

# MAINTAIN - MASK for protection and ventilation -Based on DECATHLON mask

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AIRBUS is sharing this initiative in collaboration with:

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HCU VALLADOLID  
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CHU BAYONNE

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ATELIER PONTONZ  
UBO OPEN FACTORY  
ALTRAN  
CONSORTIUM COVID19 FRANCE  
FABLABS AND MAKERS

Problems to solve:

Limited availability of masks / NIV equipments during the crisis

Existing masks doesn't have exhalation filtration system, this could augment the possibilities of the spreading the virus





Decathlon snorkel mask



Reusable **PPE parts:**

**-Filter adapter**

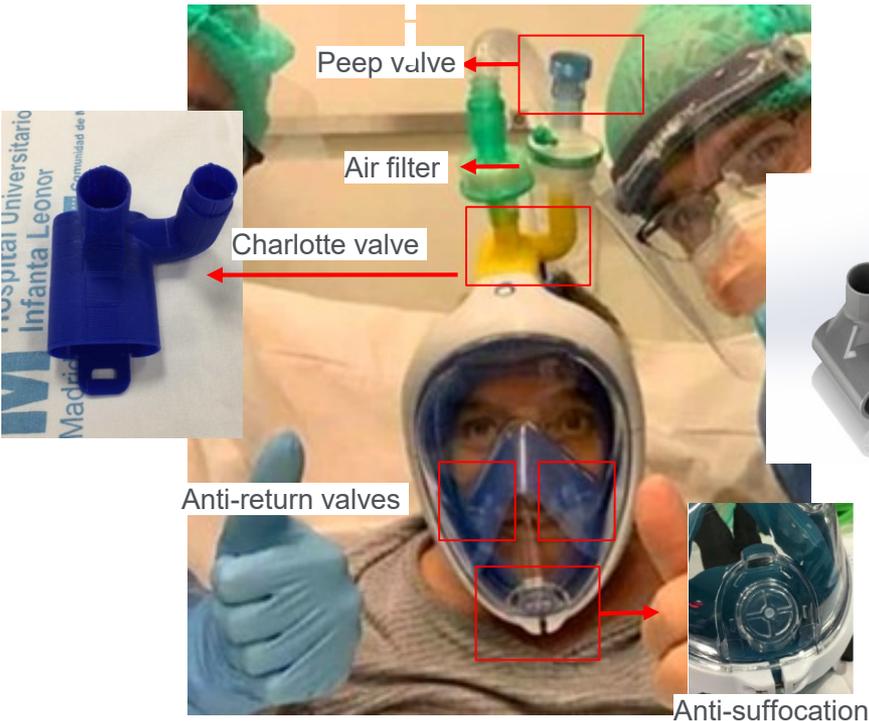


Patient NIV Mask parts:

- Anti suffocation valve**
- Inhalation adapter**
- Exhalation adapter**
- Peep valve**

### NIV initial solution: Charlotte valve (Isinnova, Italy)

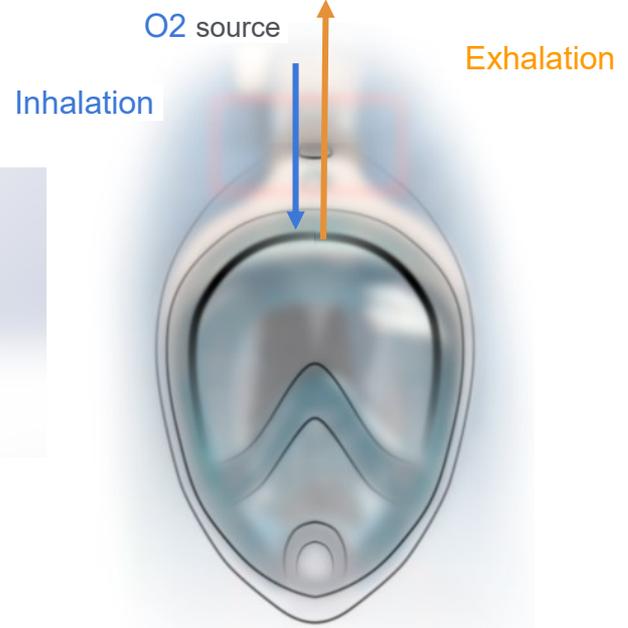
<https://www.isinnova.it/easy-covid19-eng/>



