

Supplementary materials for Processing technologies for crisis response on the example of COVID-19 pandemic— injection molding and FFF case study

Bogna Sztorch ¹, Dariusz Brzakalski ², Marek Jałbrzykowski ³ and Robert E. Przekop ^{1,*}

¹ Centre for Advanced Technologies, Adam Mickiewicz University in Poznań, Uniwersytetu Poznańskiego 10, 61-614, Poznań, Poland; bogna.sztorch@amu.edu.pl

² Faculty of Chemistry, Adam Mickiewicz University in Poznań, Uniwersytetu Poznańskiego 8, 61-614, Poznań, Poland; dariusz.brzakalski@amu.edu.pl

³ Faculty of Mechanical Engineering, Białystok University of Technology, Wiejska 45C, 15-351 Białystok, Poland;

* Correspondence: r.przekop@gmail.com, rprzekop@amu.edu.pl

Table S1 -Project chronology

Data	Task
March 23rd	Decision made to start the process of manufacturing protective helmets for medical services using FFF 3D printing technology. Preparation of a project for FFF printers based on the available PRUSA model.
March 24th	A launch of FFF 3D printing production of protective helmets made of PET.
March 27th	Verification of printing results, calculation of printing output and the amount of production waste.
March 28th	Critical verification of the usefulness of 3D printing technology for the production of protective elements. Making a decision to switch to injection technology, setting the conditions for the manufacturing of the required injection mold with an industrial partner, the company STER INSTITUTE, CEO Maciej Szymański.
March 29th	Start of designing an improved helmet body model and an injection mold for glass fiber reinforced polyamide-6 (w / w 15%).
March 31st	Completion of the design and modelling of the improved helmet body by the industrial partner, the company STER INSTITUTE, CEO Maciej Szymański.
April 1st	Start of the tool (injection mold) manufacturing in the STER INSTITUTE tool shop.
April 4th	Completion of the tool manufacturing.
April 5th	Tests and corrections of the tool in the tool shop and injection molding department of STER INSTITUTE.
April 6th	Installation of the mold on the ENGEL e-victory injection molding machine at the Laboratory of Technological Processes of the Centre for Advanced Technologies of Adam Mickiewicz University in

	Poznań, technological tests, optimization of production parameters
April 7th	Start of production at the Laboratory of Technological Processes of the Centre for Advanced Technologies of Adam Mickiewicz University, exceeding the capacity of 1000 pieces per day.

