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## *ElecSyr, made by Renault*

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### Document description

This document is an extract of project call from ONU.

ElecSyr was a candidate but didn't win any award.

### Project description

At the start of the pandemic, a Renault team was formed to design a "basic" automatic electric syringe pump to meet the needs of hospitals. As part of the treatment of COVID, each patient requires between 5 and 7 syringe pumps. There was a high risk of supply disruption. We got closer to the nursing staff (nurse and doctors), in order to understand the basic functions of a syringe pump. ElecSyr allows continuous and / or pulsed injection of a drug by infusion. The flow rate is adjustable, min value: 2ml / h. Different types of syringes are accepted with default BD plastipak Luerlock 50ml. ElecSyr is made from simple components:

- 3D printed parts
- cut pieces
- electronic board with Arduino board (or only Atmel chip)
- Stepper motor Nema 17

ElecSyr has a cost price around 200€ without any negotiation and in very small quantity. It is easy to assemble

### Added Value against COVID

ElecSyr makes it easier to manage, through automation, the administration of continuous medication. It is easily reprogrammable to add new syringe models and enrich its functionalities. ElecSyr is simple to manufacture and its cost price is very low compared to existing product on the market. Usable in the context of the current pandemic, it may subsequently be used for the treatment of other pathologies. hospitals that do not currently have a syringe pump because of the high cost, it is also an opportunity to get one.

## Innovative content of the proposal

the innovation consists of the simple, frugal realization of the electric syringe pump. it is a response to the current emergency. Its modular design makes it possible to take into account the means of production available: laser cutting, 3D printing, 3 housing solutions (stackable, reduced height, reduced bulk), 3 electronic boards depending on tools and skills (SMD or through components), spring or electronic pressure sensor ; by these choices, it is possible to assembly 10 different ElecSyr syringe pumps.

## Impact on economic, social, and environmental sustainability

- design from basic components
- Simple assembly
- simple realization
- scalable and adaptable: the software and electronics can easily be upgraded to consider current and future local needs
- repairability
- Economic
- no environmental impact

## Potential benefits for developing countries

- provide material meeting the basics of a syringe pump at a much lower cost than an existing product - ease of supply of parts, manufacturing and assembly
- the software, easily upgradeable, can integrate local constraints (type of syringes, flow ranges, new features)
- simple assembly, repairable
- few components

## Development stage

3 phases of prototypes produced: - a first in 3D printing to verify the technical choices - a second integrating the constraints of the bichat hospital (Paris): waterproofing, fixing, stacking, alerts, messages for nursing staff These second prototypes were tested in hospitals in Paris (functional) - a third version integrating test feedback, more compact with SMD electronic components and electronic pressure sensor - EMC tests planned, to be carried out To do : - optimization on trolley sensor mounting. - Assembly to be finalized taking into account local functional and assembly needs (3D tool) need in terms of Manufacturing, assembly software development for update and complement. production of electronic cards