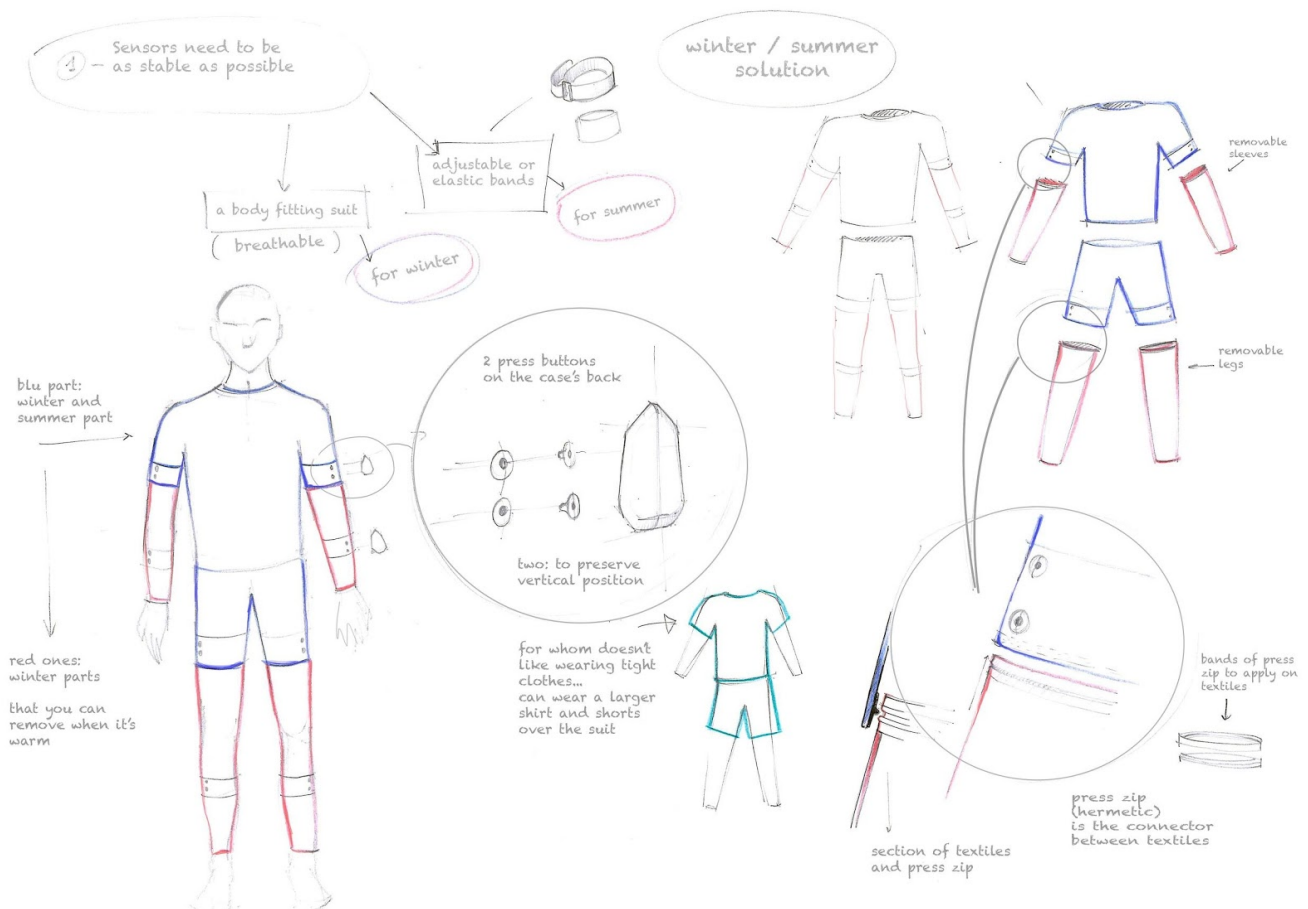


Design Concept 1 of 3 / Smart suit

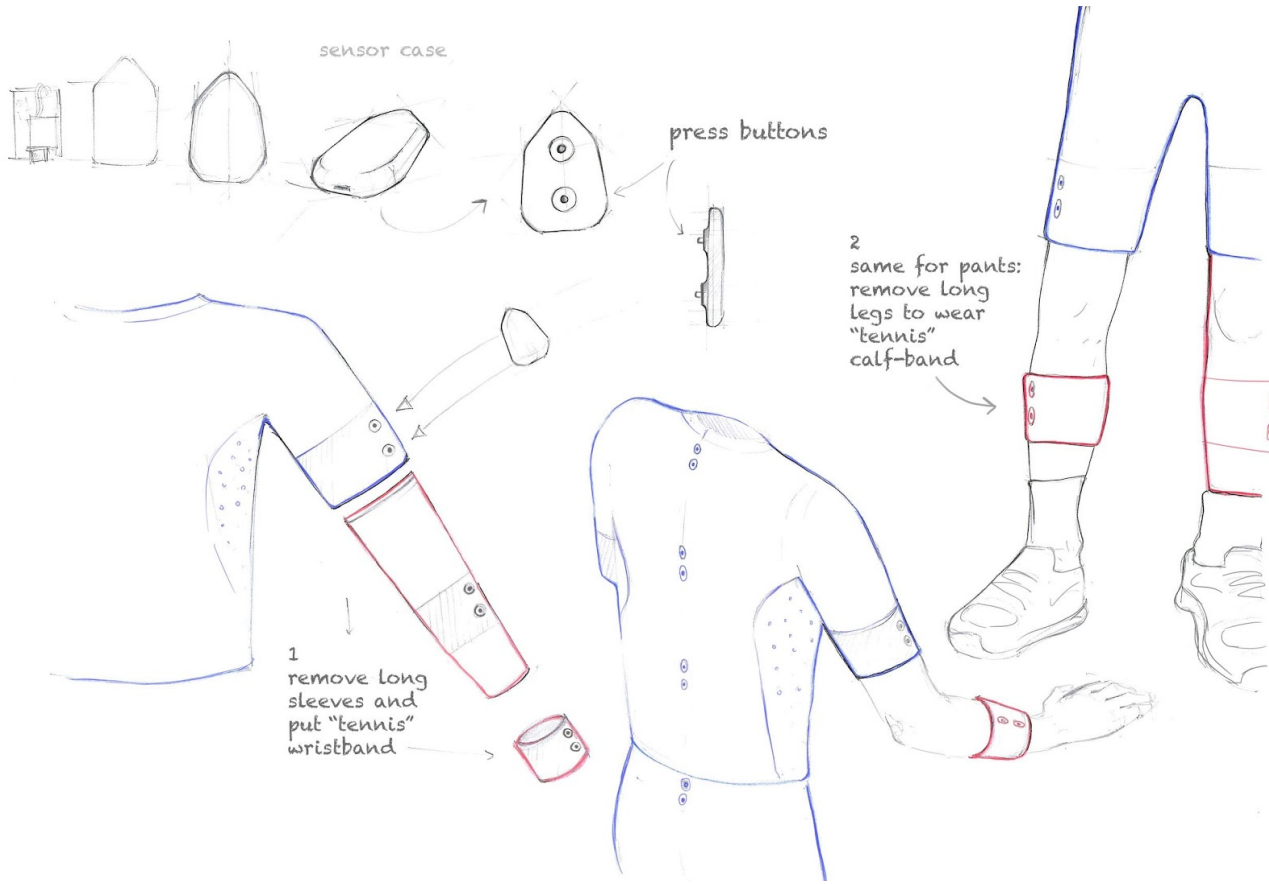
Suit requirements:

- it must be tight to the body;
- textile must be soft and smooth;
- sensors must be fastened after wearing the suit;
- shirt and pants must stay in place (fixing points are needed).

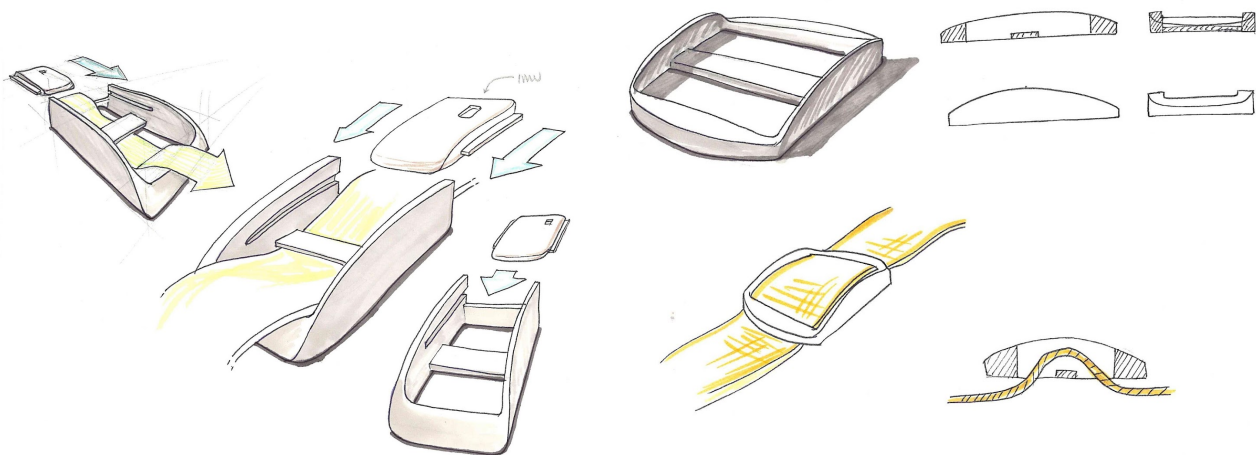
The number of IMU sensors and their position on the body has been a matter of investigation by PLUS and SRFG, therefore not being dated until the end of the project the model and the concept needed to be as flexible as possible in terms of modification of the technological additions. The design studies for concepts have focused on usability (efficacy, efficiency, satisfaction) of the overall suit and on the intuitivity and ease of placement and removal of the IMUs from the suit.