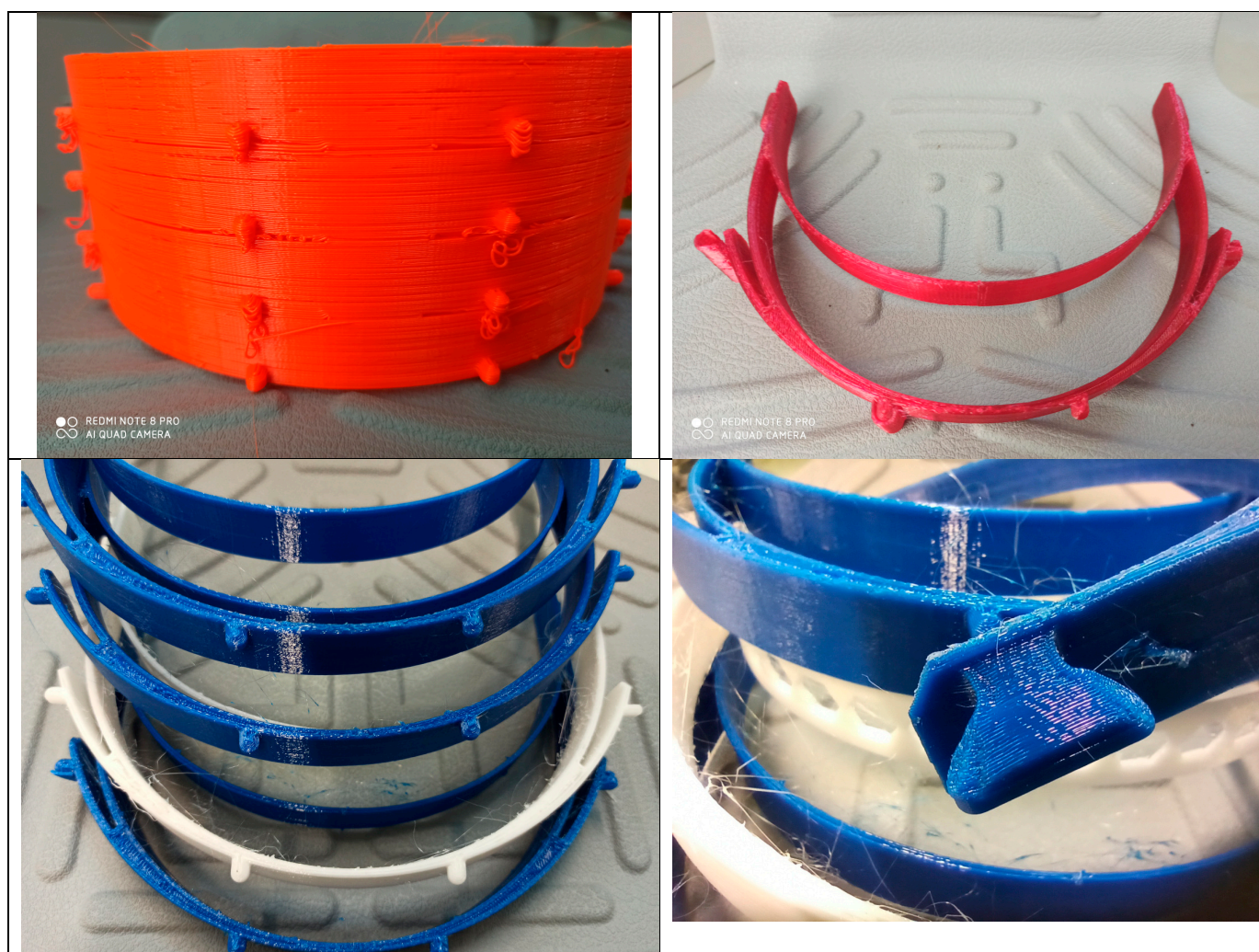


Figure S1: Protective helmet body made with FFF 3D printing technique.

