



# iLens



# Where Can You Get It?

Smart contact lenses can be ordered online for same day drone delivery.

The software can be downloaded via the Apple store or Google Play if using other companies' lenses.



# Benefits

👉 Safe and stress-free outdoor experience.

👉 Peace of mind for loved ones

👉 Lower insurance costs

👉 Reduced dependence / pressure on mountain rescue

👉 Improved availability of mountain rescue teams for real incidents.



## Impact on Users

 Empowered hikers

 Over reliance on technology

 Loss of traditional navigational skills

## Impact on Society

 The use of AR is widespread and ubiquitous

 Improved communication and connection including how we collaborate and share information

 Significant impact on how business advertise and market to customers



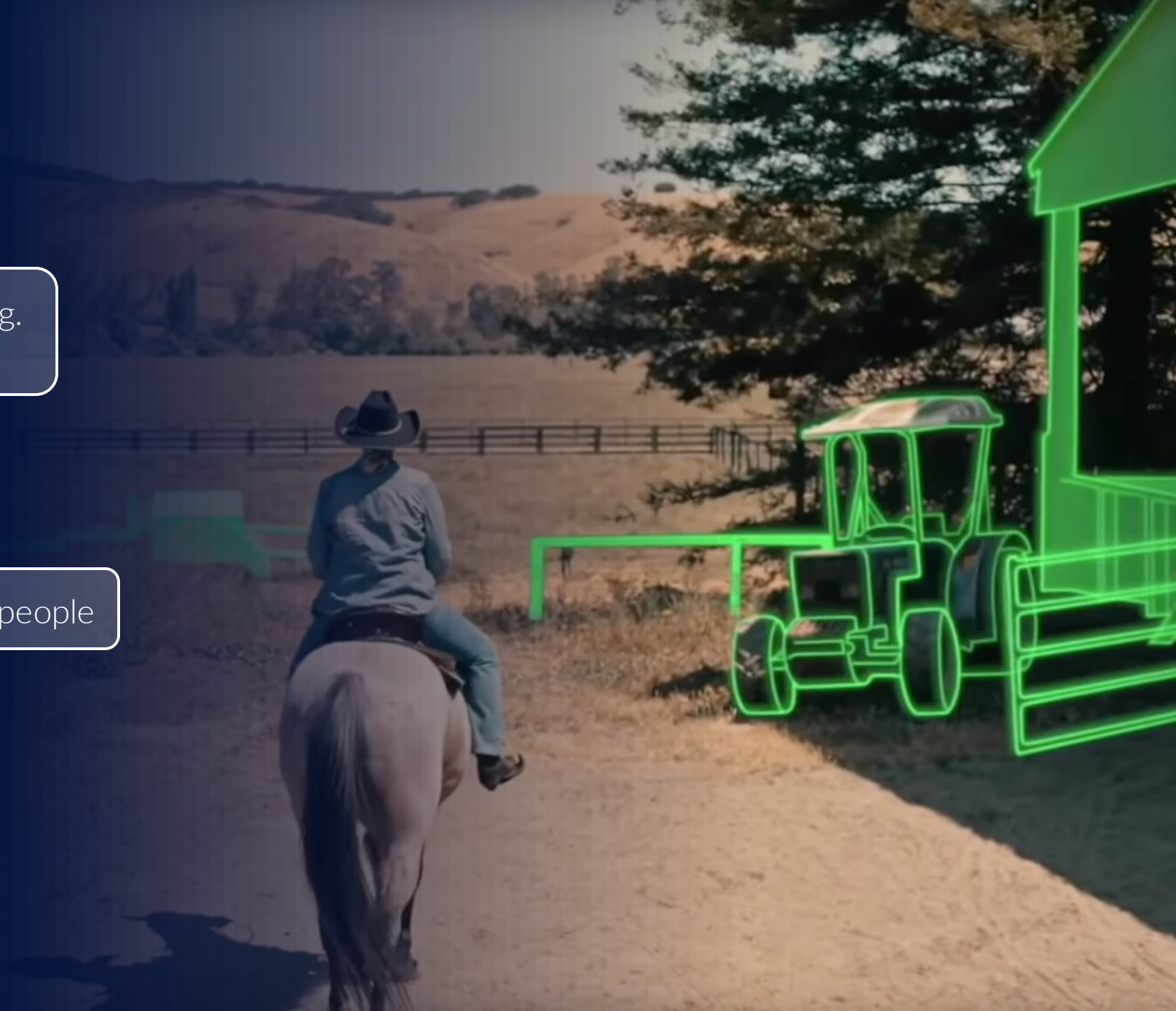
# Other Usage

👉 Other outdoor enthusiasts e.g. cyclists, runners, swimmers

👉 Tourists

👉 Visually impaired people

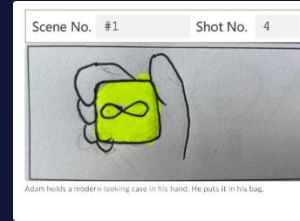
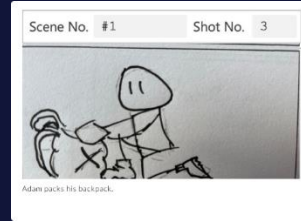
👉 Emergency services



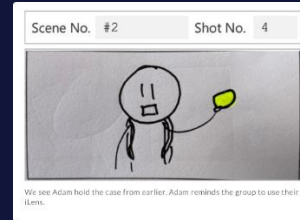
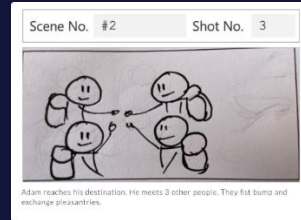