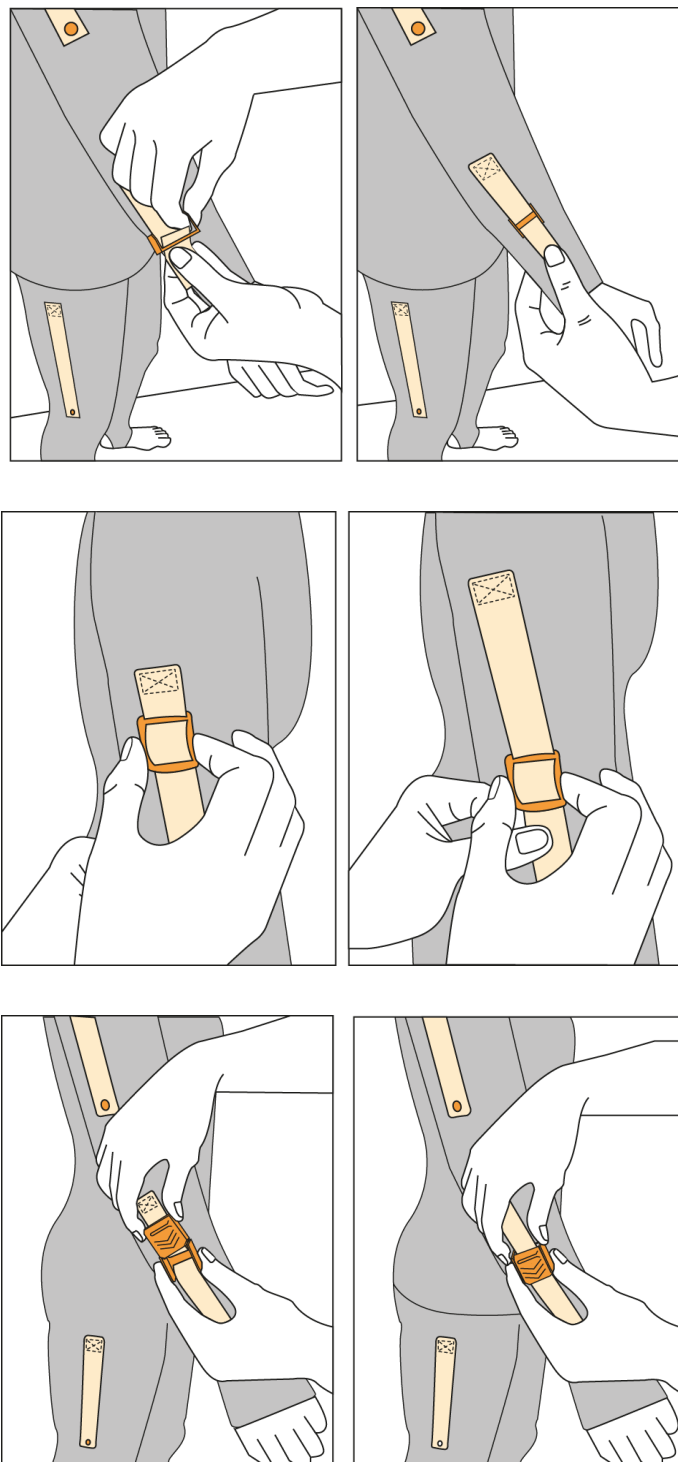
Studies of the suit concept and the fastening system of the sensors n.1



