# NilePrenuers

## Covid-19 Solution #1: Medical Face-shield

www.np.eg    www.facebook.com/nilepreneurs

## Introduction

In reaction to the current pandemic situation and outbreak of corona virus disease (COVID-19), Our team decided to help the medical staff fighting on the frontline and provide them with the needed protective equipment. With the safety equipment shortage and the high demand for the medical face-shield, many people were left without protective masks/shields. Therefore, NilePreneurs Initiative proposed solution to manufacture them with digital facilities.
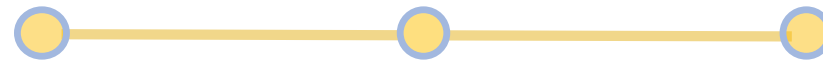
## Medical Face-shield

The face shield is a personal protective equipment designed to provide full facial protection from hazards such as flying objects, chemical splashes or potentially infectious materials.

## Project Brief

Design, develop and mass-produce protective and convenient face shields through rapid manufacturing using laser machine which is the cheapest and fastest prototyping equipment and using inexpensive materials and the most common and accessible tools and resources.

## Face-shield parts

1- Headband
2- Forehead support
3- Transparent Visor
4- Elastic Strap

FOREHEAD SUPPORT

HEADBAND

ELASTIC STRAP

TRANSPARENT VISOR
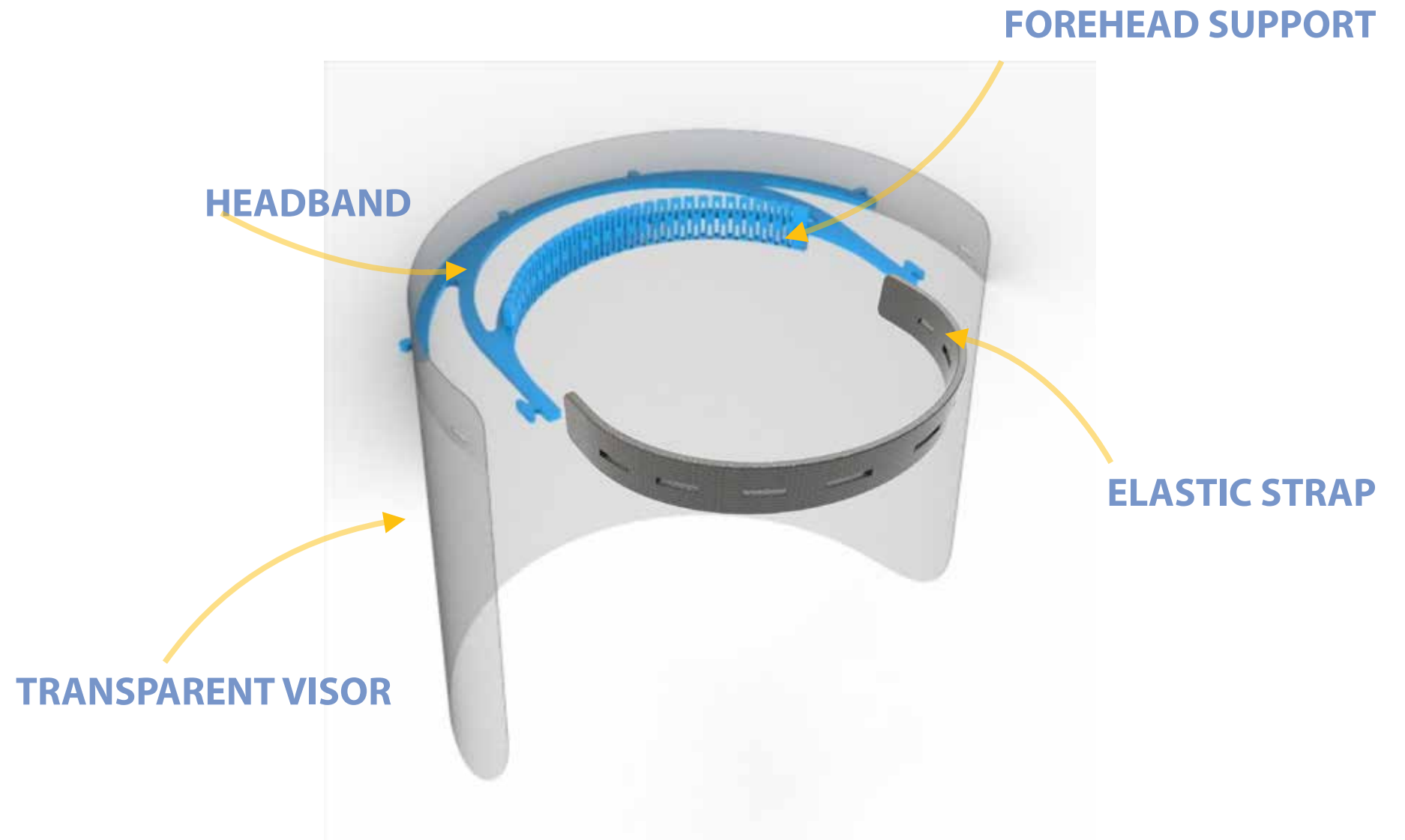
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## Prototyping and Production