# Storyboard

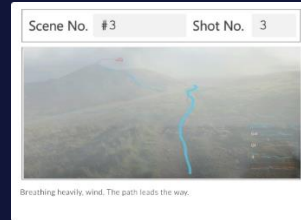
Wake up



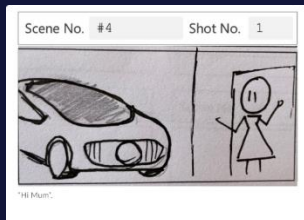
The climb



The rescue

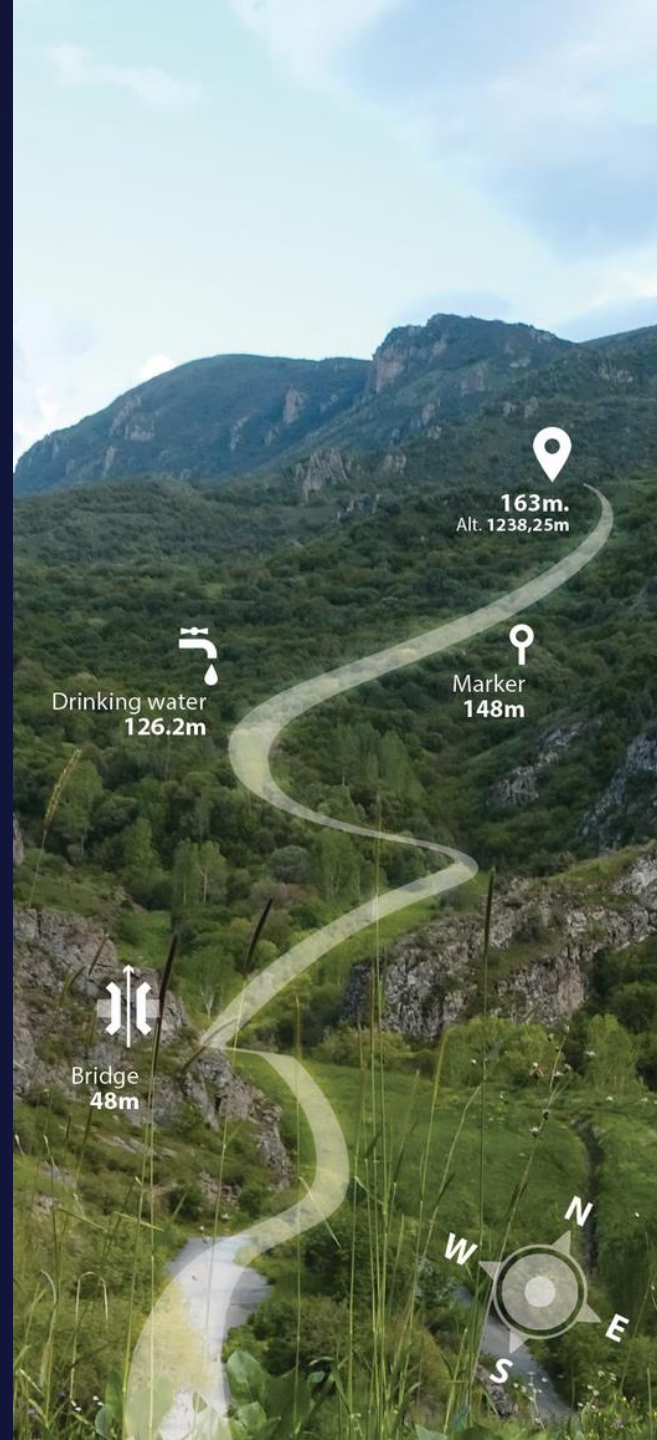


Home safe



# Design Inspiration

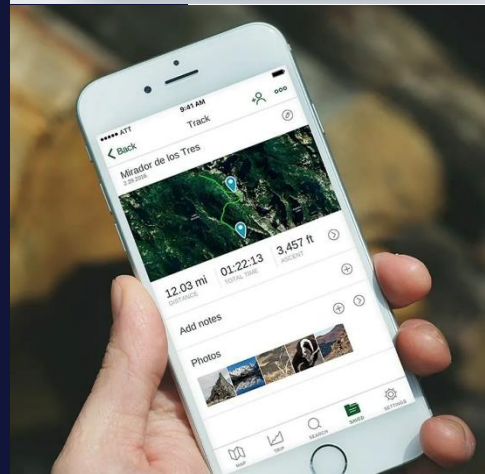
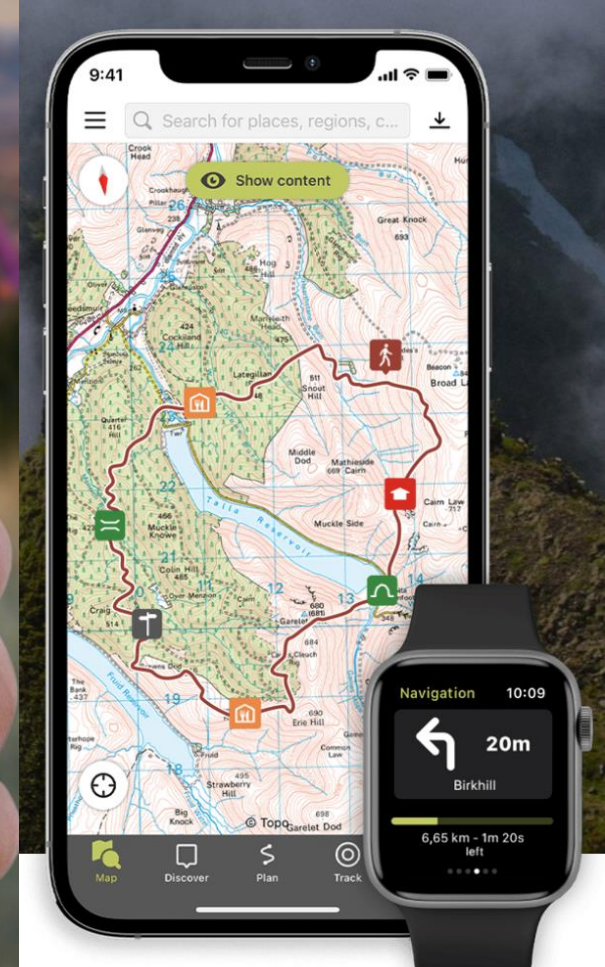