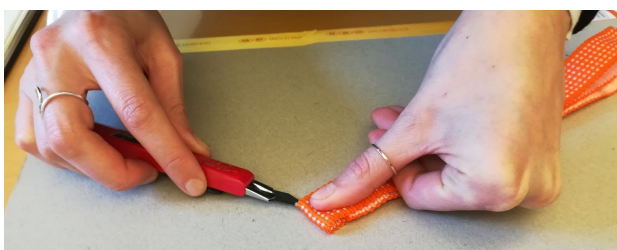
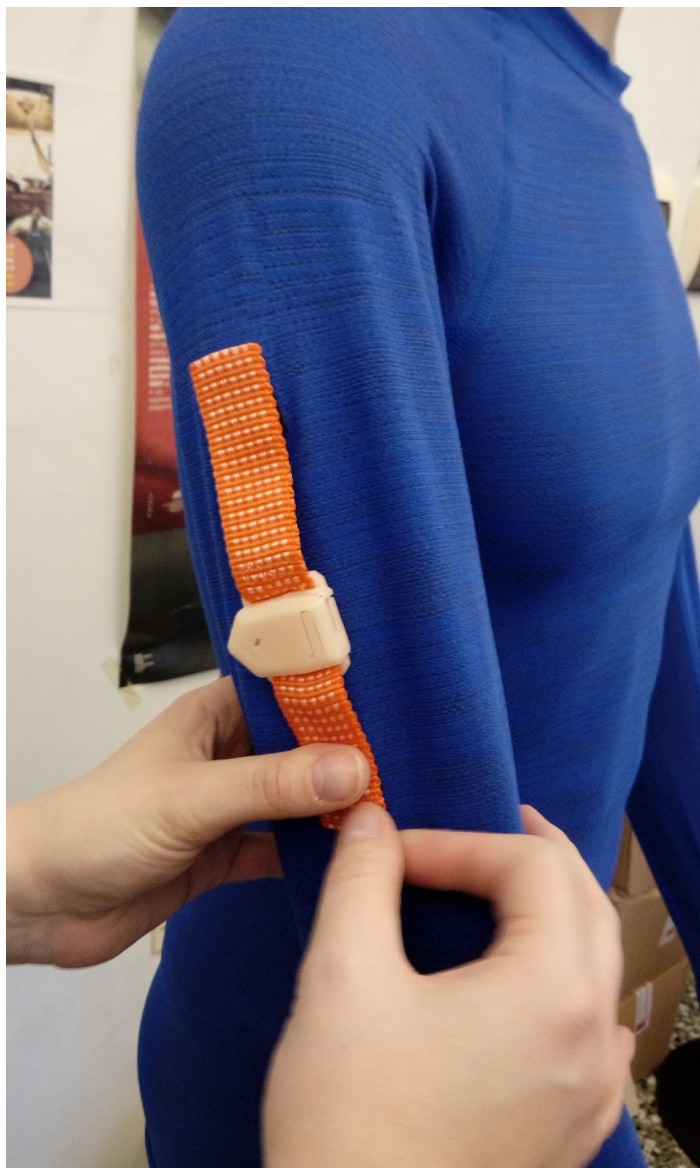
Studies of the suit concept and the fastening system of the sensors n.2



