

Igniting the business of 3D™

Enhancing the customer
experience with 3D

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FUEL 3D®



3D: The next
industrial revolution?

What's happening in the world of 3D?

- As a result of patent expirations 3D printing hit mainstream thinking around 5 years ago with the advent of desktop 3D printers aimed at the maker community
- The excitement around 3D triggered multiple sectors to explore 3D: from medical to automotive
- 3D stocks rose fast and venture capitalists invested heavily in 3D start-ups
- Fuel3D joined-in via Kickstarter in 2013 with a handheld 3D scanner aimed at the prosumer
- While stocks have fluctuated and the focus of media interest has moved-on; 3D technology is developing:
 - 3D printers will hit the market next year that produce product to finished manufacturing standards
 - 3D scanning will transition into retail applications.



HP Jet Fusion 3D 4200 Printing Solution



'Image source: Hewlett Packard Inc.'

3D printing:

Professional

Low resolution

High resolution



Throw-away

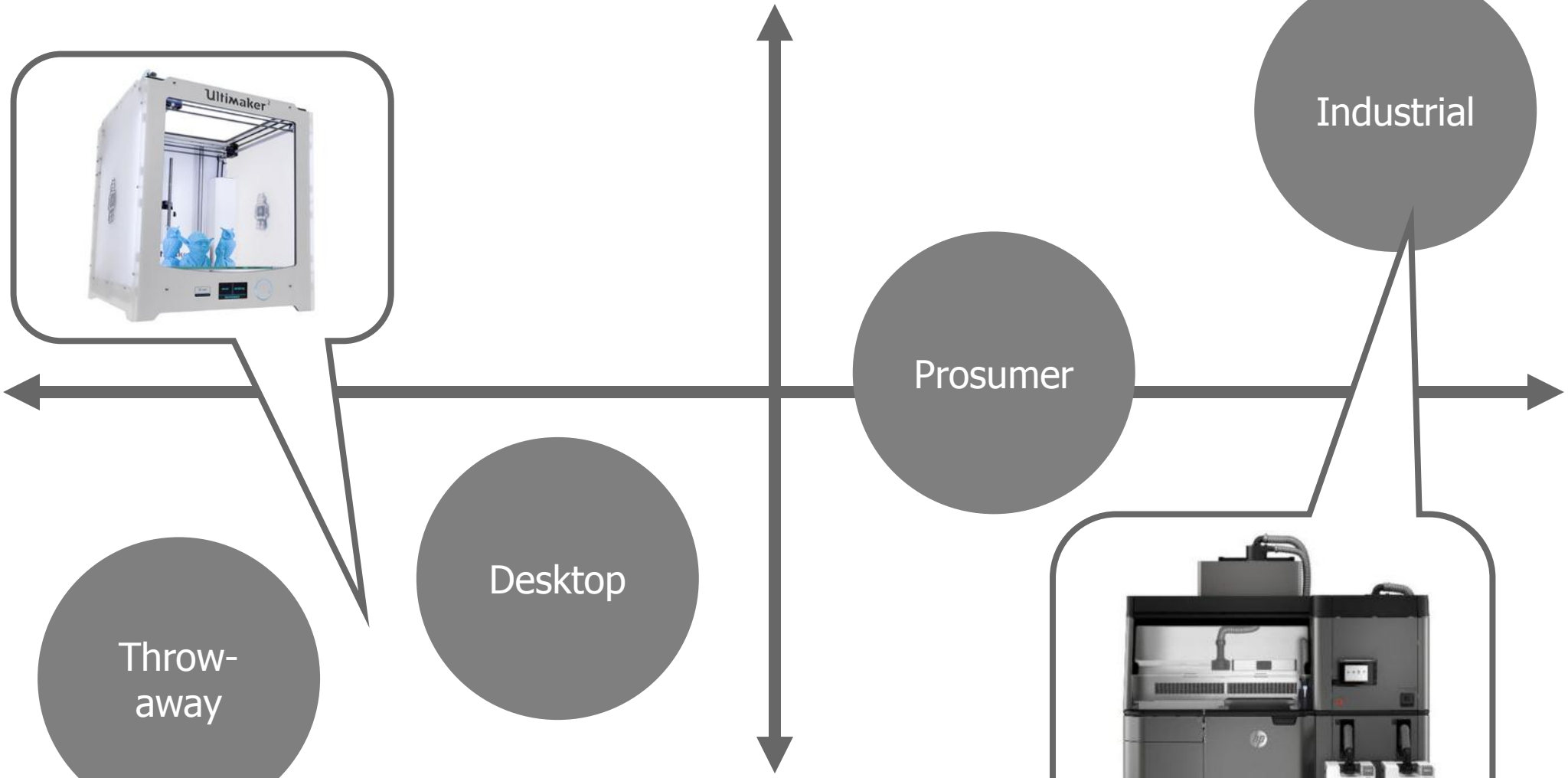
Desktop

Prosumer

Industrial

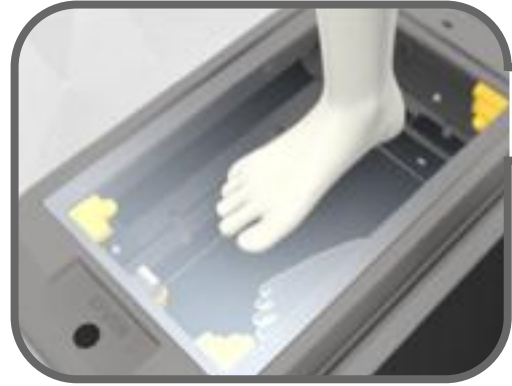


Consumer



3D scanning:

Professional



Industrial

Fuel3D
enterprise
app

SCANIFY

Prosumer

Low price
device

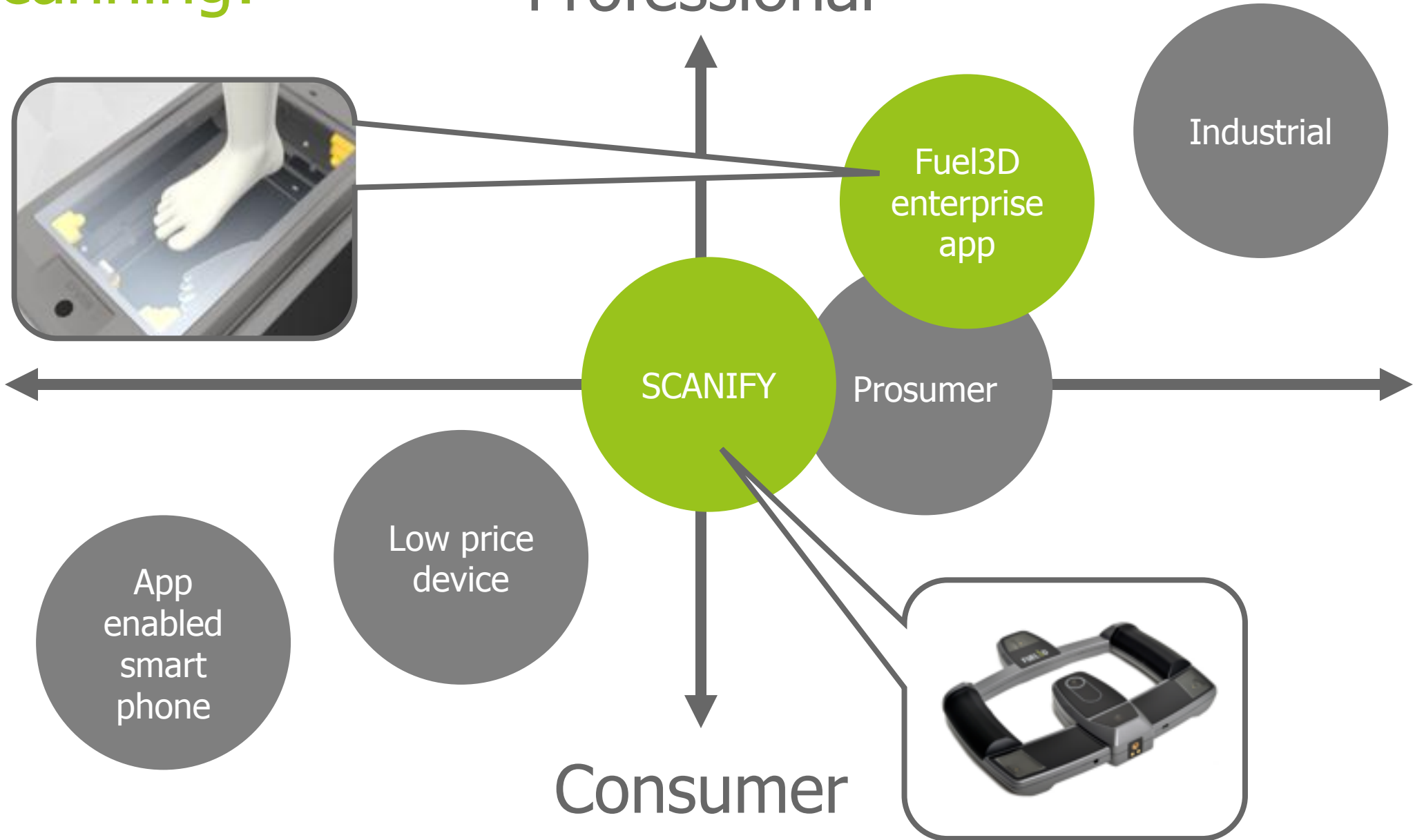
App
enabled
smart
phone

Consumer



Low resolution

High resolution



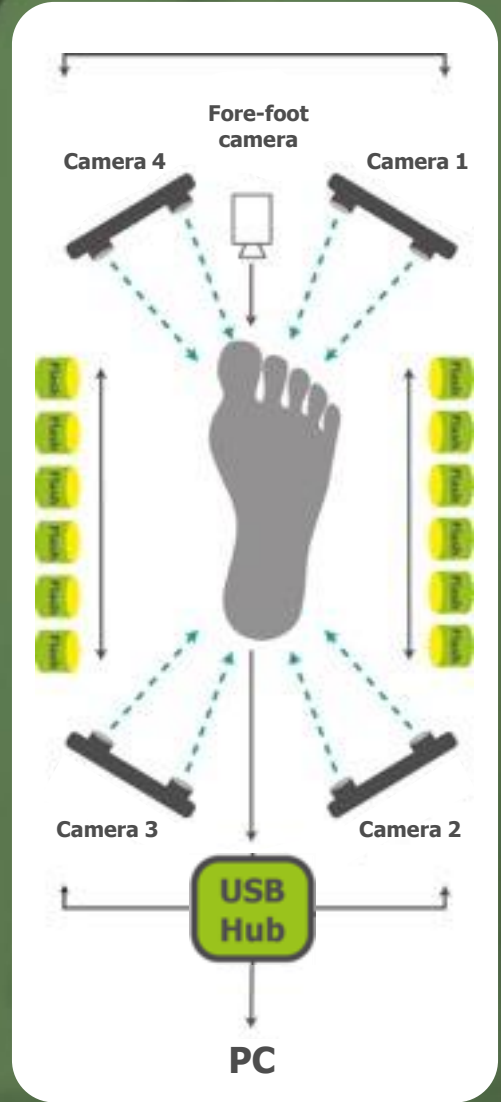
Example project:

- Next-generation scanner for foot orthotics
- The CryoScan3D developed for:



The results:

- 1-click 3D image capture at the point-of-sale in 0.1 seconds
- Immediate on-screen preview of scanned image to check position ahead of processing the 3D data for manufacturing off-site
- System developed through collaborative expertise:
 - **Cryos:** orthotics expertise; experience with earlier poor performing 3D tech; desire to adopt 3D manufacturing techniques to improve turnaround and margins
 - **Fuel3D:** 3D hardware modules; software integration expertise; system configuration and build
- Shared market opportunity: the global foot orthotic insoles market is estimated to grow at a CAGR of 5.8% to reach \$3.5 billion by 2020
- Working together: co-development period; pay-per-click shared risk



What markets will be transformed by 3D technology?

