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## BIOLOGICAL RESPIRATORY PROTECTION TODAY AND TOMORROW

### 1. IN THE HOSPITAL ENVIRONMENT

In pneumology intensive care, viruses and bacteria are more than present. For front-line healthcare staff, protecting themselves against viruses and bacteria is essential for their own safety, as well as to avoid transmitting them to other patients.

COVID has taught us that wearing face masks is a good solution, for so far they are tight-fitting on the face, but offer insufficient protection in intensive care.

The most obvious solution is to use existing respiratory protection equipment used in industrial environments. The norm that defines this type of **Personal Protective Equipment** is Commission Directive (EU) 2019/1832 of 24 October 2019.

However, this norm only defines protection against dust and liquid micro-droplets, but nothing at biological level.

### 2. IN PRACTICE

This standard was originally set for people working in buildings containing asbestos: this **Personal Protective Equipment (PPE)** is therefore designed for people carrying out heavy work and therefore needing a lot of oxygen. This implies high air flow rates, which are accompanied by a high level of noise, which is painful after just a few hours of use. This is not acceptable in a hospital environment, where care givers need to be able to communicate easily.



Louis-Philippe Mascart +32 486 18 36 06  
[lpm@medicalbubble.eu](mailto:lpm@medicalbubble.eu) [www.medicalbubble.eu](http://www.medicalbubble.eu)  
Lab and administration  
 Avenue des Rossignols 8 B-1310 La Hulpe  
Head office: The Gate, Axis Parc  
 Rue du Fond Cattelain 2, B-1435 Mont-Saint-Guibert  
 Belgium

### 3. “MISEMPLOYMENT” USE: TRICKY AND RISKY !

This industry norm is respected by PPE manufacturers but does not meet the expectations of healthcare services. Of course, to meet the requirements of the medical field, we apply this norm, and, in addition, we have decided to meet all non-standard requirements of biological protection.

The specifications for intensive care in a hospital environment are necessarily very different. The PPE initially designed for industry are therefore as unsuitable as they are derivative of their original field of action. We will leave the conclusion to a Physician Head of Pulmonology Department: "What we're using is nothing more than a bad DIY job, but we haven't found anything else on the market".

### 4. TAKE THE PLUNGE...

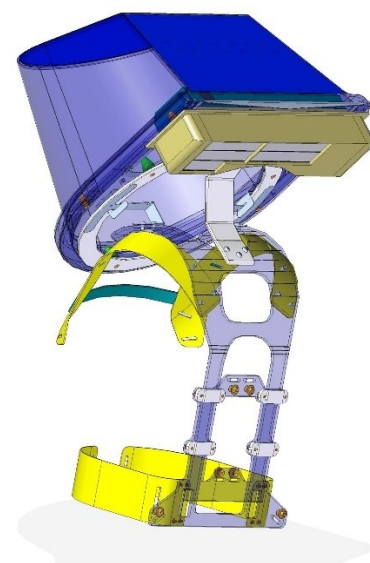
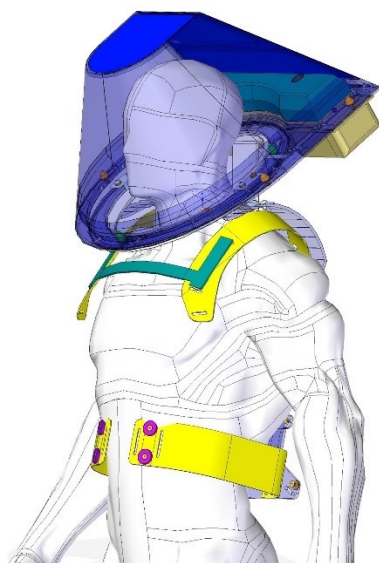
During one of our meetings in a hospital environment, we also realised that no one had decided to remedy this unacceptable yet very common situation, not even the care givers in intensive pneumology who are on the front line.

As an automation Engineer specialising for over 20 years in the development of prototypes in the biotechnology, nuclear and food industries, decontamination, and sterilisation issues form the basis of our activities: we therefore decided to launch the development of our own equipment meeting 100% of hospital needs, and many other industrial and safety requirements.

### 5. AND SWIM!

Thanks to numerous interviews with care givers, the specifications very quickly turned out to be very different from those of the protective equipment’s available on the market. The solution we are proposing is also very different. Moreover, its originality has enabled us to patent it. A prototype enabled us to test our concept against the realities of the field, and a risk analysis led us to functionalities to be implemented. Today, development is complete and industrial production has begun.

### 6. HERE IS THE RESULT!





*This is not a protopipe  
... but a demonstrator of  
industrial equipment  
in the making...*



## 7. OUR STRENGTHS

### 7.1 Safety

- The Ergo-Air is the only biological respiratory equipment that protects its user even when it breaks down because the user has more than 15 minutes to get out of the work area (sterile, or contaminated) and put on another Ergo-Air
- The Ergo-Air filters are HEPA cleanroom filters (EN 1822:2009), type H13 (99.95%) which reduce the residual risk to 0.05% for particles of 0.1 $\mu$ . Viruses need aerosol droplets as vehicles to move: aerosols above 0.1 $\mu$  will be mechanically stopped by the filter, and aerosols below 0.1 $\mu$  will be captured by the free ionic bonds of the filter fibres
- The back fastener ensures a firm and supple hold on the body while leaving complete freedom of movement (user size: 1.6m to 2m).

### 7.2 Sterility

- All the equipment is sterile and delivered in sterile packaging. It can then be decontaminated using a wipe soaked in alcohol or Actril, or biofilm-destroying enzymes. Ozone sterilisation again before each use is recommended for use in operating rooms
- Decontamination is easy, fast, and efficient thanks to the Ergo-Air's fluid design (all smooth and rigid surfaces, no inaccessible corners).



### 7.3 User comfort

- Thanks to very large filter surfaces (20 times the surface area of an FFP2 mask), the compressor uses very little energy for the air flow required in the hood, lowering the compressor noise to a virtually inaudible level
- By measuring the intensity of the user's breathing, the Ergo-Air automatically adjusts the airflow to the physical effort of the user
- The airflow can be increased to cool the hood at the user's request
- No need to wear a face mask, no contact with the head or face, and no more fogging of glasses
- One model fits all sizes from 1.6m to 2.0m.

### 7.4 Patient comfort

- Visual contact with the whole of the caregiver's face: this vision is beneficial for everyone, essential for the hearing impaired, and impossible with FFP2/FFP3 masks
- Easy oral communication between caregiver and patient thanks to textiles used in operating theatres, located under the hood and on the top and back of the hood.

### 7.5 Additional services

The Ergo-Air is supplied with accessories for validation, contactless battery charging during equipment sterilisation, traceability software and, as an option, ozone sterilisation equipment and centralised computerised alarm collection.

### 7.6 Respect for the environment

As the Ergo-Air is reusable, it generates no waste, saving 800 FFP2 masks over the lifetime of an Ergo-Air (5 years).

The entire production of the Ergo-Air is carried out in Belgium, so it has a minimal carbon footprint, and its assembly is entrusted to an Adaptive Work Company.

## 8. A COMPENDIUM OF TECHNOLOGIES

- Ventilation controlled by a microprocessor according to the physical effort made by the user
- Filter cleanliness measurement
- Bluetooth communication
- Voice alarms signals
- Design guarantees sterility during handling
- Thermoforming
- UV-curing adhesives
- Double RFID labelling for total traceability.

*Whether the subject is of interest to you or concerns you,  
your point of view will help us move forward.*

*Thank you in advance.*