## Materials:


Acrylic Sheet 3mm


Laminating Film
(PET 400 μ - PVC not recommended)


Chloroform


Acrylic Sheet 3mm


Sanitizing Kit
Chlorine or Ethanol> 70%


Buttonhole Rubber Band

# Prototyping and Production

## Tools & Machines:



Press Machine

Paint Brush

Scissors

Syringe

Sanitizing tools
Face Masks & Gloves

Laser Cutting Machine

## Prototyping and Production

**Modelmaking & Production:**

1- Cut the headband (part 1) and the forehead support (part 2) on the acrylic sheet using the laser machine

2- Cut the Transparent Visor (part 3) on the PET roll using either laser machine or press cutters

3- Cut the Elastic Band (part 4), each strap 32 cm long



1



2



3

CAD Design Link:  https://grabcad.com/library/face-shield-v2-1

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**Prototyping and Production**

**Assembly & Packing:**
It is recommended to use masks and gloves during the assembly

1- Disinfect your hands and tools
2- Acrylic sheet is covered with a protective film from both sides, peel it off carefully. You can use a knife or your fingernail to lift the film up. (Don't forget to use gloves during the assembly)
3- Insert the forehead support (part 2) into the protruded guides of the headband (part 1)
4- Use chloroform to glue part 1 and part 2 together using paint brush or syringe
5- Leave two parts to dry  for minutes
6- Pack all parts along with the user manual into the zip lock bags

Always remeber to keep your working space and yourself as clean as possible

Suggestions for improvements: Send to: info@np.eg
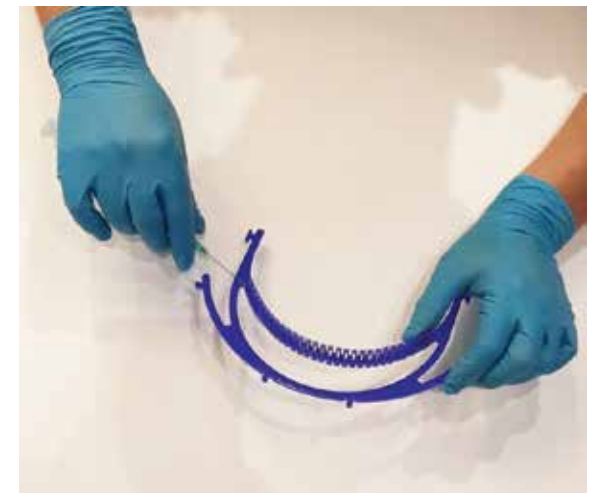
**User Assembly Guide**

1- Open the package and read the instructions guide
2- Mount the visor (part 3) on the headband (part 1) using the holes in the visor and the protruding guides in the headband. Hold it with your thumb, then  push your hand through the headband.
3- Attach the rubber band to both ends of the headband, adjust the length as necessary
4- Disinfect the shield before use



