

MAINTAIN - MASK for protection and ventilation

-Based on DECATHLON mask



AIRBUS is sharing this initiative in collaboration with:

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DECATHLON FRANCE
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ATELIER PONTONZ
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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

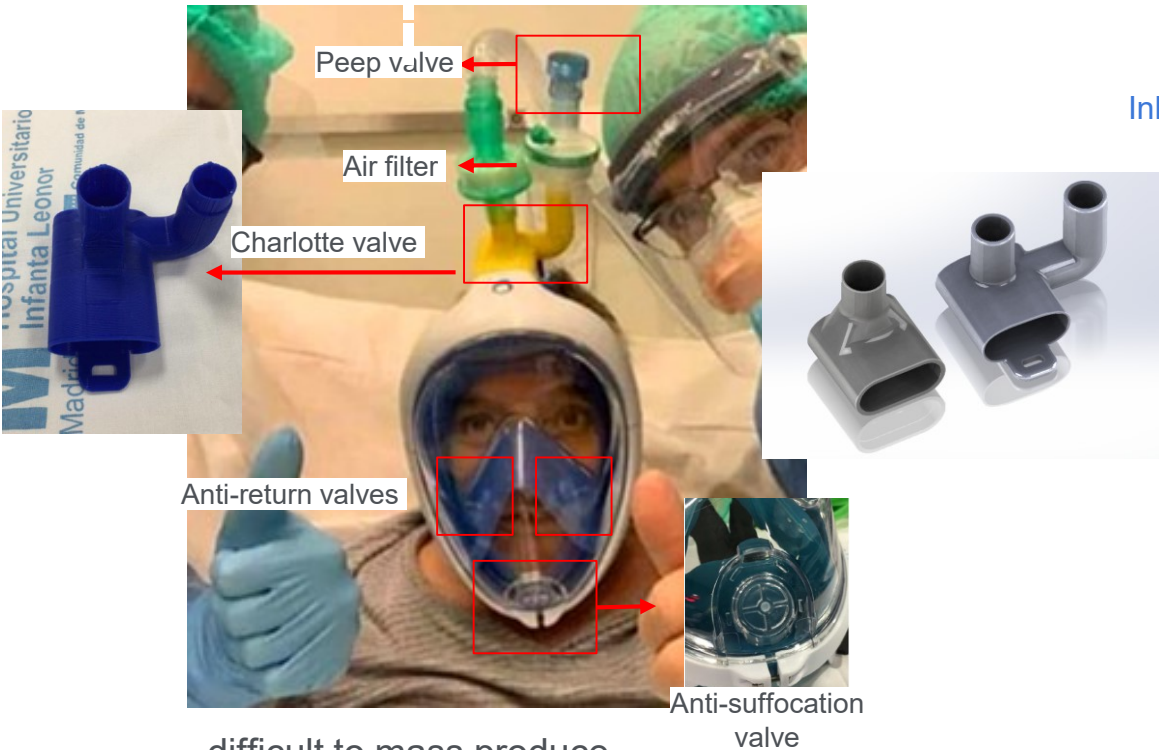


Patient NIV Mask parts:

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

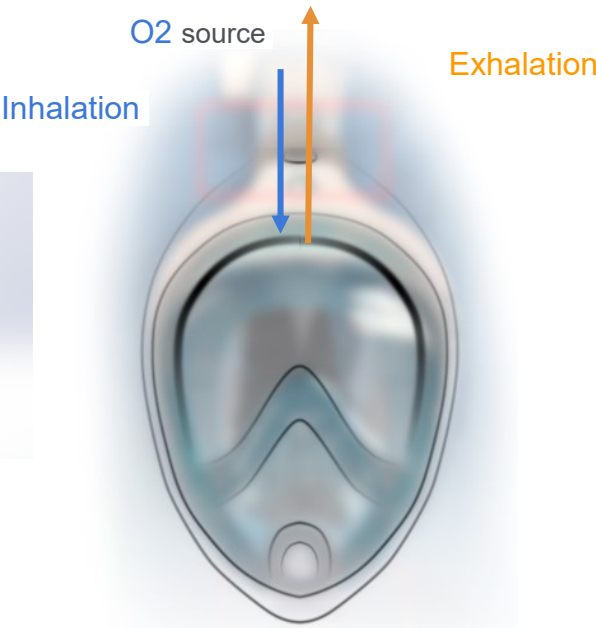
NIV initial solution: Charlotte valve (Isinnova, Italy)

