

DTU Promises to Deliver a Twenty-Million Dong Covid-19 Ventilator

On April 11, DTU presented the DTU-Vent (version 1.0) to the Danang People's Committee Chairman, Mr. Huynh Duc Tho, and to leaders of the Danang departments of Health, Science and Technology.





Mr. Huynh Duc Tho and department leaders attend the presentation and visit labs

The DTU-Vent non-invasive ventilator feeds oxygen to the lungs at a fixed frequency, through a nasal or full face mask, with sufficient quantities of air to stimulate the breathing of patients suffering respiratory distress. The highlights of the product are:

- Technological autonomy with a high degree of localization
- Pricing five times lower than similar devices on the market, at only twenty million dong each



DTU Provost Dr. Le Nguyen Bao and his group present the DTU-Vent

The DTU group researched many different types of ventilators available on the market today, such as the MIT's E-Vent, Oxford University's OxVent, the Medtronic PB650 and the Lowenstein Ventilator. However, some of these were not designed to meet Vietnamese economic and production requirements. For example, "super-saver" models equipped with the Ambu® silicon bag, such as the E-Vent, make it difficult to obtain the necessary high air compression levels and it is also hard to control special parameters, due to deformation of the bag. The Medtronic PB650 is constructed using expensive and diverse microcontrollers and sensors, including the Microelectronic ST10F276Z5T3 and the Honeywell AWM3300V. As a result, the DTU research group chose a design with using locally available components and materials that still met market requirements, including:

- A piston pump with highly stable and accurate air flow
- A design based on the guidance of the AMMI-Covid-19 committee
- The minimum number of components, with essential sensors only
- The group focused on the rapid delivery of a compact ventilator, with a battery to guarantee three hours of continuous operation in case of power failure





Zoom in of the first DTU ventilator

Although this is only the first version of the DTU-Vent, the product has several outstanding features:

- The pump volume adjustment is more sensitive than ventilators using wind turbines, which are difficult to control, such as the Medtronic product
- The piston design conserves more power than other ventilator types
- The noise of the air pumping is quieter

- Production cost is lower by using only the bare minimum number of sensors

DTU-Vent allows ten different position settings according to patient height, to expedite time and ease of operation. Other settings control air pressure, providing instantaneous response to the patient's vital signs.



Dr. Le Hoang Sinh (left), research leader

During the completion stage, Dr. Le Hoang Sinh, the DTU-Vent group leader, will add extra functionality, such as positive end-expiratory pressure (PEEP), remote control, air flow temperature adjustment and the integration of a touch screen with real-time graphs. Currently this is all done through an attached computer.

Chairman Huynh Duc Tho pledged financial support during the completion and commercialization of the DTU-Vent. In addition, the Health Director, Ms. Ngo This Kim Yen, and the Science and Technology Deputy Director, Mr. Tran Van Hoang promised to assist doctors and health workers to test the device and provide their final evaluation upon completion. They all encouraged the research group to try their best to put the final product into operation as soon as possible.

DTU

- Among Asia's 500 best universities ranked by the QS in 2020
- The second university in Vietnam to be ABET accredited
- The third of eight Vietnamese universities ranked by URAP
- Ranked 1,854th in the top 2,000 universities worldwide and third of the four Vietnamese universities in the CWUR ranking
- Second in Vietnam in the Nature Index ranking.

(Media Center)