Studies of the suit concept and the fastening system of the sensors n.3

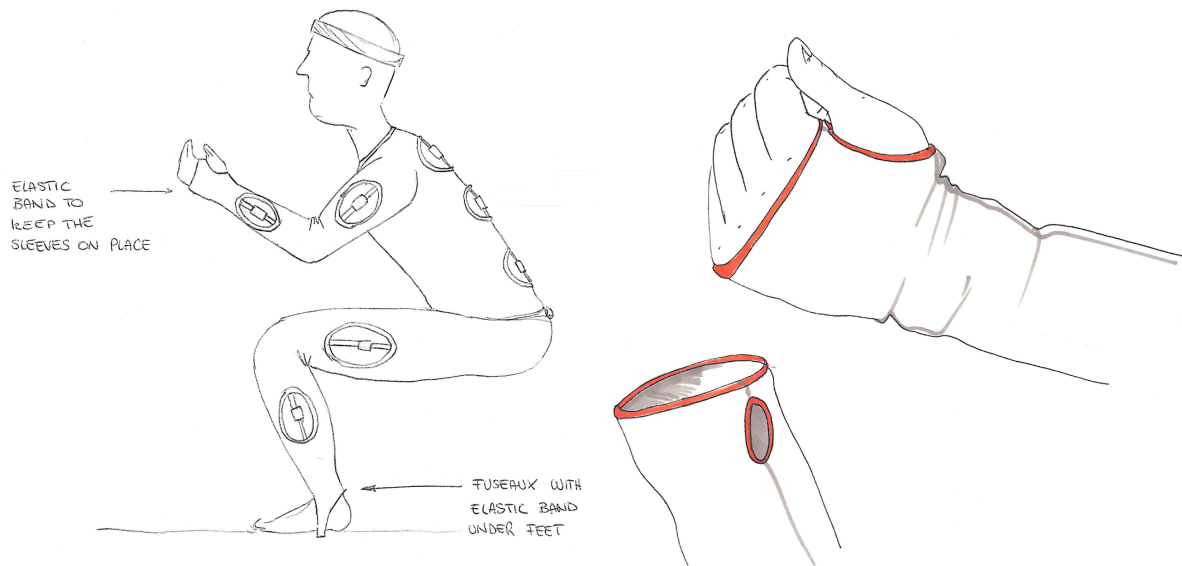


Studies of the suit concept and the fastening system of the sensors n.4

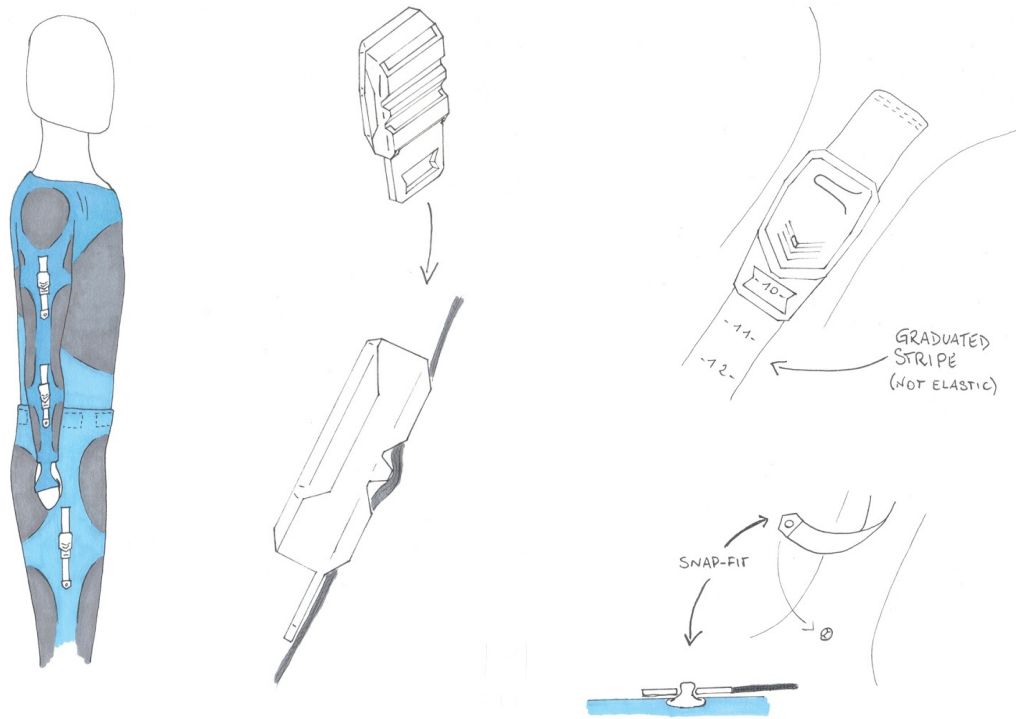
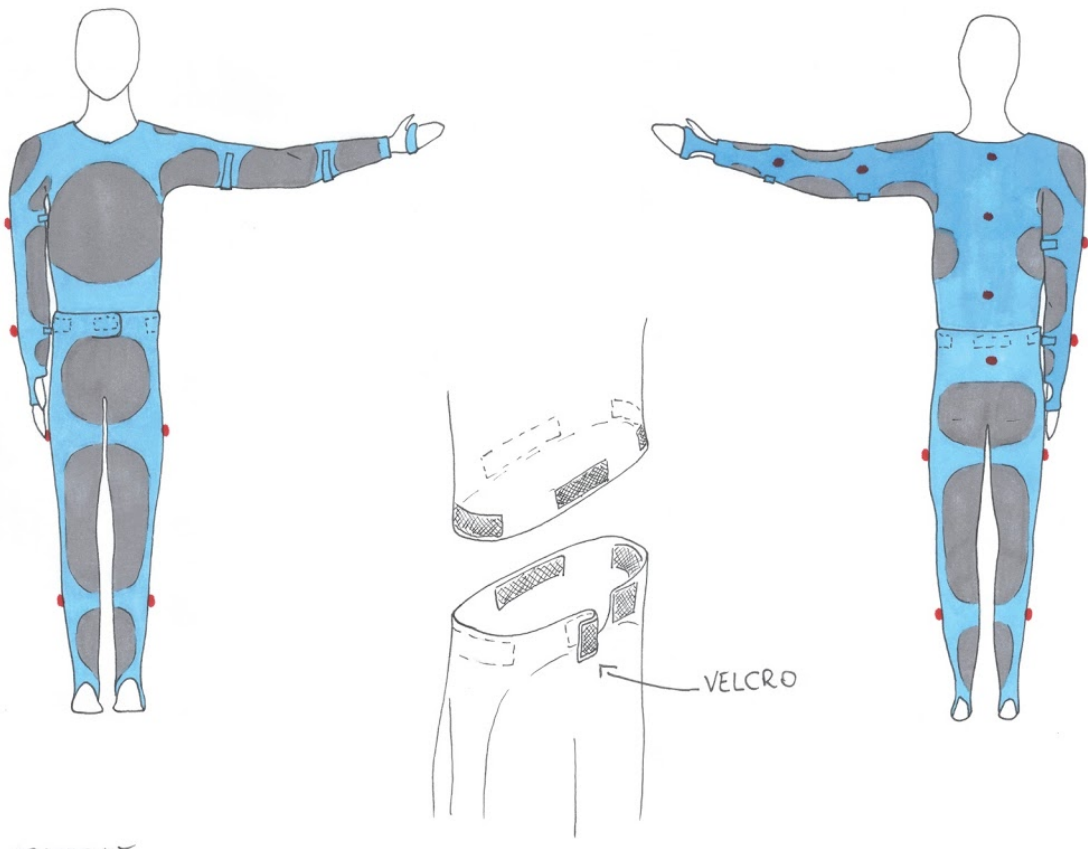