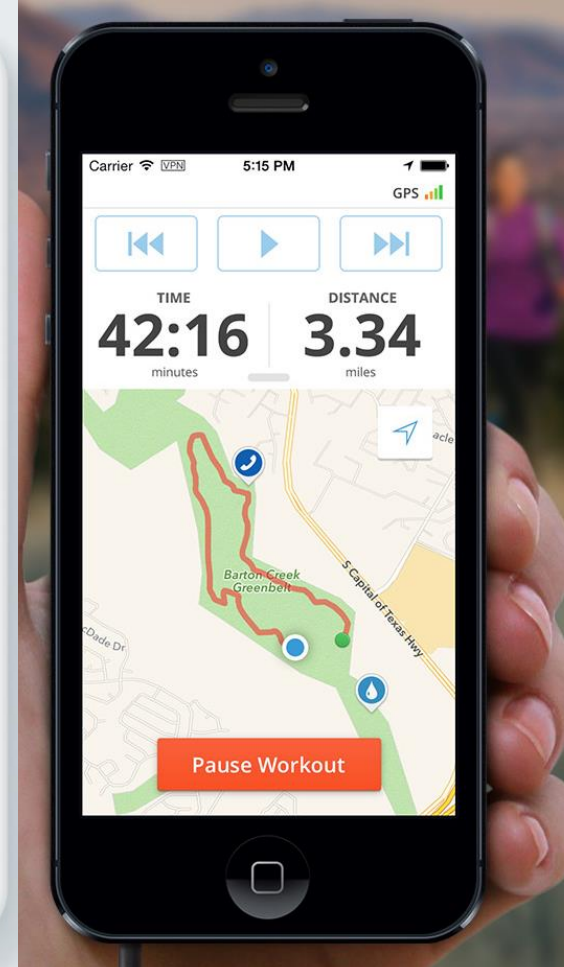
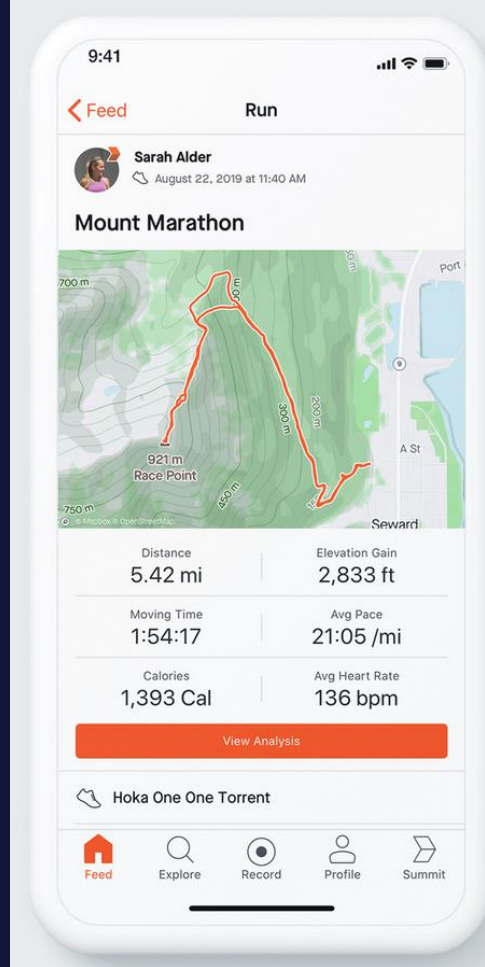
Augmented reality navigation, tracking and information display