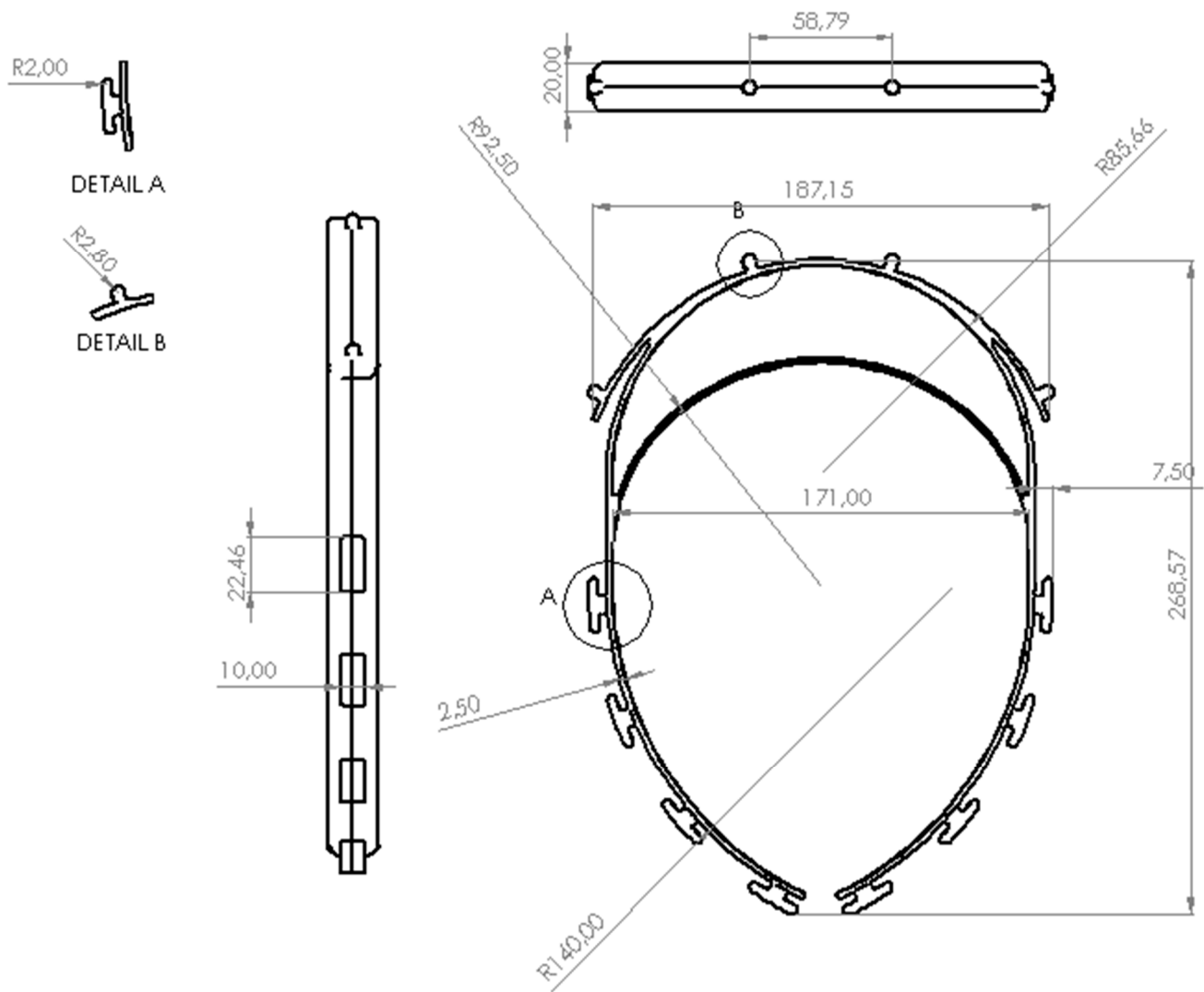


Figure S2: Technical drawing of protective helmet body design for Injection molding production method.