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



difficult to mass produce

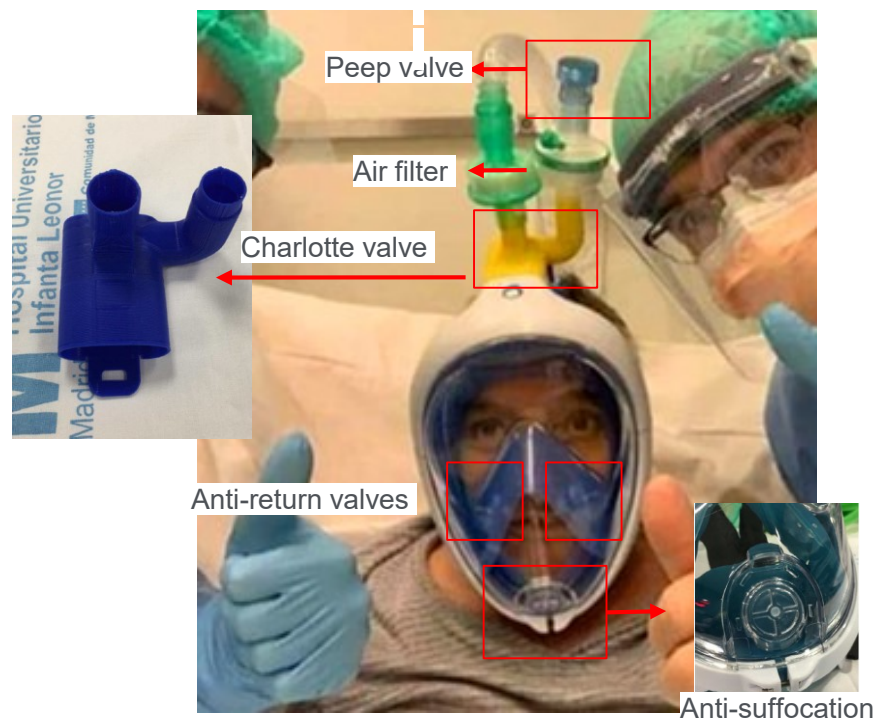
PEEP: Positive End **Expiratory** Pressure



Mask exhalation valve reversed to function as anti-suffocation valve

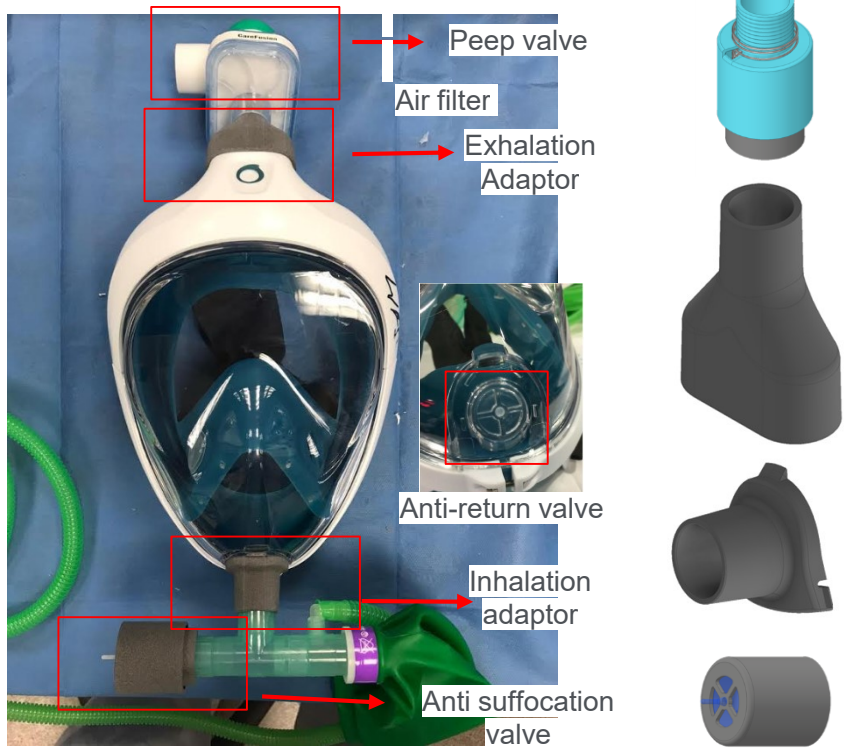
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difficult to mass produce

