AR & VR Smartglasses and Functional Contact Lenses 2016-2026

Description: This new report is focused on how the market for smart glasses and contact lenses is going to evolve in the next decade, based on the exciting research and developments efforts of recent years along with the high visibility some projects and collaborations have enjoyed. The amount of visibility this space is experiencing is exciting developers of a range of allied technologies into fast-tracking/focusing their efforts, as well as creating devices and components designed specifically to serve this emerging industry.

Some of the newest devices that have ignited significant interest in smart eyewear are going above and beyond the conventional definition of a smart object; they are in effect, portable, wearable computers with a host of functionalities, specially designed apps etc. that add new ways for the wearer to interact with the world along with smartphone capabilities, health tracking options and many other features. The features of some of the more advanced devices have been based on and have sparked worldwide innovation efforts aiming to create an ecosystem of components that will enable what is bound to be a revolution in form factor for wearables.

User interface is probably one of the most significant features in this revolution. As interfacing with computers undergoes a constant evolution, allowing for wider adoption as interaction becomes more "natural", smartglasses are bringing about the next big step in this ever-changing space. From keyboards to touchscreens to cameras & positioning/location/infrared sensors, a new wave of innovation is making interfacing with computers gesture-based, and nowhere else is that more obvious than in eye-worn computing.

But it is not just wearable sensors and user interfaces, but also near-eye displays and optics as well as energy storage devices that represent some of the examples of technology tool kits that are evolving and improving in performance. They are hence constituting the pieces that are falling into place in order to enable new functionalities and form factors, both necessary to create products as innovative as near-eye and on-eye computers.

There are of course significant challenges that need to be addressed in order to achieve consumer acceptance and widespread proliferation of this paradigm-shifting type of device. Miniaturization of components, development of powering schemes that will allow sufficient usage time between recharge points, flexibility and stretchability of components that are meant to operate in diverse environments (from saline solutions to high and low temperatures) are only some of the segments where innovative research and development work is taking place.

The report includes insight into how different entities are addressing these challenges: developments, company and research activities in the space for smart glasses and lenses as well as company profiles of players actively involved in this space, concluding with market forecasts for both smart glasses and smart contact lenses for the next decade.

Contents:

1. EXECUTIVE SUMMARY AND CONCLUSIONS

2. CONTACT LENSES
   2.1. Contact lens materials
   2.2. Contact lenses and disposability
   2.3. The market for contact lenses

3. SMART CONTACT LENSES
   3.1. The Google-Novartis collaboration
   3.2. Target Applications - startups & research activities
      3.2.1. Medical
      3.2.2. Infotainment

4. CHALLENGES WITH SMART LENSES
   4.1. The blood glucose measurement challenge
4.2. On board powering schemes - Remote power
4.2.1. Primary or rechargeable cells?
4.2.2. Energy harvesting
4.3. Miniaturization
4.4. Transparent encapsulation of electronic components and manufacturing considerations
4.5. Cost structures
4.6. FDA approval

5. SMART GLASSES
5.1. Google Glass
5.1.1. Google Glass Explorer features
5.1.2. Google Glass Enterprise
5.1.3. Luxottica partnership
5.2. Vuzix M100
5.3. Epson Moverio BT-200 & BT-2000
5.4. Recon Jet - Snow2
5.5. Kopin Solos
5.6. Optinvent ORA 1 - ORA X
5.7. Meta 1 - Meta Pro
5.8. ODG R-7
5.9. Microsoft Hololens
5.10. Sony SmartEyeGlass
5.11. Magic Leap
5.12. GiveVision
5.13. Others
5.14. What are ""enterprise"" applications all about?

6. AR VS. VR
6.1. Oculus Rift
6.2. Sony PlayStation VR
6.3. Samsung
6.4. Zeiss - Avegant
6.5. Merge VR - HTC VR

7. MICRODISPLAY TECHNOLOGIES
7.1. LCoS microdisplay
7.1.1. LCoS microdisplay structure
7.1.2. Optical principles of LCoS microdisplays
7.1.3. Generating color in a single panel configuration - Time Domain Imaging (TDI™) - ForthDD
7.1.4. Generating color in a single panel configuration - Color filters
7.1.5. Generating color in a single panel configuration - Field sequential color (FSC)
7.1.6. Generating color in three panel configuration
7.2. Transmissive LCD microdisplay
7.3. OLED on silicon microdisplays
7.4. LED microdisplays

8. MICRODISPLAY TECHNOLOGY PROVIDERS
8.1. OLED microdisplays
8.1.1. eMagin
8.1.2. SONY
8.1.3. MICROOLED
8.1.4. Dresden Microdisplay (DMD)
8.1.5. Yunnan OLiGHTECK
8.2. LCoS microdisplays
8.2.1. Himax Display
8.2.2. HOLOEYE
8.2.3. Syndiant
8.2.4. ForthDD
8.3. Transmissive LCD Microdisplays
8.3.1. Epson Corporation
8.3.2. Kopin
8.4. microLED microdisplays
8.4.1. mLED
8.4.2. infiniLED
8.4.3. LumioDe
8.4.4. Luxvue
8.4.5. Ostendo
8.5. Some examples of microdisplay products
8.6. Comparison of microdisplay technologies