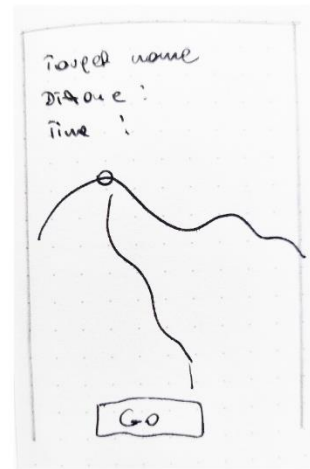
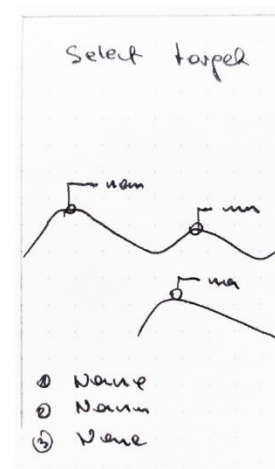
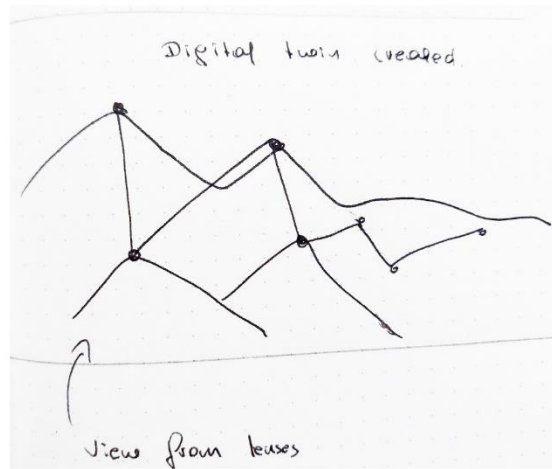
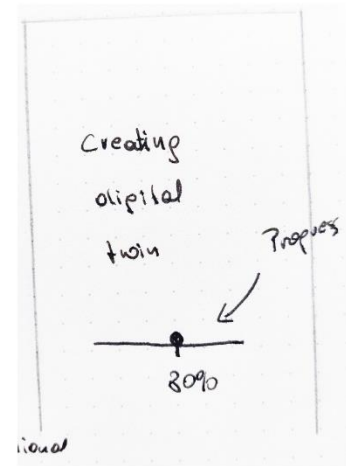
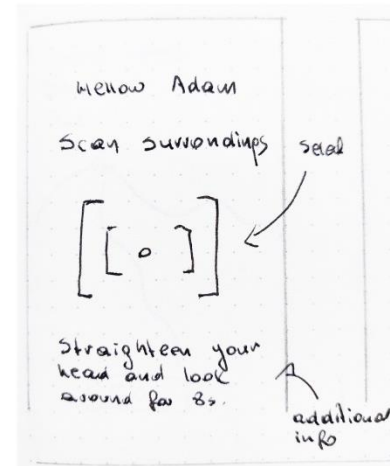
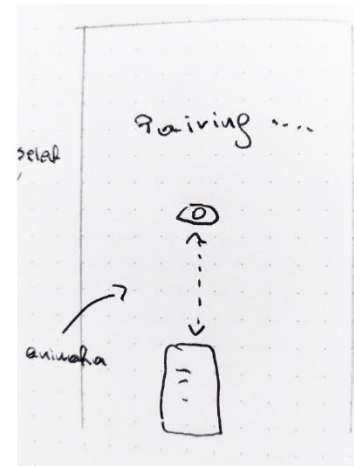
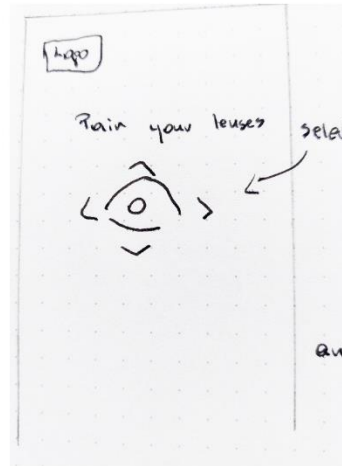
# Design Inspiration