Studies of the suit concept and the fastening system of the sensors n.4

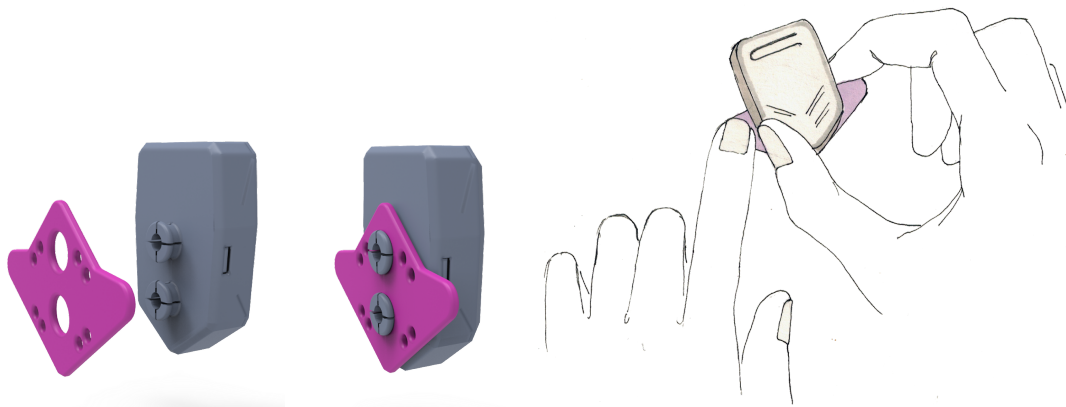
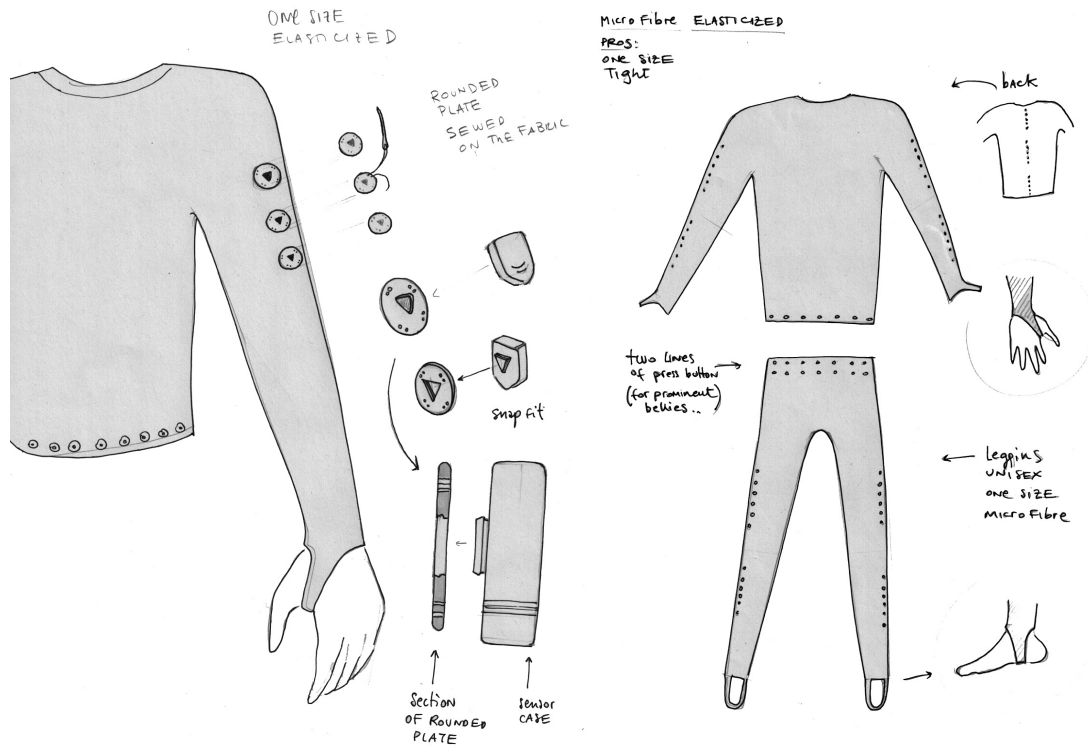
In this phase of concept definition, sketches, fast prototypes and models have been produced to investigate the best functional and technical solution.



