



# ESSILOR Smartglasses

# Development Goals for EEG Smart Glasses

- **Active EEG Electrodes**

- Improve signal quality with **less noise** and **in-situ amplification** for more accurate brain activity monitoring.
- **Evaluate different electrode materials** such as conductive printed elastomeric electrodes, or advanced materials like graphene, to optimize signal quality, comfort, and manufacturing scalability.

- **PPG Nosepad Sensor**

- Integrate a **PPG sensor in the nosepad** to enable further feature extraction from a stable facial contact point.

- **Frontal Reference Electrode**

- Position the **reference electrode at the front** of the frame for consistent and low-impedance referencing (temporal electrodes will become crucial for neural information)

- **EOG Electrodes (Optional)**

- Explore the integration of EOG electrodes for eye movement tracking, depending on technical feasibility and alignment with Essilor's eye-tracking roadmap. This feature may be omitted if alternative eye-tracking technologies are provided by Essilor.

- **Bone Conduction Audio**

- Add **bone conduction technology** for discreet, open-ear audio playback (e.g., for future project **HABS music**)

# Development Goals for EEG Smart Glasses

- **Miniaturized Electronics**

- Miniaturize the PCB and processors to ensure seamless integration into the temple arms of the glasses, preserving comfort, aesthetics, and wearability.
  - Local storage to ensure privacy. Communication via wifi or Bluetooth to retrieve data
- Enable on-device processing of EEG and PPG data to reduce communication latency, enhance real-time responsiveness, and ensure sensitive data is processed locally instead of being sent externally.
- Use local physical data storage on the device to keep data secure and private.
- Employ **Bluetooth Low Energy** (BLE) for secure wireless data transmission when needed, maintaining user privacy and data integrity.

# Key points target

## **Ergonomics**

**Weight  
Comfort  
Aesthetics  
Durability**

## **Performance**

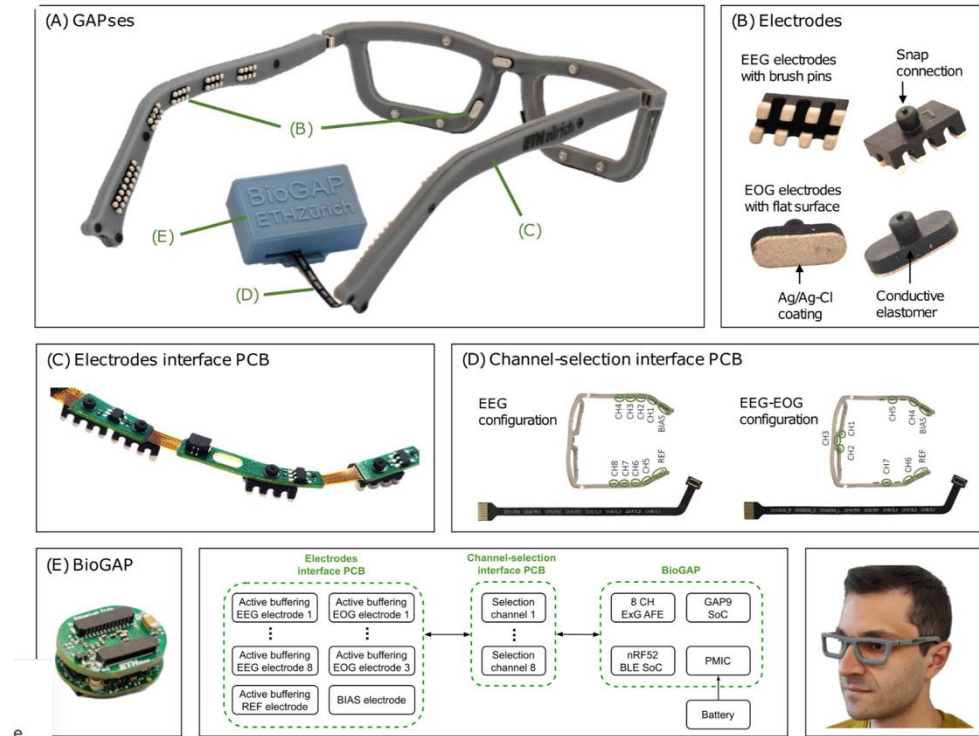
**Good signal  
Accurate positioning of  
electrodes  
Electronics integration**