Mobile app navigation



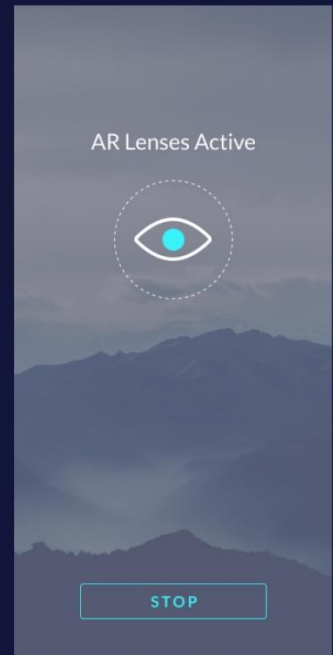
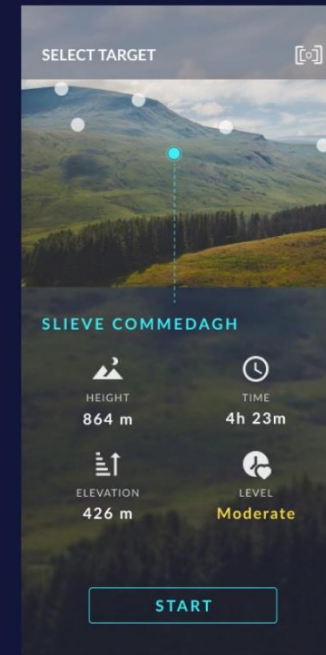
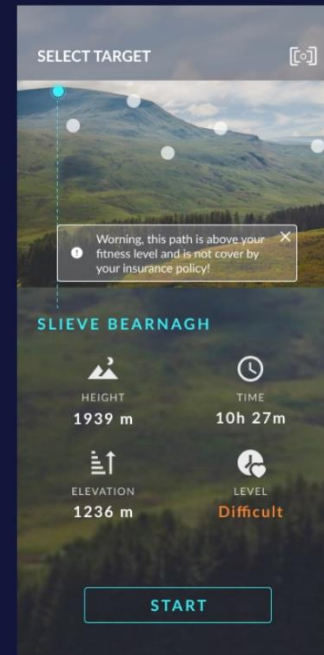
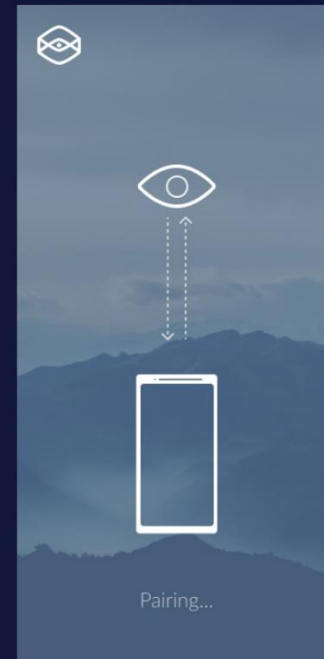