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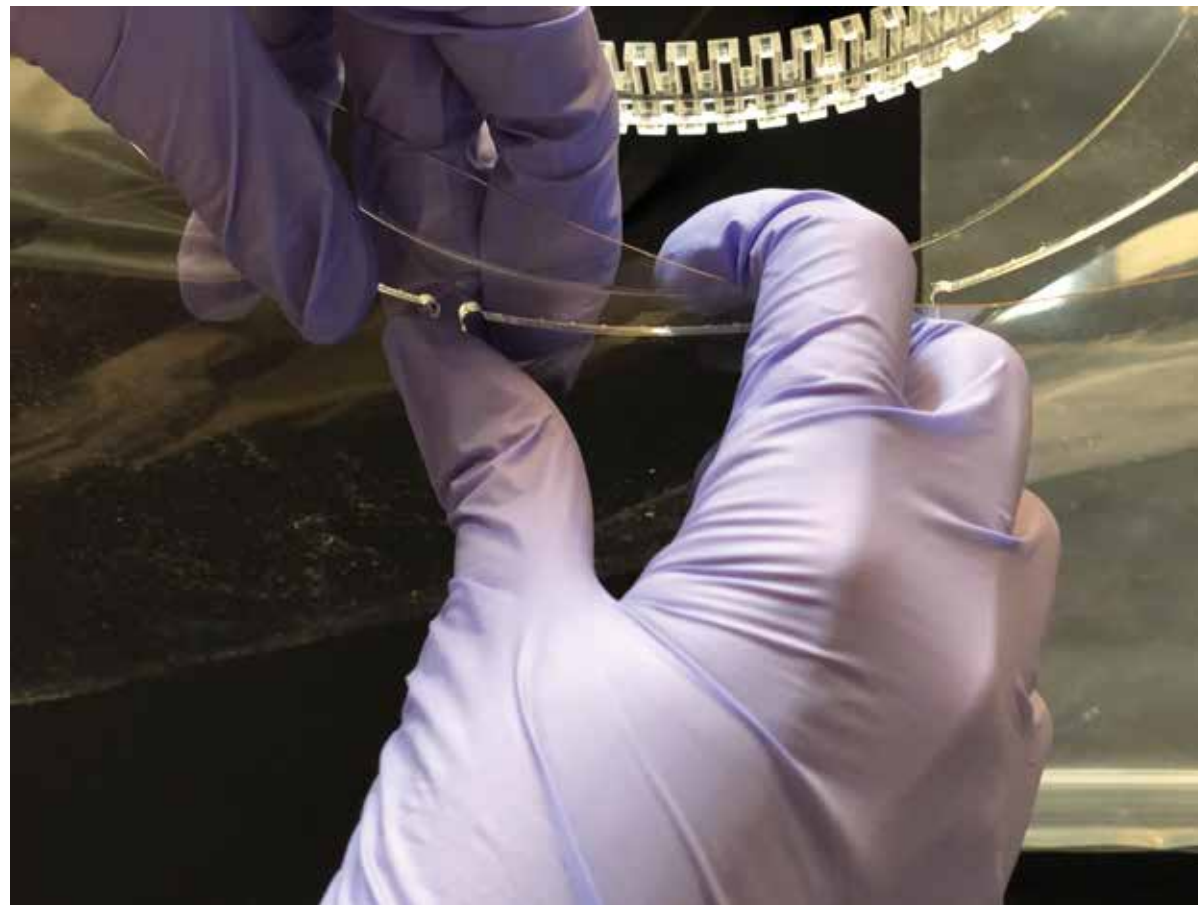
## Using Instructions

1- Face shield is a personal protective tool and cannot be used by multiple persons

2- The shield is a part of the personal protective equipment and can not be used alone

3- Face Shield is suitable for reuse. Each hospital should determine appropriate use / reuse protocols based on a review by the hospital's Infection Control group
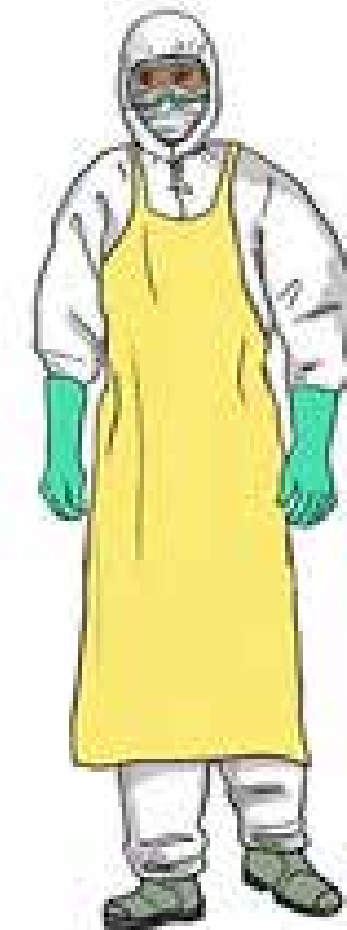
4- Sterilization Compatibility

| | HEADBAND (Acrylic) | FOREHEAD SUPPORT (Acrylic) | VISOR (PET Plastic) | STRAP (Rubber) |
|---|---|---|---|---|
| Autoclave | X | X | X | X |
| Ethylene Oxide | ✓ | ✓ | ✓ | ✓ |
| Gamma Radiation | ✓ | ✓ | ✓ | ✓ |
| Electric Beam Radiation | ✓ | ✓ | ✓ | ✓ |

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## Community

The design of the shields is fully open-source, anyone can produce it and/or modify it