## **Communication**

**On device data  
processing  
Storage  
Safety and privacy**

- Which processes is HABS involved in?
- What level of decision-making authority does HABS have?
- How much internal development is handled by Essilor?
- Is HABS responsible only for software, or also hardware?

# Gapses

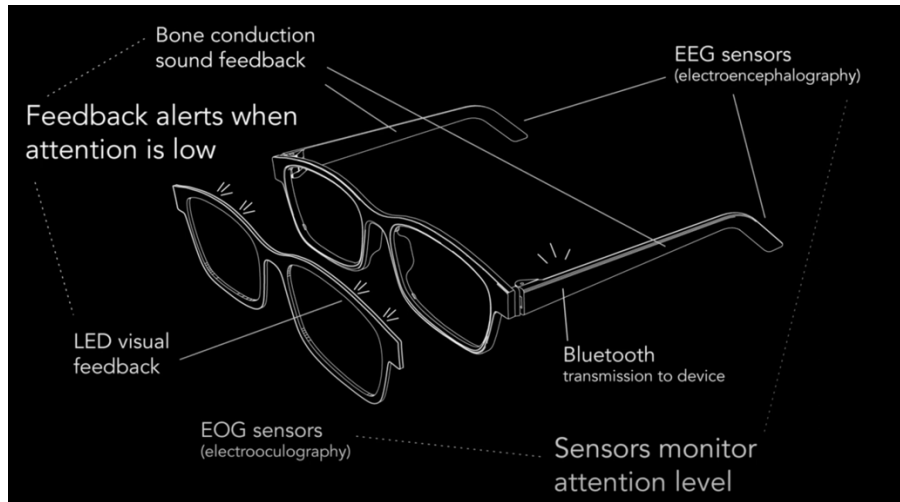


**Custom Dry Electrodes:** Made from conductive elastomer with silver-silver chloride coating, allowing extended wear without gels or skin irritation. Flat electrodes for EOG, brush-style for EEG to penetrate hair and ensure skin contact.

**BioGAP Platform:** Features two SoCs—GAP9 for DSP and machine learning, and a Nordic BLE chip—plus the ADS1298 AFE, enabling 24-bit resolution across up to 8 EEG channels.

**On-Edge Processing:** The GAP9 RISC-V processor enables local signal processing, enhancing privacy and reducing wireless transmission. Includes smart power management (clock gating, voltage scaling) for extended battery life.

# Attentiv U V2



## Key Features:

- EEG and EOG sensors
- Operates **standalone and offline**, ensuring **data privacy**.
- Local data storage
- Lighter design for improved comfort
- Small PCB
- Integrated Bone conduction
- WiFi connectivity alongside Bluetooth



AttentivU V2

<https://www.attentivu.com/glasses-v2>

# Aria Gen 2



## Key highlights

- **PPG Sensor in Nosepad**
- **Advanced Sensor Suite:** Includes RGB camera, 6DOF SLAM cameras for spatial tracking, eye-tracking cameras, spatial microphones, IMUs, barometer, magnetometer, and GNSS for precise location and motion sensing.
- **On-Device Processing:** Custom chips enable SLAM enhancing privacy and responsiveness.
- **Lightweight & Portable**
- **Audio Features:** Open-ear speakers with noise cancellation and a contact microphone

**NO EEG SENSOR**

<https://www.extremetech.com/electronics/meta-unveils-aria-gen-2-smart-glasses-with-built-in-heart-rate-monitor>