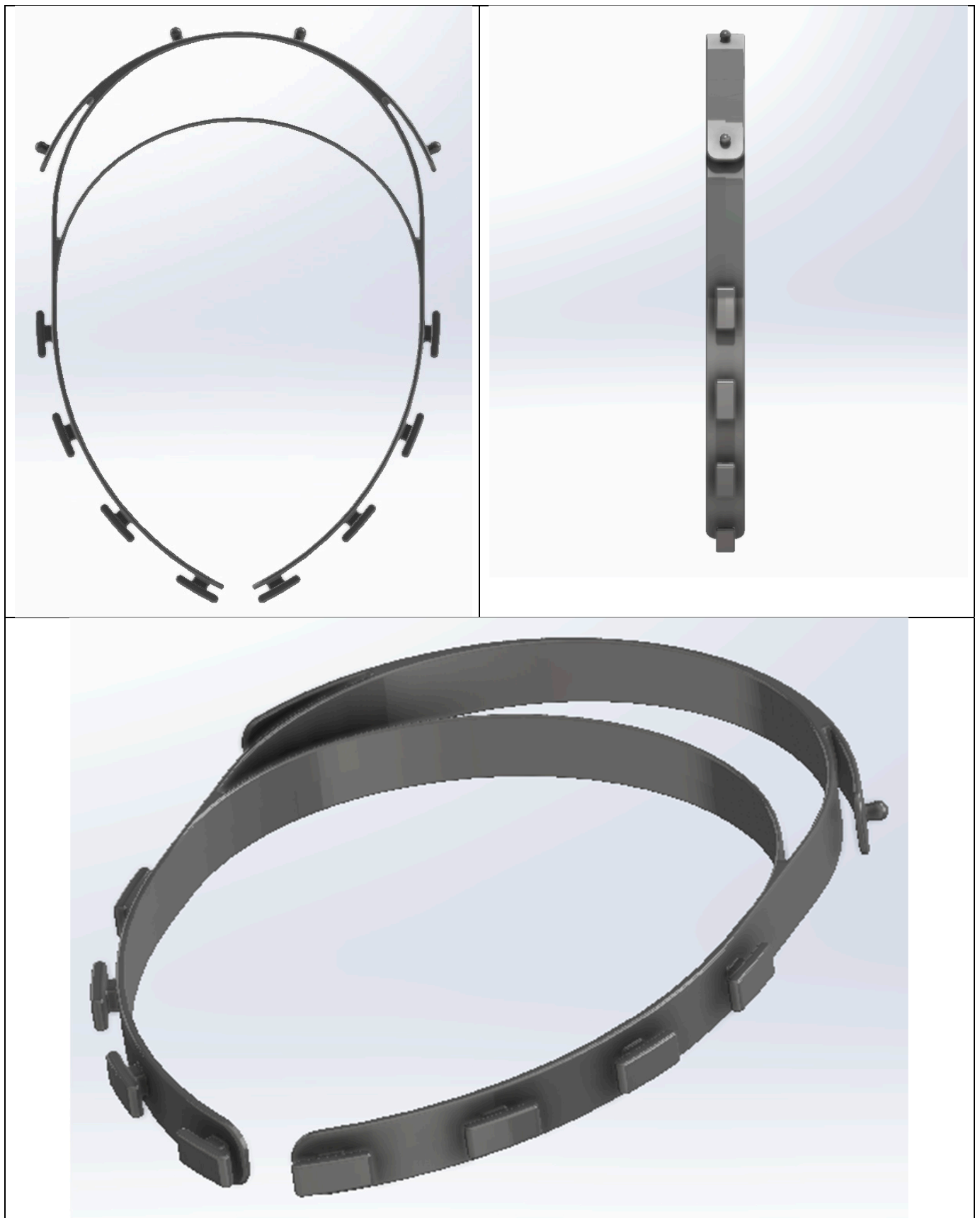


Figure S3: 3D model of protective helmet body design for Injection molding production method.



Figure S4: technological tests and optimization of injection molding.



Figure S5: Protective helmet fully assebled and tested for the comfort of using.

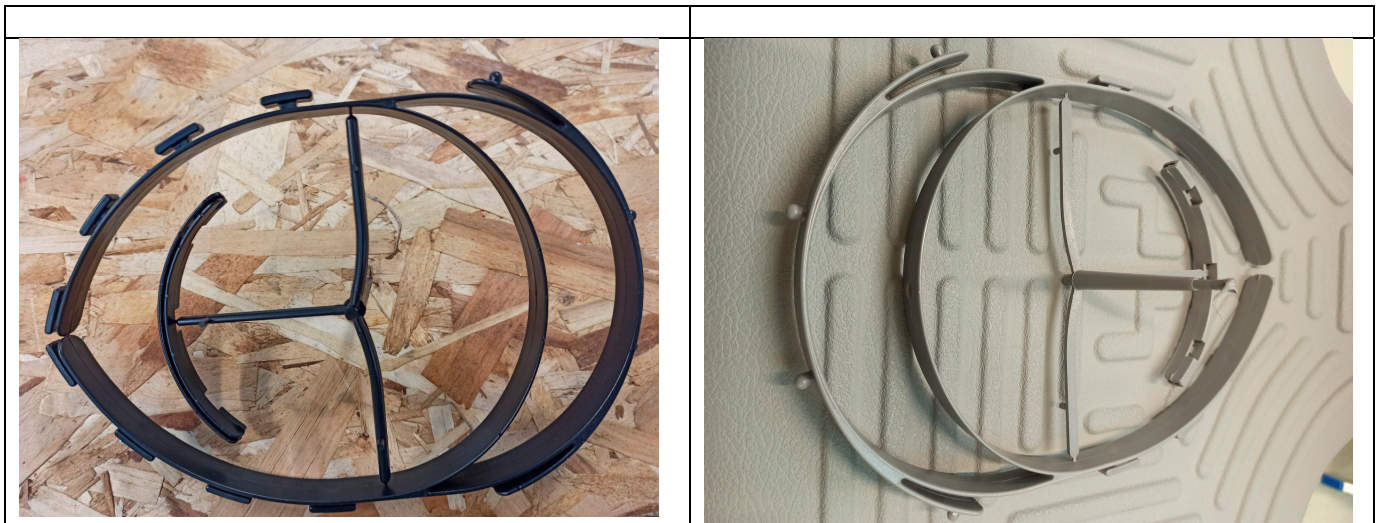


Figure S6: The protective shield detail as received during injection molding process (with sprue remaining).