Studies of the suit concept and the fastening system of the sensors n.5



Studies of the suit concept and the fastening system of the sensors n.6



Studies of the suit concept and the fastening system of the sensors n.7

Quality of the textile and identification of WKS by Cifra s.r.l.

Through the study of different textiles and systems for fastening, we identified an interesting possibility to exploit a specific pattern of holes in the textile with a set of buttons placed on the back of the cases: in this way the flexibility of the textile guarantees the fitting to the user's body and becomes structural at the same time.



Textile and fastening moodboard

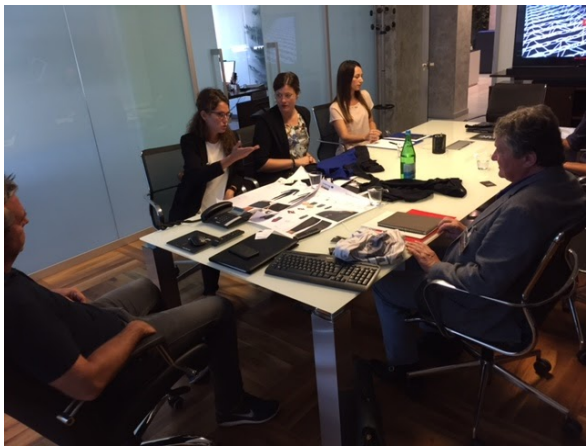


Renders of the fastening system

The company producing the specific textile is WKS by Cifra s.rl., based in Verano Brianza (Monza, Italy) and guarantees the quality of the fabric through a knitting dynamic which includes the holes since the design phase, not producing them a second time and therefore ensuring their resistance to stretch, use and time.

The Lead Partner got in contact with the company and we had a meeting in the factory, where we expressed our design needs and we had the occasion to discuss with the technical office the details, to then move and visit the factory and the production site.

We agreed on the production of a few prototypes.