# Wireframes



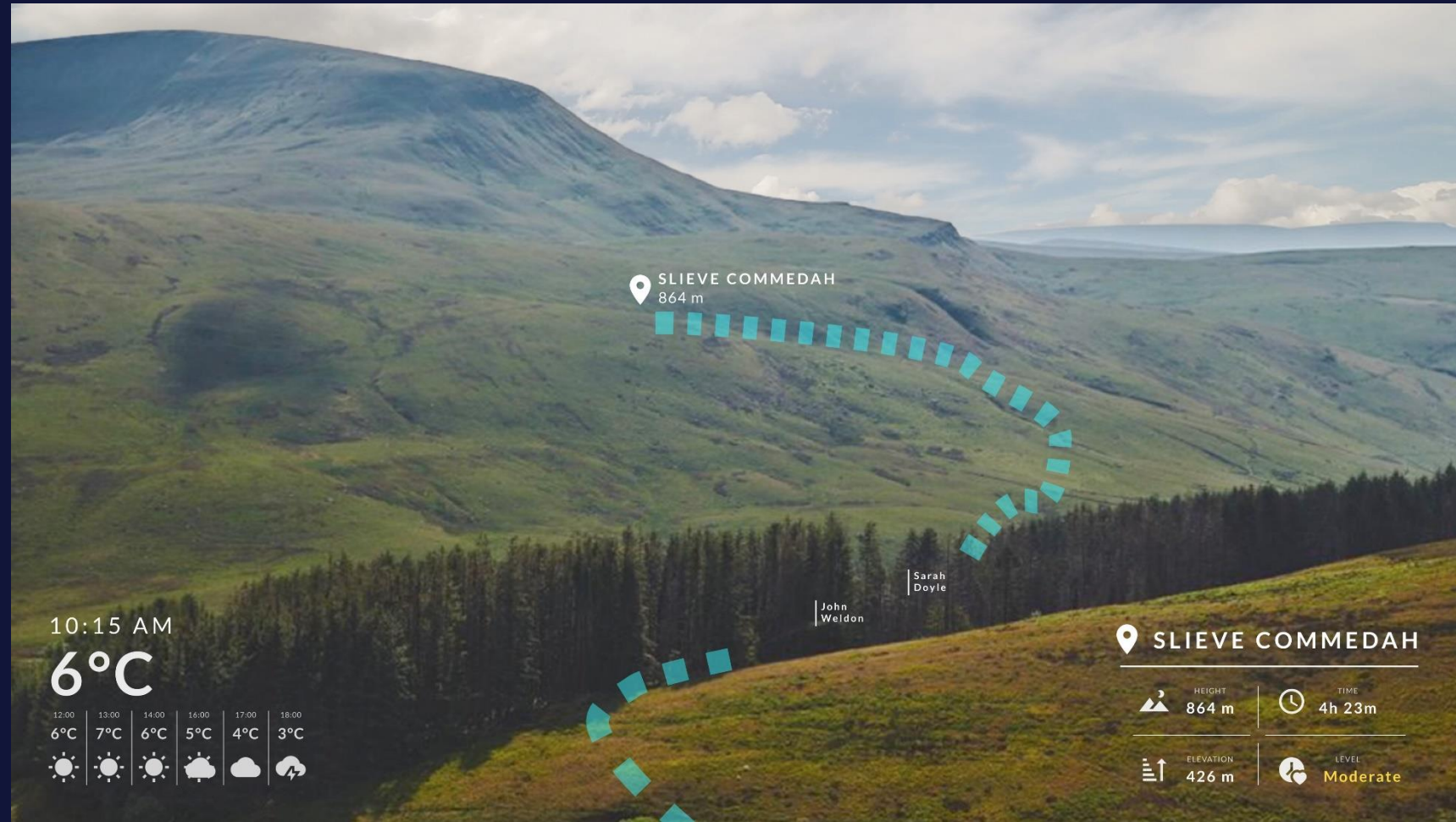
# Prototype

## Mobile App



# Prototype

AR Hiking lenses interface







ΛΡ-ΗΙΚΕ

# Ethical Caveats

👉 **Social division** - access for the few and not the many

👉 **Privacy** - identifiable information of unknowing bystanders

👉 **Public safety and wellness** - including consumer protection and personal safety

👉 **Security** - malicious shared data, disruption to AR tracking, registration or information collection

👉 **Environmental, Social, and Governance** - relationship between military and AR



# Critical Evaluation

👉 Opportunity to design without the current limitations of technology, culture and politics

👉 Power of storytelling

👉 Opportunity to stretch imagination

👉 Unconventional, provocative process

👉 What will be the AR tipping point?