difficult to mass produce

Anti-suffocation valve

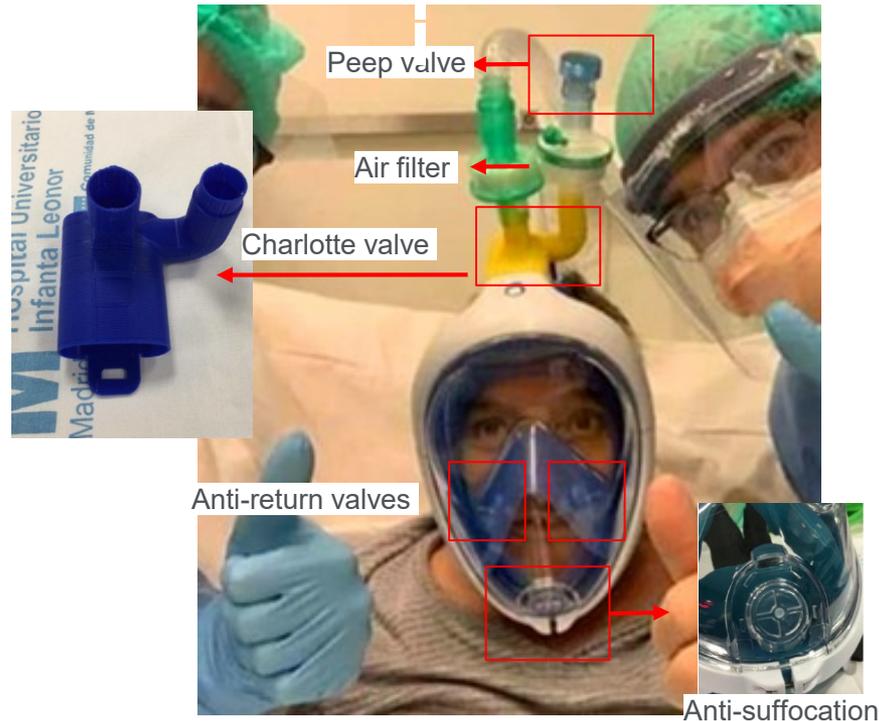
PEEP: Positive End **Expiratory** Pressure



Mask exhalation valve reversed to function as anti-suffocation valve

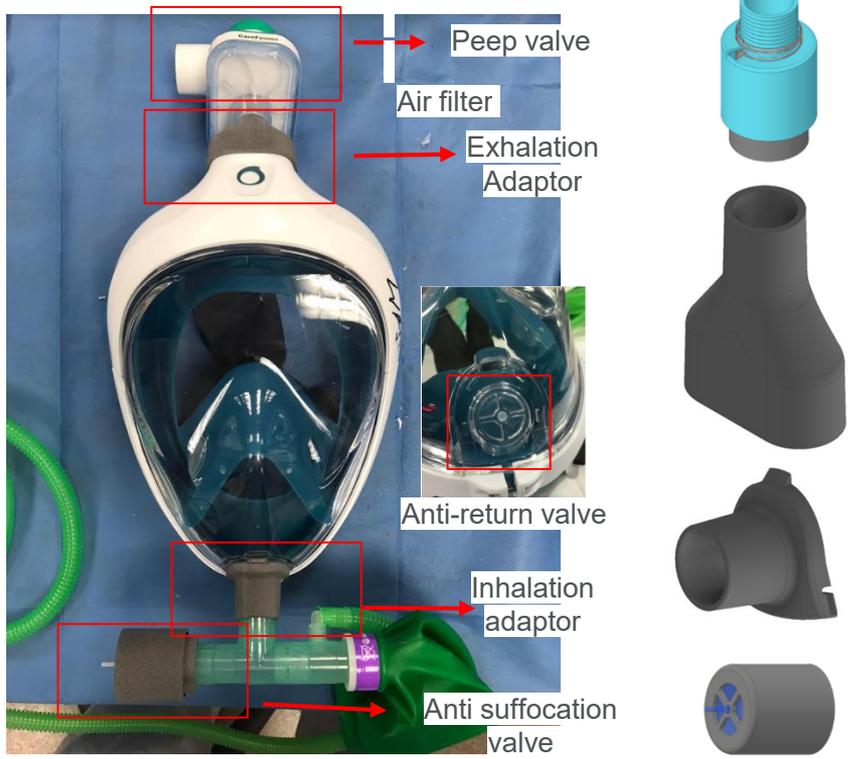
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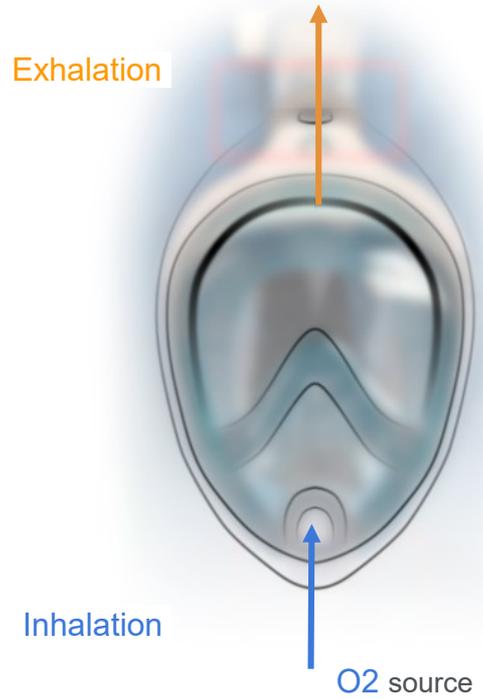
### NIV new solution: Modular kit