9. OPTICS ARCHITECTURES FOR HEAD MOUNTED DISPLAYS
9.2. Freespace Optics see-through architectures
9.2.1. Flat combiner architectures
9.2.2. Curved combiner architectures
9.2.3. Freeform, total internal reflection (TIR) combiners
9.3. Waveguide/lightguide see-through architectures
9.3.1. Diffractive waveguide
9.3.2. Holographic waveguide
9.3.3. Polarized waveguide
9.3.4. Reflective waveguide
9.3.5. "Clear-Vu" reflective waveguide
9.3.6. Switchable waveguide
9.4. Other approaches to see-through displays
9.4.1. Innovega
9.4.2. Olympus
9.4.3. Others
9.5. Occlusion architectures
9.5.1. Immersion display magnifier architectures
9.5.2. Micro-mirror arrays
9.6. Comparison of optics approaches for head mounted displays
9.7. Suppliers of optical engines
9.7.1. Digilens - SBG Labs
9.7.2. eMagin
9.7.3. Himax Displays
9.7.4. HOLOEYE
9.7.5. Kopin
9.7.6. Lumus
9.7.7. Laster

10. METRICS AND REQUIREMENTS IN AR AND VR DISPLAYS
10.1. Field of view (FOV) and resolution
10.2. Latency
10.3. Parallax
10.4. Distortions & aberrations
10.5. Summary of optics and display requirements for AR and VR
10.6. User interface. Voice & Gesture recognition

11. POWER SUPPLY
11.1. Batteries for Smart Glasses and Lenses
11.1.1. Energy storage technologies in consumer electronics
11.2. Battery market size
11.3. The emergence of wearables
11.4. LG Chem's offerings to the wearable market
11.5. Apple's approach to wearable technology
11.6. Samsung SDI - never falling behind
11.7. Nokia's contribution
11.8. Limited production-STMicroelectronics
11.9. Showa Denko Packaging / Semiconductor Energy Laboratory
11.10. Kokam and Routelade, Korea
11.11. Initial conclusions on energy storage for smart eyewear.

12. INTERVIEWS
12.1. Atheer Labs
12.2. Avegant
12.3. FlexEl, LLC
12.4. Imprint Energy, Inc
12.5. Jenax
12.6. Kopin Corporation
12.7. MicroOLED
12.8. Oculus
12.9. Optinvent
12.10. Ricoh
12.11. Royole Corporation
12.12. Seiko Epson Corporation
12.13. Vuzix

13. FORECASTS
13.1. Smart contact lenses
13.2. Smartglasses

Ordering:  
Order Online - [http://www.researchandmarkets.com/reports/3492301/](http://www.researchandmarkets.com/reports/3492301/)

Order by Fax - using the form below

Order by Post - print the order form below and send to

Research and Markets,
Guinness Centre,
Taylors Lane,
Dublin 8,
Ireland.
Fax Order Form
To place an order via fax simply print this form, fill in the information below and fax the completed form to 646-607-1907 (from USA) or +353-1-481-1716 (from Rest of World). If you have any questions please visit http://www.researchandmarkets.com/contact/

Order Information
Please verify that the product information is correct and select the format(s) you require.

<table>
<thead>
<tr>
<th>Product Name:</th>
<th>AR &amp; VR Smartglasses and Functional Contact Lenses 2016-2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Address:</td>
<td><a href="http://www.researchandmarkets.com/reports/3492301/">http://www.researchandmarkets.com/reports/3492301/</a></td>
</tr>
<tr>
<td>Office Code:</td>
<td>SCBR8VHX</td>
</tr>
</tbody>
</table>

Product Formats
Please select the product formats and quantity you require:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic (PDF) - 1 - 5 Users:</td>
<td>USD 5708</td>
</tr>
<tr>
<td>Electronic and Hard Copy (PDF) - 1 - 5 Users:</td>
<td>USD 6021 + USD 58 Shipping/Handling</td>
</tr>
<tr>
<td>Electronic (PDF) - 1 - 10 Users:</td>
<td>USD 8547</td>
</tr>
<tr>
<td>Electronic and Hard Copy (PDF) - 1 - 10 Users:</td>
<td>USD 8860 + USD 58 Shipping/Handling</td>
</tr>
</tbody>
</table>

* Shipping/Handling is only charged once per order.

Contact Information
Please enter all the information below in BLOCK CAPITALS

<table>
<thead>
<tr>
<th>Title:</th>
<th>Mr ☐</th>
<th>Mrs ☐</th>
<th>Dr ☐</th>
<th>Miss ☐</th>
<th>Ms ☐</th>
<th>Prof ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Name:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Last Name:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email Address: *</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job Title:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postal / Zip Code:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phone Number:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fax Number:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Please refrain from using free email accounts when ordering (e.g. Yahoo, Hotmail, AOL)
Payment Information

Please indicate the payment method you would like to use by selecting the appropriate box.

☐ Pay by credit card: You will receive an email with a link to a secure webpage to enter your credit card details.

☐ Pay by check: Please post the check, accompanied by this form, to:
Research and Markets,
Guinness Center,
Taylors Lane,
Dublin 8,
Ireland.

☐ Pay by wire transfer: Please transfer funds to:
Account number 833 130 83
Sort code 98-53-30
Swift code ULSBIE2D
IBAN number IE78ULSB98533083313083
Bank Address Ulster Bank,
27-35 Main Street,
Blackrock,
Co. Dublin,
Ireland.

If you have a Marketing Code please enter it below:

Marketing Code: ____________________________

Please note that by ordering from Research and Markets you are agreeing to our Terms and Conditions at http://www.researchandmarkets.com/info/terms.asp

Please fax this form to:
(646) 607-1907 or (646) 964-6609 - From USA
+353-1-481-1716 or +353-1-653-1571 - From Rest of World