How we look at the marketplace:

Retail

Eyewear

Tech wearables

Fashion

Sportswear

Cosmetics

Footwear

Industrial

Antiquities

Virtual reality

Quality assurance

Security

Forensics

Lab analysis

Healthcare

Wound care

Dental

Veterinary

Brain surgery

Chronic disease

Facial applications

Why eyewear?

Retail

Industrial

Healthcare

▶ Eyewear

Tech wearables

Fashion

Sportswear

Cosmetics

Footwear

Virtual try-on

Custom fit

3D
manufacturing

- The global eyewear market was valued at \$102.66 billion in 2015⁽¹⁾
- Online purchases of RX eyeglasses and Plano sunglasses growing 15% average year on year⁽²⁾

1. <http://www.grandviewresearch.com/industry-analysis/eyewear-industry>
2. <http://www.statista.com/statistics/256799/percentage-of-eyewear-sold-online-in-the-us-by-type/>

The digital optician?

Digitalization in eyewear:



Digitalization in eyewear:

- 2 dimensional
 - Virtual try-on (VTO)
- 3 dimensional
 - Superior virtual try-on (head rotation)
 - Product recommendation (data management)
 - Best-fit (inventory management)
 - Custom fit (3D printing etc.)
 - Personalized customer data:
 - Customer preferences
 - Customer loyalty
 - Better marketing: turnover

2D

VTO

See yourself wearing glasses

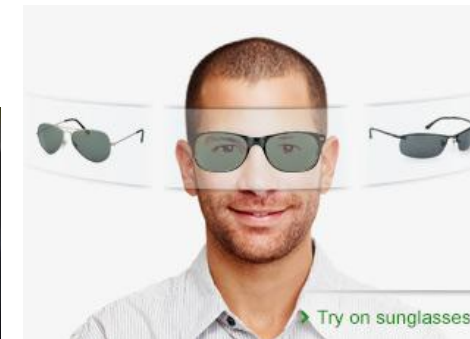
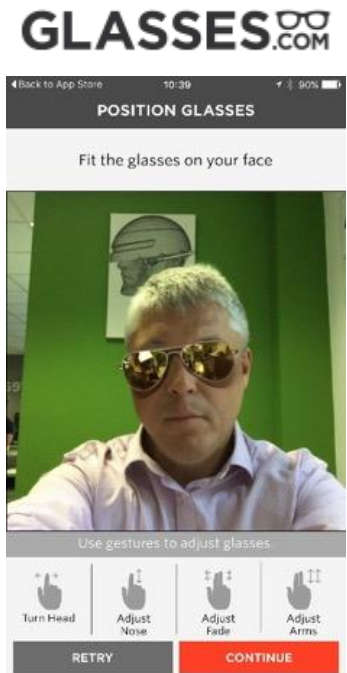
3D

Improved VTO experience

ALREADY EXISTS

2D: current technology for virtual try-on

- Self-visualization wearing eyeglasses
- Requires an object as a reference to calculate the face's measurements (e.g. credit card or driving license)
- Purely for visualization



Digitalization in eyewear:

- 3 dimensional accurate face measurement delivers:

