# Wearable augmentative and alternative communication (wAAC)

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## Medical technology and devices

> TRL 3-4

### Problem

In the realm of human interaction, effective communication is a cornerstone of societal functionality. However, this vital interaction channel remains a challenge for individuals afflicted with disabilities that impede conventional communication methodologies. Presently, individuals with Complex Communication Needs (CCN) resort to desktop-oriented augmentative and alternative communication (AAC) systems for linguistic expression. Nevertheless, these conventional systems lack the requisites of privacy, portability, and robustness.

### Solution

The Wearable Mixed Reality (MR) Augmentative and Alternative Communication (AAC) System is a revolutionary technology intended to improve the communication experience for individuals grappling with Complex Communication Needs (CCN). This innovative technology enables the interpretation of user input through either Eye-Gaze (EG) or Brain-Computer Interfaces (BCI), effectively controlling a dynamic communication board.

The core framework incorporates two distinct modes: EGbased and BCI-based, offering users unprecedented flexibility in tailoring their interaction modality. A pivotal facet of this system is the vocabulary matrix sourced from real-time object detection, with words projected onto the surfaces of recognized objects. This novel approach not only facilitates communication but extends its utility to pedagogical contexts.

Moreover, this invention rectifies the temporal synchronization discrepancy between the communicative facets of the two systems, thereby enhancing the system's operational cohesiveness, usability, and reliability.

### Intellectual Property Status

This IP is wholly Sydney-owned and is protected by PCT application No. PCT/AU2023/050443.

### Potential Commercial Applications

Embedded communication enhancement: Integration within smart glasses or windows, propelling communication functionalities to unprecedented heights.

Medical assistive integration: Offering assistance to patients afflicted with conditions such as cerebral palsy, autism spectrum disorder, and amyotrophic lateral sclerosis, where communication support is imperative.

Competitive advantages:

- Synergistic mode fusion: The utilisation and synchronisation of both EG and BCI modes bestows an elevated level of adaptability and reliability upon the system.
- Precision augmentation: Leveraging MR input-output dynamics alongside sophisticated label mapping methodologies, the system attains exceptional real-time precision.
- Holistic learning integration: Beyond mere communication, the innovation serves as a vehicle for education by delivering an extensive lexicon and AI-fuelled insights.
- Ready to use: The prototype is engineered into the form of a portable helmet which is both functional and highly ergonomic

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