

Design Brief 2 of 3

Smart wristband and hub

The research line 4 - Dehydration has been addressed in two parallel approaches: the complexity of the issue to monitor didn't allow to find direct references to existing similar products at a commercial level, thus an analysis of technologies under research and commercial devices monitoring parameters associated to a status of dehydration were starting points to develop the design.

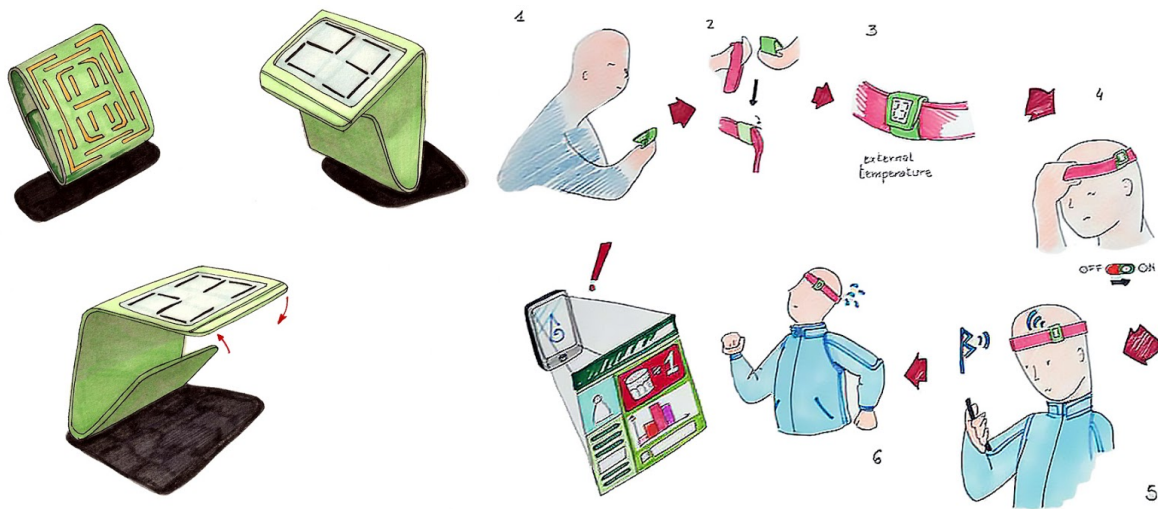
From a medical point of view, we based our development on the suggestions and indication provided by ULSS1 in the attached document ("AGEDESIGN ITAT1033 - main feedback on document of SRFG and PLUS and suggestion on concept 4 related to dehydration").

Following a design driven approach, we focused the research on sketches to find usability and mode of use that might allow the design of a speculative wearable device, reasoning on the better position to monitor dehydration through different technologies at different TRL (technology readiness level): from systems based on chemical reactions with the sweat to skin impedance readers, a literature review on the effectiveness of the different technologies drove to the exclusion of invasive systems for which the design control wouldn't be effective. The choice of avoiding invasive operations on the user was also connected to the non-medical purpose of the AGEDESIGN outcome, whose aim is to reach a reliable system for personal use.

The sketching phase consisted in a study of positions and interactions that the user should have with a device worn all day long, trying to focus on positions from which the body heat and the hydration status might be controlled in a more effective way, considering the temples, the back of the ears, the armpits and the wrists.

We investigated through sketches the possibilities to hook sensors to wearable elements such as headbands, t-shirts, glasses and wristbands.





Sketches of possible dehydration monitoring devices

The correlation of the dehydration status with other physical parameters such as heartbeats, blood pressure and body weight drove us to merge the research line 4 with the research line 1 - Vascular circulation. Indeed, not being possible to identify dehydration through a single parameter, the collection of multiple parameters should have included a set of different sensors and devices that might compose a monitoring kit.

To finalize the brief definition and the technical requirements for this system's sensors, we sought for an external consultancy on photoplethysmograph. The collaboration with an electronic engineering company would allow us to produce the electronics on our design needs instead of creating a case for already existing and not verified technology.