easier to manufacture: injection molding

### NIV 'low cost' solution

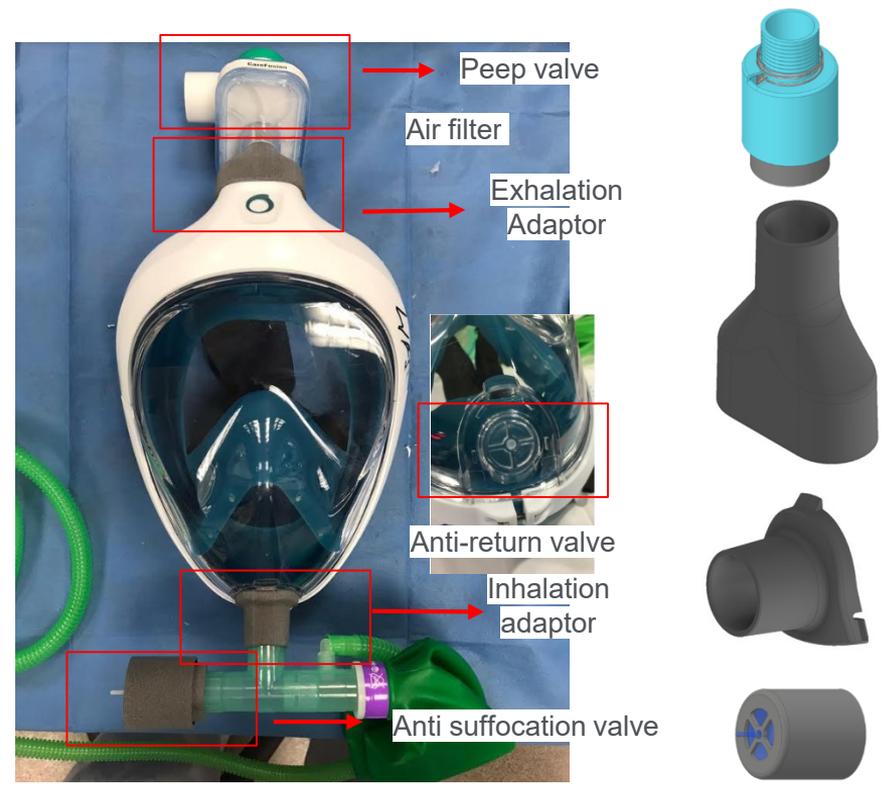
PEEP: Positive End **Expiratory** Pressure



Other Benefits:

Fresh air inlet next to patient nose

Modular kit allows diferent configurations depending on equipment availability



easier to manufacture: injection molding

### PPE 'one filter' solution



Mask exhalation valve can be blocked to avoid spreading virus in case the user is infected