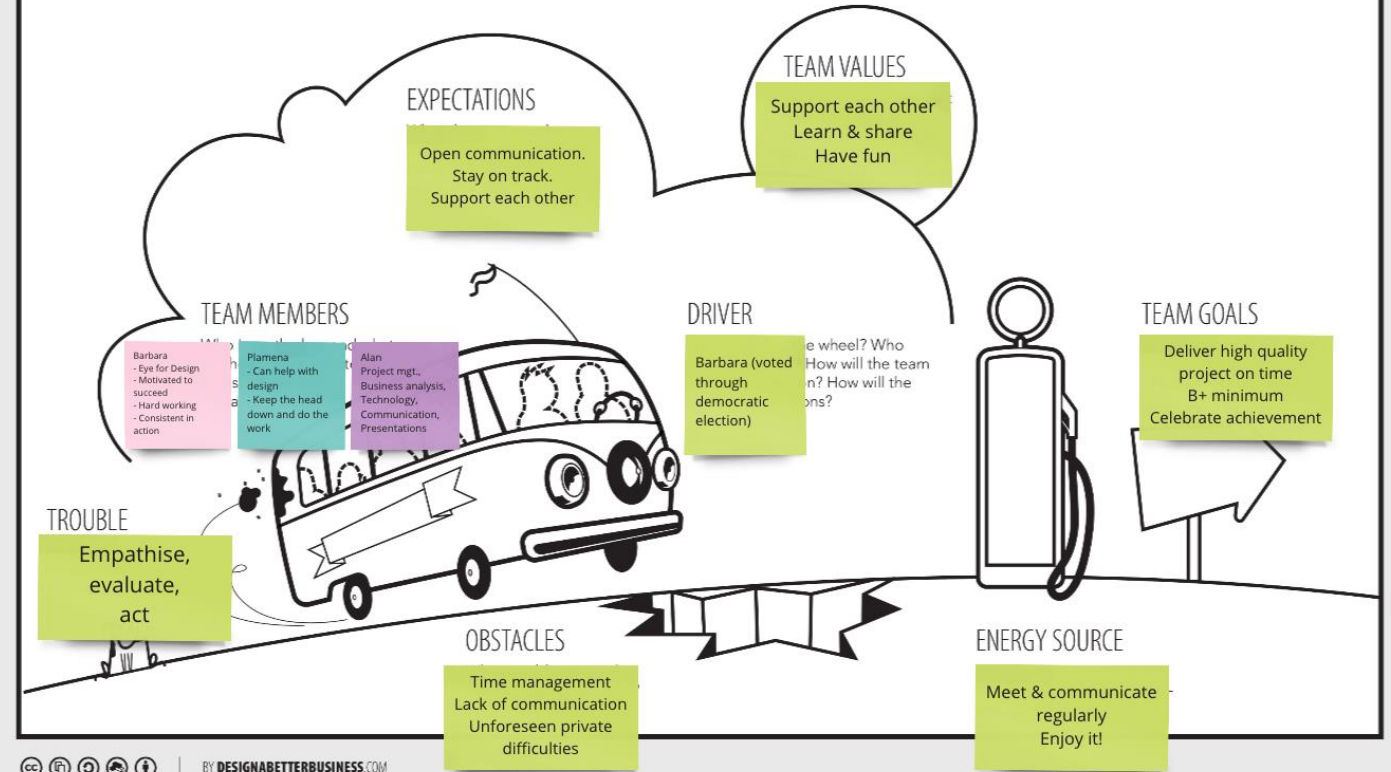
👉 How wicked was our problem?

👉 How different would the outcome be if it was 2019 and we were meeting in person?

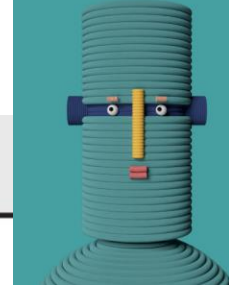


# Our Team

## TEAM CHARTER CANVAS



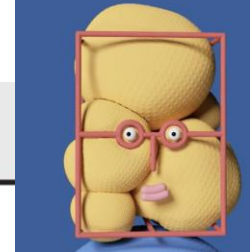
Alan  
The Producer  
mycreativetype.com



Barbara  
The Thinker  
Deep thoughts, big questions.



Plamena  
You are the Innovator  
Move, shake, disrupt, repeat.





I feel that we're at the point in history that maybe parallels the early home computers. Augmented reality in the next 20 years is really going to transform the way that we compute.

-Jeri Ellsworth

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# Appendices

Neptun team's Miro Board: [https://miro.com/app/board/uXjVOMNw9uM=](https://miro.com/app/board/uXjVOMNw9uM=/)

Final Video (OneDrive):

Final Video (Youtube): <https://youtu.be/6PGF7cmJ9Wo>



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