NIV new solution: Modular kit



easier to manufacture: injection molding

NIV 'low cost' solution

PEEP: Positive End **Expiratory** Pressure

Exhalation

Inhalation

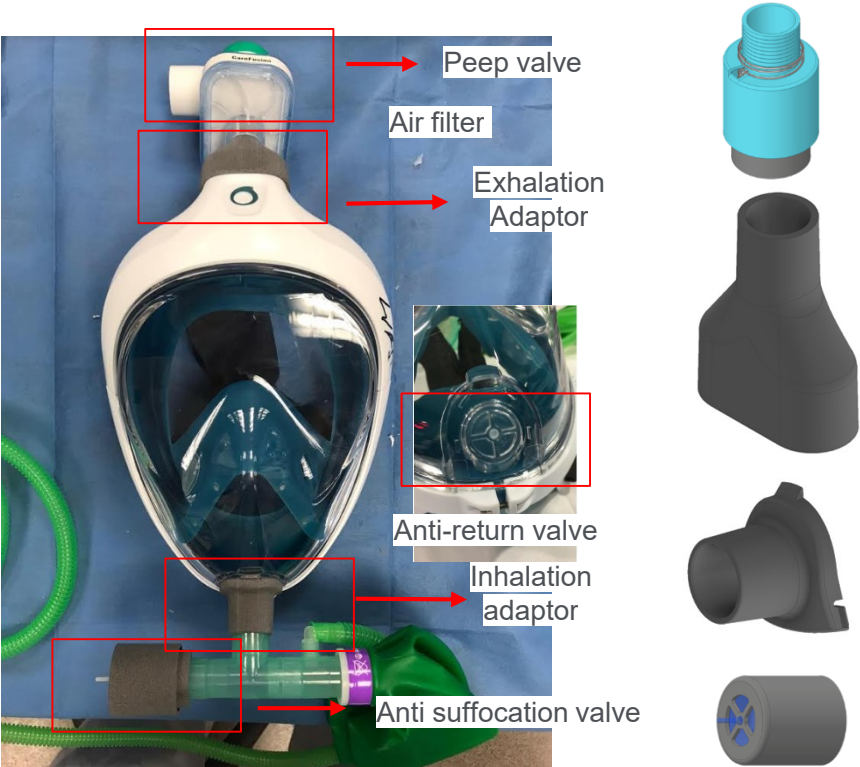
O2 source



Other Benefits:

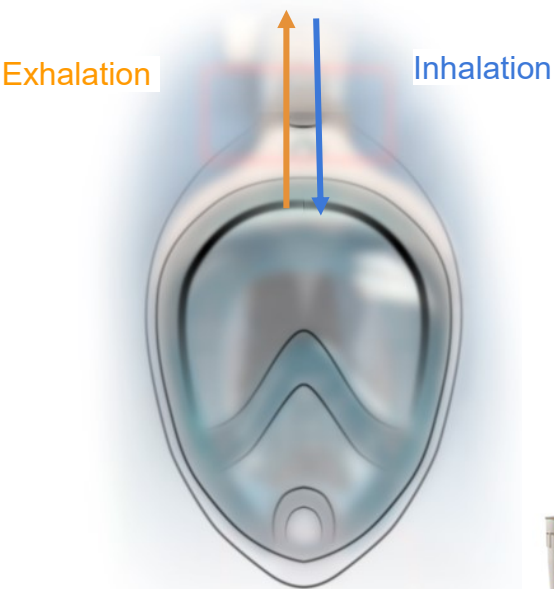
Fresh air inlet next to patient nose

Modular kit allows diferent configurations depending on equipment availability

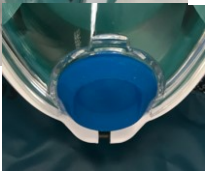
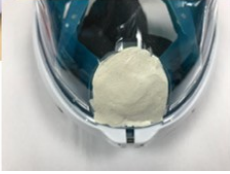


