

Doctoral School of Information and Biomedical Technologies, Polish Academy of Sciences

DEVELOPMENT OF A DIFFERENTIAL MECHANICAL VENTILATION
SYSTEM FOR SHARED VENTILATION IN A CASE OF SHORTAGE OF
DEVICES FOR LUNGS FUNCTION SUPPORT

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Project Description:

A pandemic of a coronavirus Sars-Cov-2 inducing a COVID-19 disease and spreading around the world in 2020 indicates a shortage of the ventilators due to the large number of patients requiring mechanical ventilation at the same time. Several solutions for so-called „shared ventilation” were presented to address this problem. These solutions are based on the pneumatic splitters and enable ventilation of two or more patients using only one ventilator. Despite the ethical issues, the shared ventilation suffers from several problems like patient safety, the influence of one patient's deterioration or improvement to the ventilation of the second patient, and pathogens transmissions between patients by a respiratory circuit or limited respiratory system monitoring and therapy capabilities. In IBBE-PAS the original system for independent lungs ventilation, called Ventil, was developed (European Patent no 3154617,2020). This system can be technically used for shared ventilation. Unfortunately, it has several limitations for exploitation in clinical practice.

This project aims to modify the previously developed Ventil system in terms of the ventilation safety of two patients in the case of long-term respiratory therapy. Data analysis from laboratory and animal experiments regarding this system optimization is the main problem to solve in this project.

The collaboration with the Department of Large Animal Diseases with a Clinic of the Warsaw University of Life Sciences (SGGW) is considered in this project.

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