The system to be developed was required to be portable, comfortable to wear and attractive for a senior public. Reduced dimensions, visual feedbacks and connection with other devices and smartphones were minimum requirements for our design.



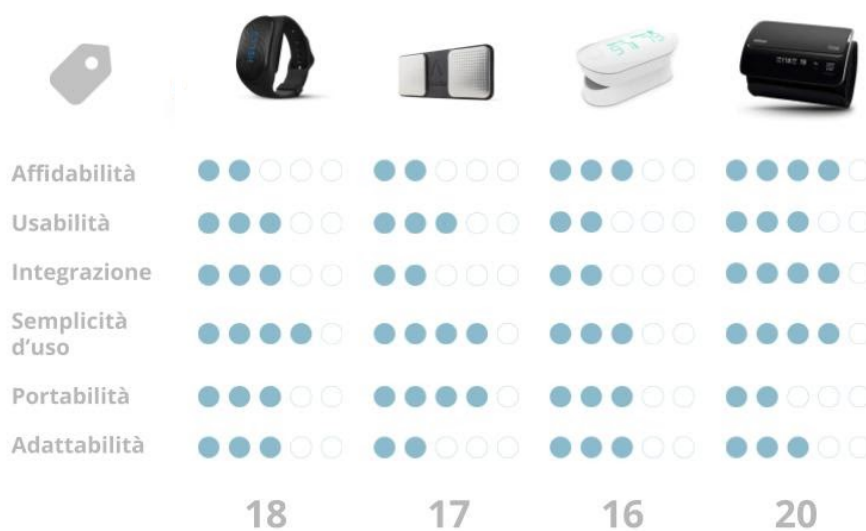
Sketches of use scenario: the alert

The parameters included into the system for a complete monitoring include: dryness of the skin, oxygen in blood, pressure and heartbeat.

An analysis of the state of the art has been conducted by identifying commercial products addressing the single issues, enhancing the lack of integration between the different devices and related smartphone applications.

The list of devices identified is attached.

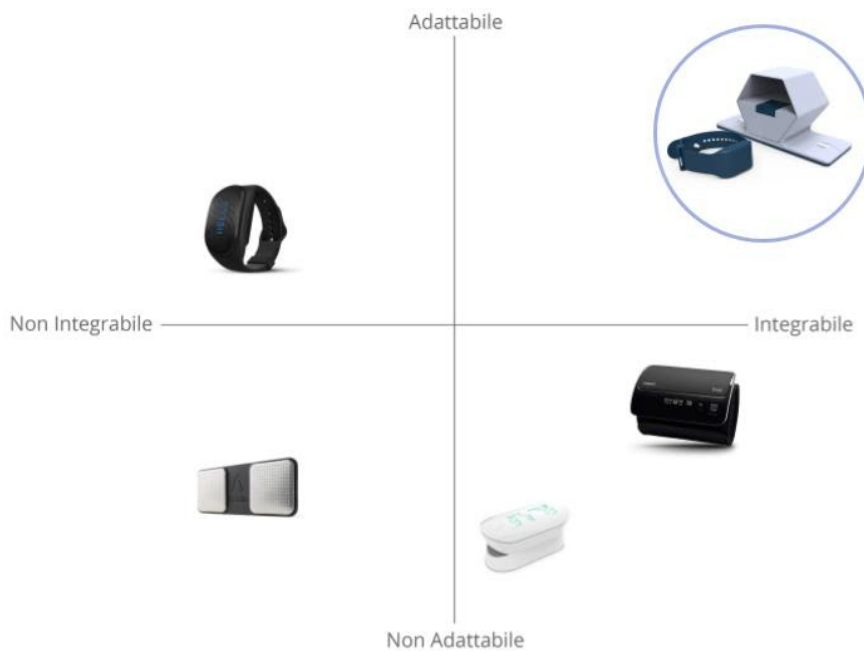
The devices have been then bought and compared (attached tables), collected then in positioning maps in which a mark for our expected system has been placed.



Competitive analysis of the selected devices



Positioning map based on affordability and usability



Positioning map based on adaptability and integration