3D Best fit

Improved VTO experience

Recommend styles that suit you

Input your prescription

Choose frames

Outputs the best fitting frame size

Your glasses are shipped to you

3D Custom fit

Improved VTO experience

Recommend styles that suit you

Input your prescription

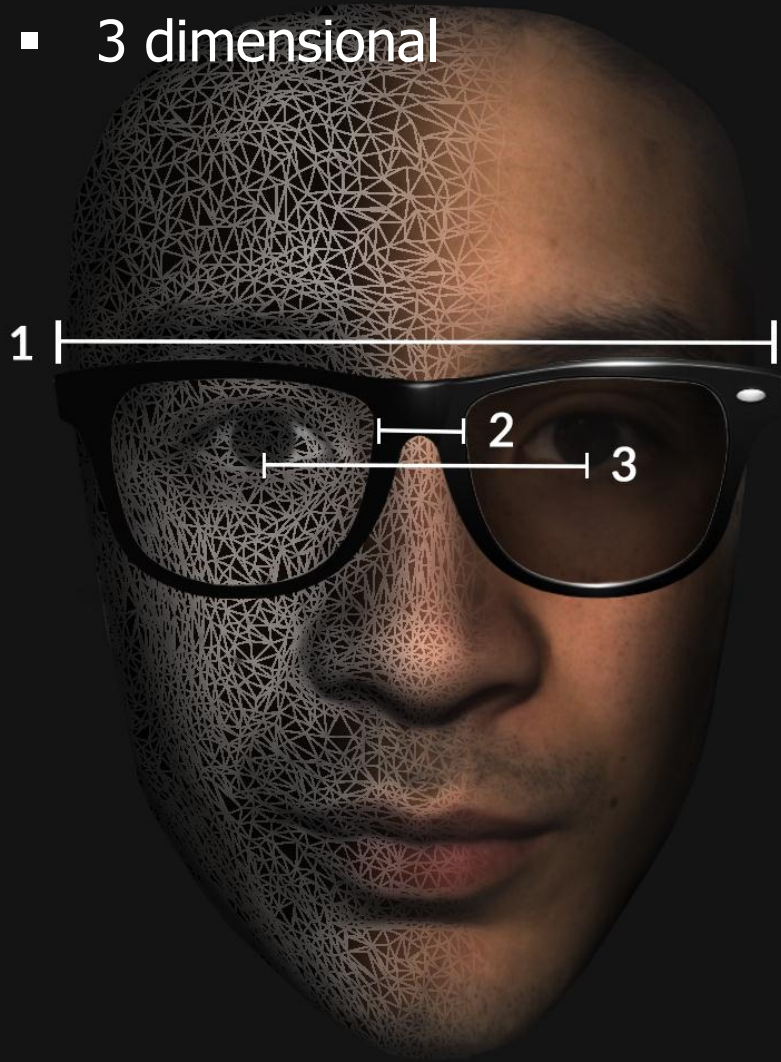
Choose frames

Your frames are manufactured

Your custom glasses are shipped to you

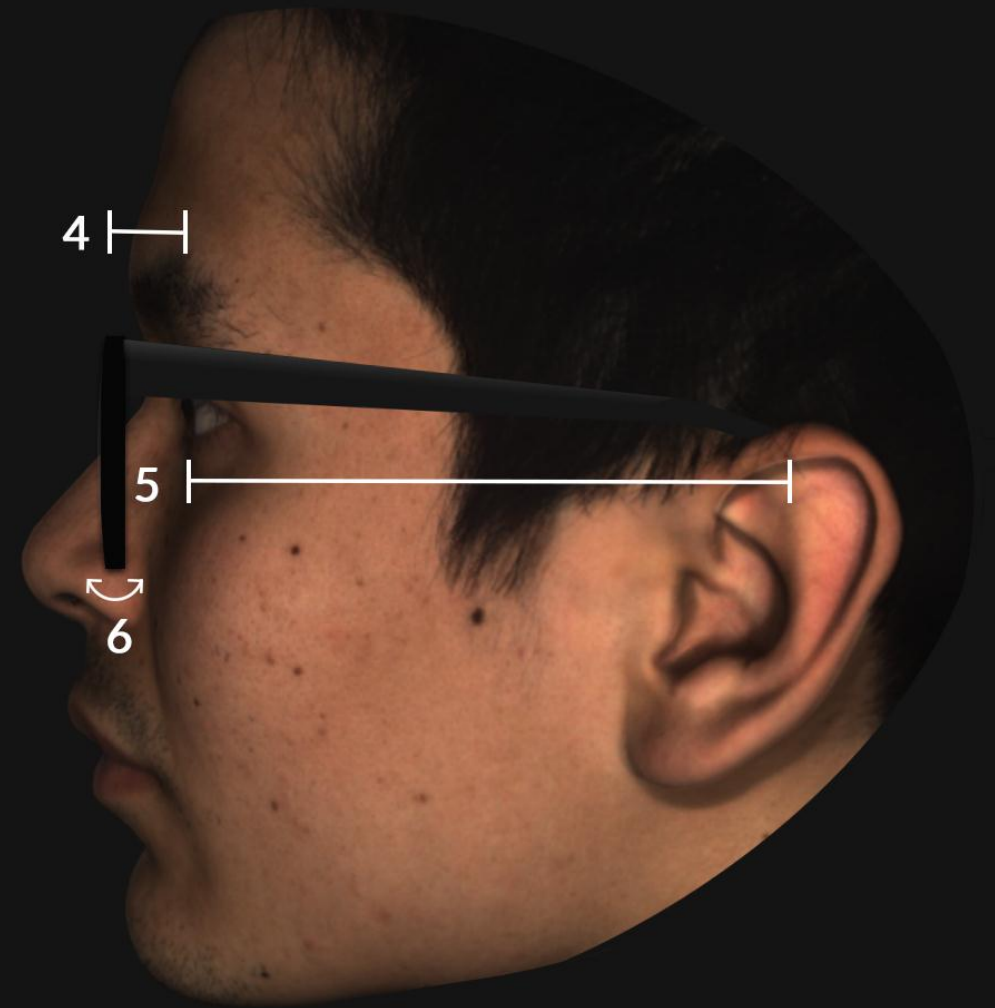
Digitalization in eyewear:

- 3 dimensional



Measurements

1. Head width
2. Bridge width
3. Interpupillary distance
4. Bridge projection
5. Eye-ear distance
6. Pantoscopic tilt



Digitalization in eyewear:

- 3 dimensional accuracy (Fuel3D)
 - Nose Area: $\pm 0.5\text{mm}$ (green)
 - Cheek/brow: $\pm 0.5\text{mm}$ (blue)
 - Face, Elsewhere: $\pm 0.75\text{mm}$ (orange)
 - VTO area: $\pm 20\text{mm}$ (pink)
- IPD inter- pupillary distance



In 3D scanning
speed is everything

Autodesk
123D Catch

45 seconds →

Cubify
Sense

20 seconds →

David
SLS-3-HD

60 seconds →

Artec
EVA

20 seconds →

Fuel3D
Technology

→ **0.1 seconds** (eye blink = 0.2 seconds)

1

Point of sale



Optician

PC

2

3D scanning platform

Software

Hardware

Pay-per-click Billing

Prescription (Rx) e.g IPD

Support

3

Customer service

Virtual try-on

Best fit

Frames database

Prescription data

Custom fit

4

Production & delivery

Customer data

Prescription (Rx)

Frames database

Component assembly

Custom manufacturing

5

Point of delivery



Optician

Home delivery



The 3D enabled future ...

- Increased buyer purchases due to reduced hassle-factor
- Focus on consumer services
 - Fashion guidance online and in-store
 - In-store kiosk
 - In-mall kiosk
 - Customer loyalty
 - 48 hour delivery
- Commercialization from new technologies
 - Frame customization (from components)
 - Fully bespoke frames (CNC, pressed, 3D printed, hand crafted)
 - Bespoke frame decoration (3D printed or premium hand decoration)
- Centralized resource planning and supply chain management

Current status

- Partnering with 3 customers in developing 3D platforms:
 - 3D virtual try-on
 - Custom fit
 - Leading global brand
- Actively engaged with leading brands, frames manufacturers, large and independent retailers
- We received funding of \$1.6 million from European Commission's Horizon 2020 Research and Innovation Programme
 - Development of a 270-degree 3D scanner for full-face capture
- We have created an advisory panel of industry experts to understand:
 - Technical requirements
 - Customer service realities
 - How to innovate and bring industry with us ...



Co-funded by the European Union

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Thank you.
Questions or comments?

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