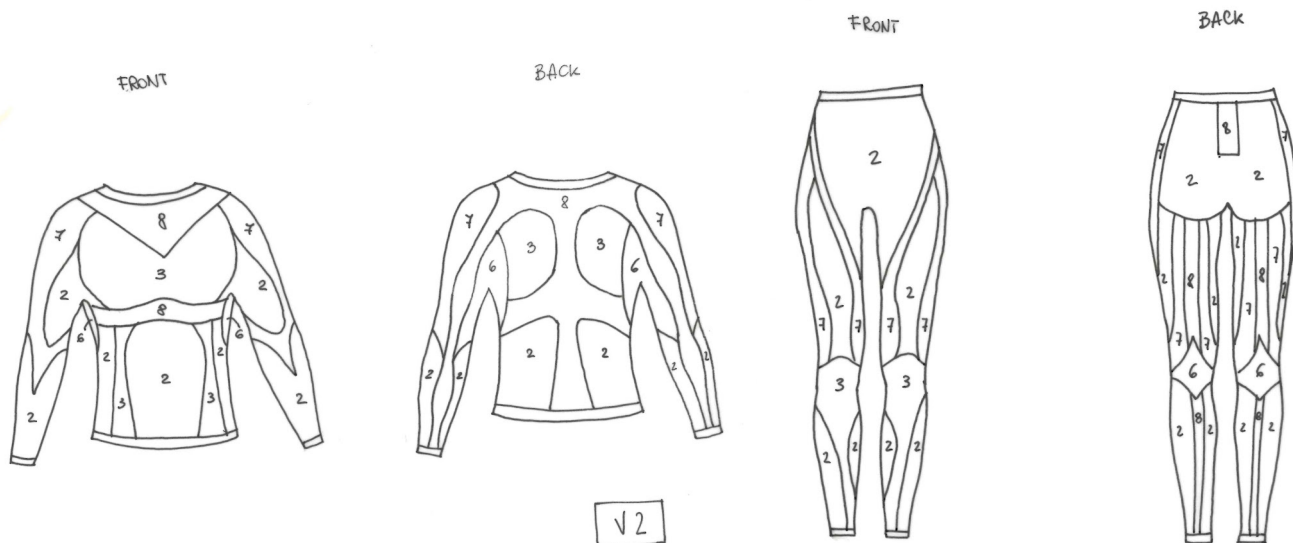
luav researchers and CPV visiting Cifra s.r.l.

Technical drawings for the suit prototypes

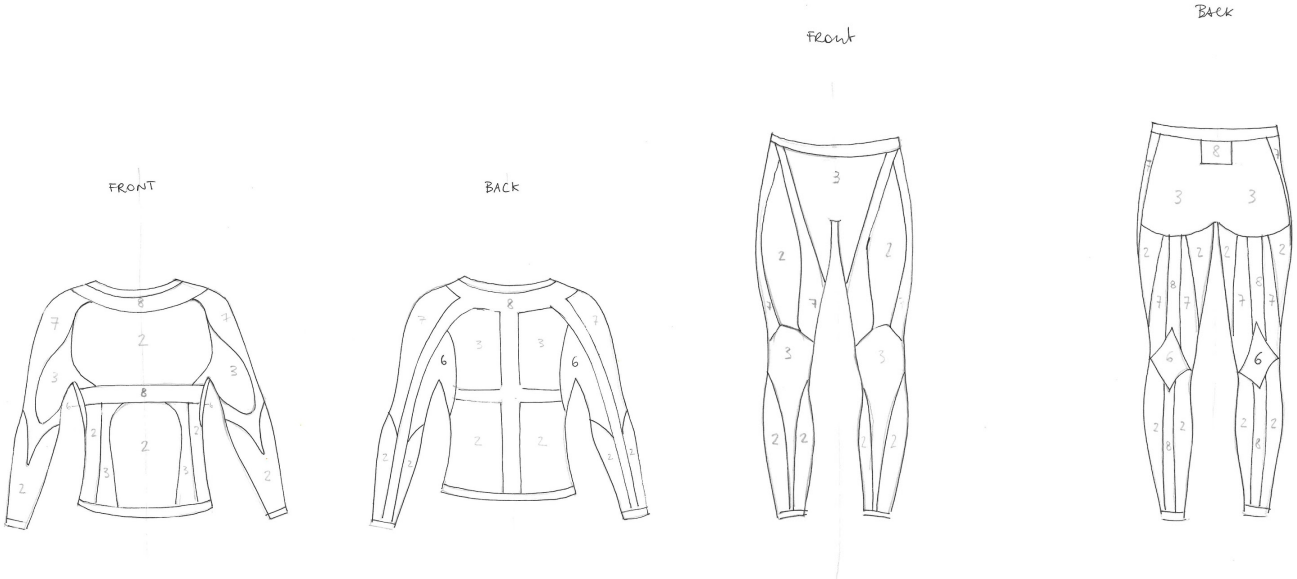
After visiting the technical implants, Cifra s.r.l. provided a set of fabric samples to use as reference for the properties of the final textile. The material used is Lycra and the differences in the knit define the strength and the elasticity of the final model.

The suits have been designed with perforated stripes to allow the insertion of the sensor cases. The striped part has been kept for all the length of the legs and the arms to allow the modification of the position of the sensors since the number of sensors and their position has undergone variations until the final steps of the project (reduction of IMU number, definition of position on the body, need of further electronics).

Gender variations have been included into the design of the suits, that are different to fit the female and the male body appropriately, alternating softer textile in sensitive anatomical parts and stretcher textile in the parts of the bodies where skin and muscles get more flabby when ageing.



Technical drawings for the female version



Technical drawings for the male version