The "Bloc OPératoire Augmenté" (BOPA) chair

The "Bloc OPératoire Augmenté" (BOPA) innovation chair is the result of a partnership between Assistance publique - Hôpitaux de Paris (AP-HP) and Institut Mines Télécom (IMT). Located at the Paul-Brousse Hospital, within the AP-HP GHU, the BOPA Chair innovates by pursuing two human and technological objectives: transforming the relationship to error in the operating room (OR) and enhancing the practitioner capabilities through digital technologies. By digitizing the OR, BOPA's founders want to transform the perception of the surgical act from the point of view of the surgeon, the medical student and the patient.

Launched in January 2020, the BOPA Chair accelerates the development of digital technologies, either in gestation or already existing which enable to increase the senses (vision, speech and touch) of the different OR actors. These devices helping the improvement of practices are being tested in a mock OR provided by the Paul-Brousse AP-HP hospital. They are finalized and then quickly validated in the OR of the Hepatobiliary Center. The tested solutions are then disseminated within the whole AP-HP, in all surgical disciplines, adult and pediatric.

BOPA is structured around six systemic blocks:

- the Human Factor Block,
- the Viz Block,
- the Bot Block,
- the Light Block,
- the Touch Block,
- the Box Block (by analogy with the black box in avionics).

They cover the areas of communication between surgeon and patient, surgical image capture, natural language analysis in the OR, augmented reality through the use of digital twins or fluorescent light, collaborative robotics or cobotics, and protection of the data of the block and the patients.
Blok-viz (assisted vision)

IMT Atlantique is particularly involved through the **Blok-viz (assisted vision)** that it pilots. The objective is to record what **the surgeon sees**, how he works, and where he looks. Given the layout of the block, such an implementation is difficult if the surgeon does not wear himself an equipment allowing the recording of his gestures and a simple and visualizable **remote interaction** between him and an expert (AI, staff, remotely or not). Therefore, we have designed a **headband** that completes the surgical glasses (see below).

This headband is totally new in that it integrates, in addition to an **oculometer, fixed cameras, pan/tilt motorized cameras** controlled either by the gaze direction or by an external command, with a certain number of **optical pointers** visible or not by the surgeon, facilitating external supervision and intervention (e.g. for training and risk reduction in surgery). **Blok-viz** will also provide an opportunity to test innovations, such as the use of smart contact lenses with embedded laser pointers, the goal of which is to replace in the future the current unreliable and cumbersome oculometers.

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