CAD Design Link:  https://grabcad.com/library/face-shield-v2-1

Currently we distribute our face-shields through Misr El-Khair

If you have any inquiries please fill our online form:

https://docs.google.com/forms/d/e/1FAIpQLSdjOCkNkQtH8rYqbBBx-Tl4XXUlWXO7J3nEa_PMpeC52XBgfRA/viewform

Questions & Recommendations

Connect with Us: https://www.facebook.com/nilepreneurs
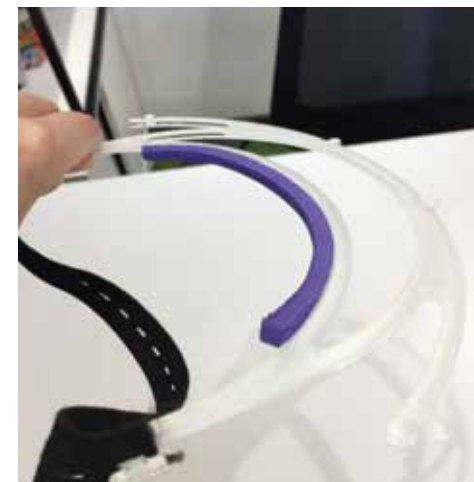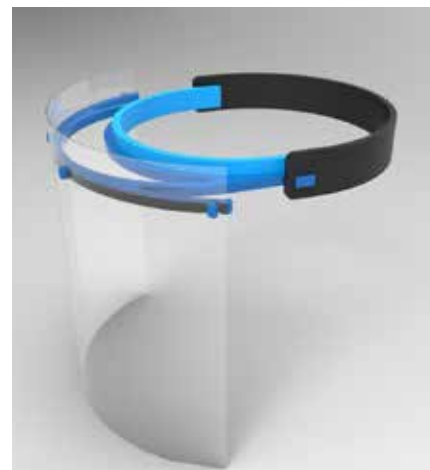
## OUR Project Story

1- Explore the need for the product and study the user experience (why & how doctors use the shields)

2- Review existing and similar open source solutions like Prusa and Georgia Tech

3- Study the ergonomics and anthropometrics for the face and entire head

4- Design the shield and Prototype the first iteration

5- Quick testing followed by design modifications then development of the 2nd iteration

6- User testing for the 2nd iteration in hospitals

PRUSA

## OUR Project Story

7- Develop the 3rd iteration with the required modifications as per user feedback
8- Approval from Infection Control Unit in Zayed Hospital
9- Finalize last version of the design and CAD model
10- Start mass production
11- Packaging & user manual design
12- Packing product
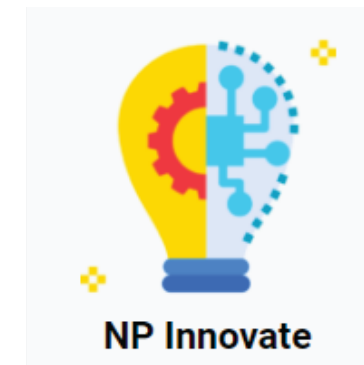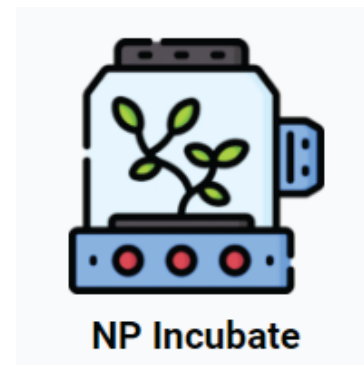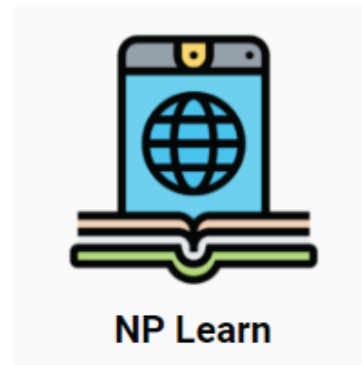13- Distribution
14- Waiting for the 4th iteration feedback

# About NILEPRENUERS

NilePreneurs is a national, fast growing, initiative funded by Central Bank of Egypt, and implemented by Nile University. We aim to enhance the ecosystem for entrepreneurs in Egypt through our different programs. The initiative works closely with different banks, governmental entities and international organizations to achieve its targets.

NilePreneurs has 5 pillars that target business needs, tackle existing business problems and give them innovative solutions:

BDS Hubs          NP Learn          NP Incubate          NP Innovate          NP Compete

# For more information

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