Figure S7 : Correction of the protective shield band for the head size of a particular user.

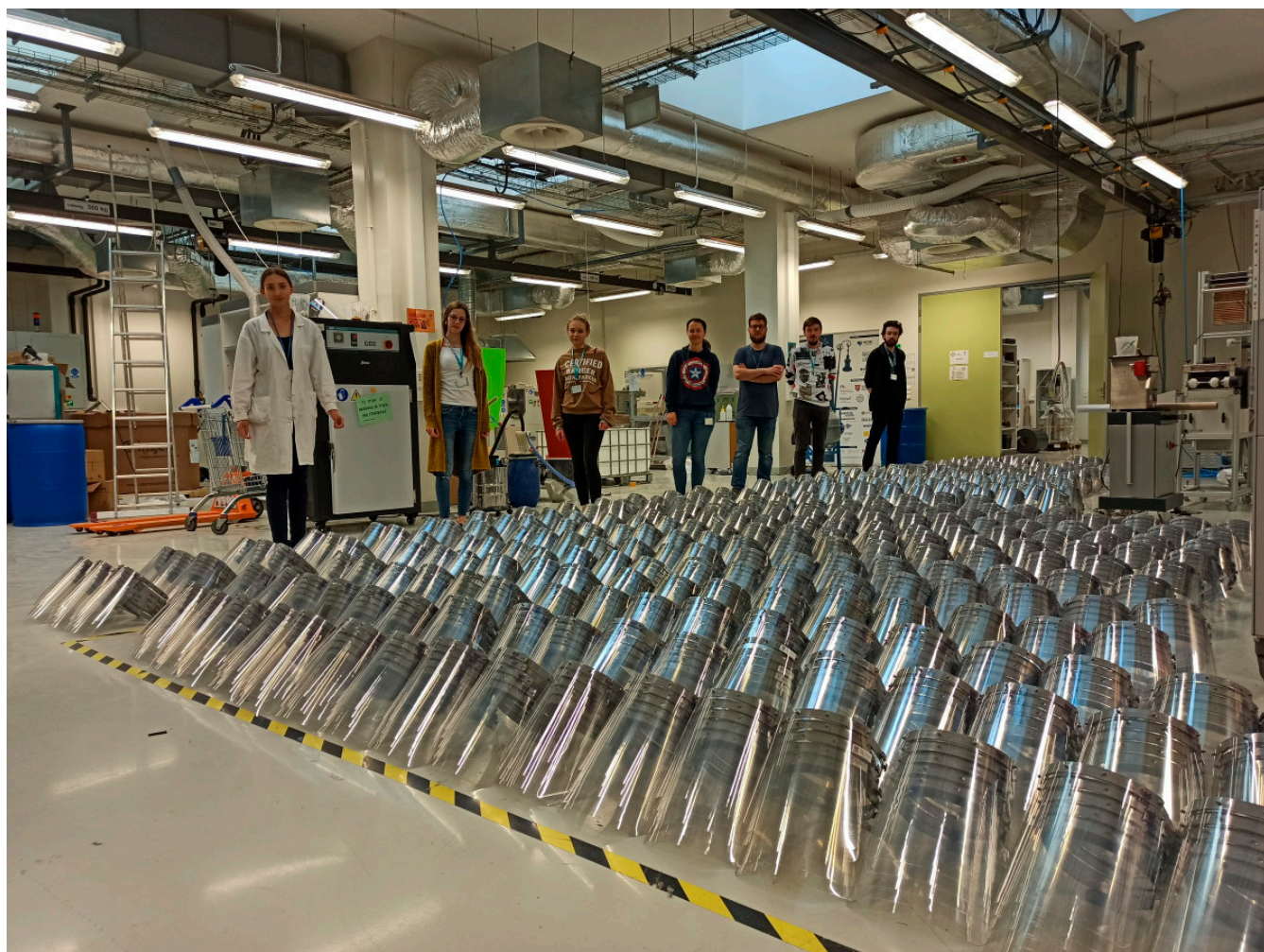


Figure S8: The technological team dealing with the study of the production process of the protective helmets