easier to manufacture: injection molding

PPE ‘one filter’ solution



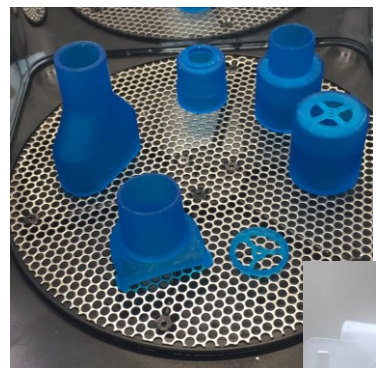
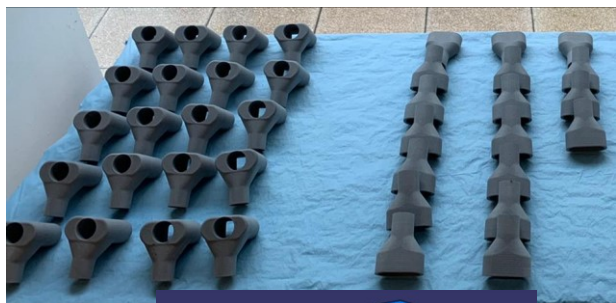
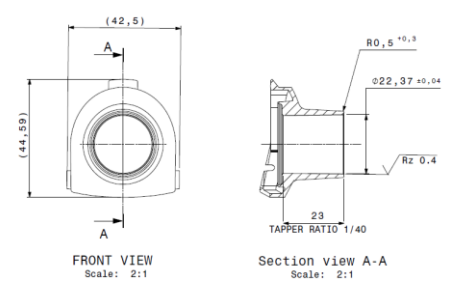
Mask exhalation valve can be blocked to avoid spreading virus in case the user is infected



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

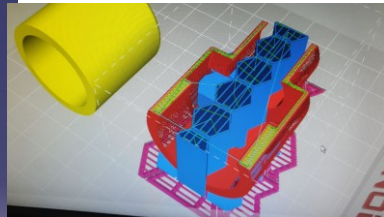
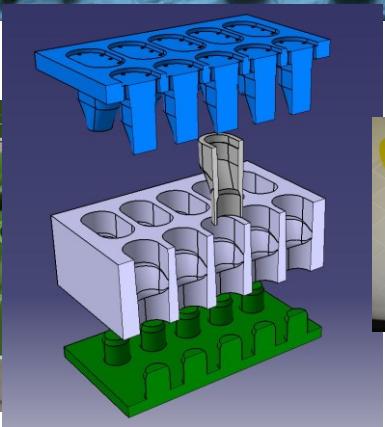
Reusable Decathlon Snorkel Mask **PPE + NIV mask** as an emergency alternative for non invasive ventilation assistance for COVID19 patients

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



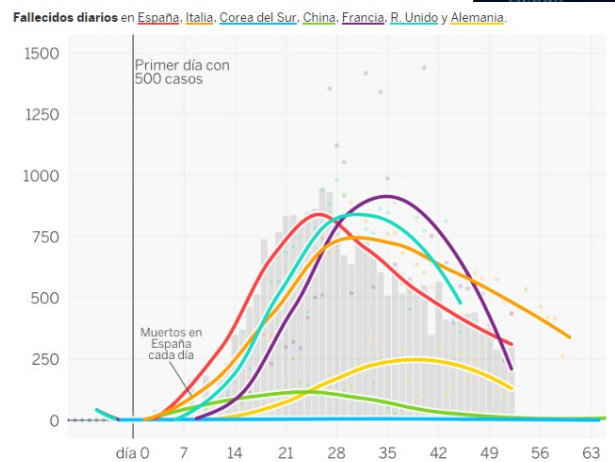
Medical tests included: breathability/pressurization/sealing, esterilization/desinfectation, dermatological, safety tests
Certification on going

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

Assembly procedure:

<https://youtu.be/lbjdunXFbQ8>

<https://youtu.be/p5YVUVtmufI>