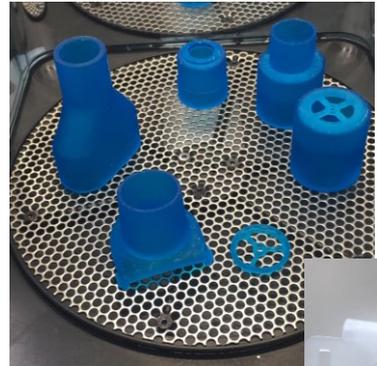
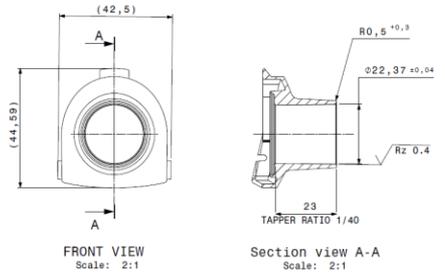


Similar projects:  
 French Consortium: <https://adaptateur-masque.planktonplanet.org/>  
 Standord 'Pneumask': <https://www.pneumask.org/>



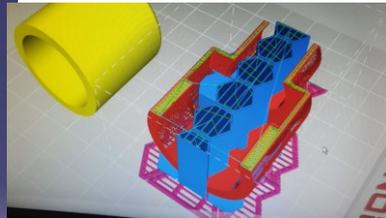
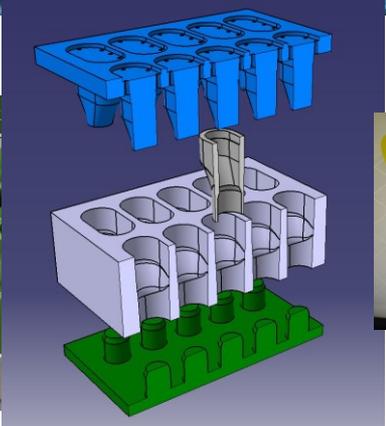
Reusable Decathlon Snorkel Mask **PPE + NIV mask** as an emergency alternative for non invasive ventilation assistance for COVID19 patients

Engineering tests to validate designs, manufacturing process and materials



BIC launched injection molding for similar adaptors for PPE

Interfaces compliant with ISO 5356 standards



Manufacturing technologies considered: 3D Printing (FDM, SLA, SLS, MJF), casting, injection molding  
Preferred materials: PP, PU, PA, biocompatible resins

Reusable Decathlon Snorkel Mask **PPE + NIV mask** as an emergency alternative for non invasive ventilation assistance for COVID19 patients

Medical tests to evaluate system performance to compare it with existing solutions

Medical tests in Madrid  
Infanta Leonor Hospital



Medical tests included: breathability/pressurization/sealing, esterilization/desinfection, dermatological, safety tests  
Certification on going

Non profit initiative - certify in your own country before using

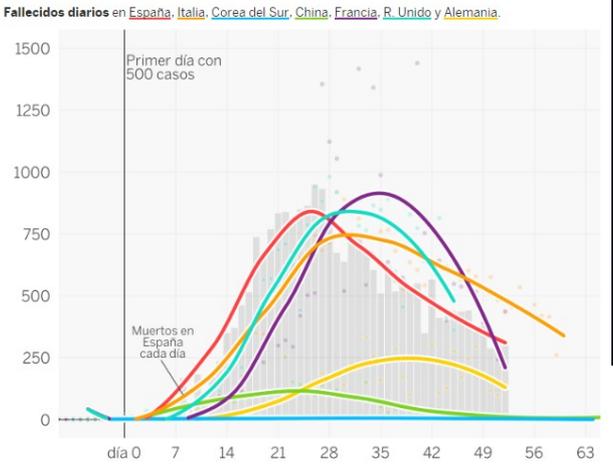
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Non profit initiative - certify in your own country before using

Reusable Decathlon Snorkel Mask **PPE + NIV mask** as an emergency alternative for non invasive ventilation assistance for COVID patients

Next Step: Share and Export solutions, targeting other countries in America, Africa and Asia



## Links

All CAD files are under [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International \(CC BY-NC-SA 4.0\)](https://creativecommons.org/licenses/by-nc-sa/4.0/) and available here : <https://drive.google.com/drive/u/0/folders/15-Eo7vTS69AckzyDiBeQvo46jfJTKphs>

Drive : [https://drive.google.com/drive/u/0/folders/1J-ft3M1anEUcVjdL0rq7b6MYuY0n3I\\_Y](https://drive.google.com/drive/u/0/folders/1J-ft3M1anEUcVjdL0rq7b6MYuY0n3I_Y)

Assembly procedure:

<https://youtu.be/lbjdunXFbQ8>

<https://youtu.be/p5YVUVtmufl>