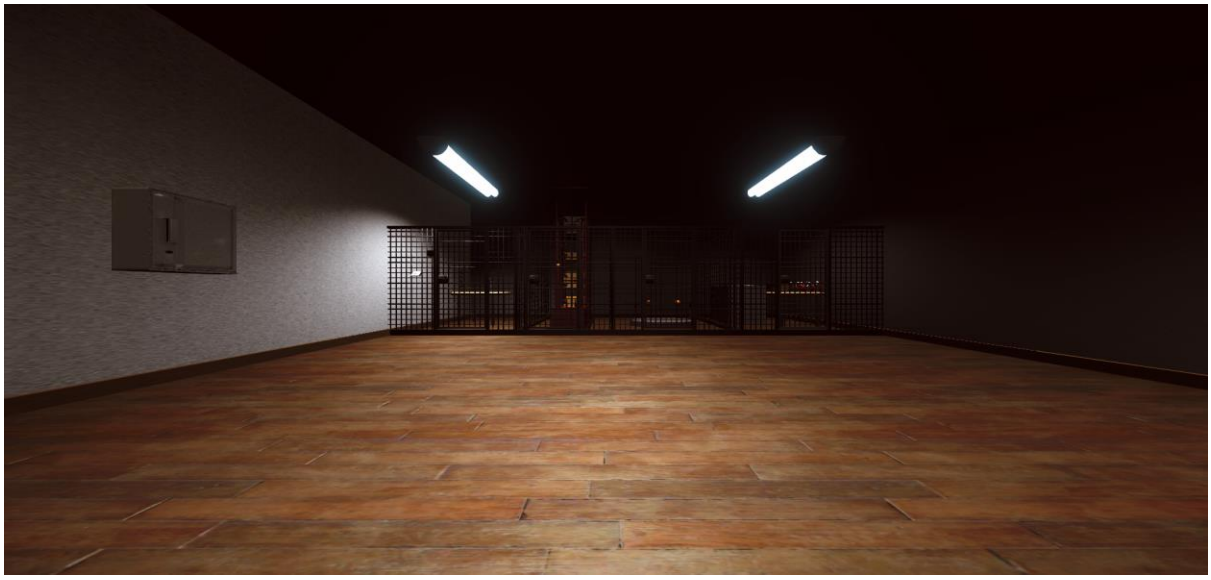
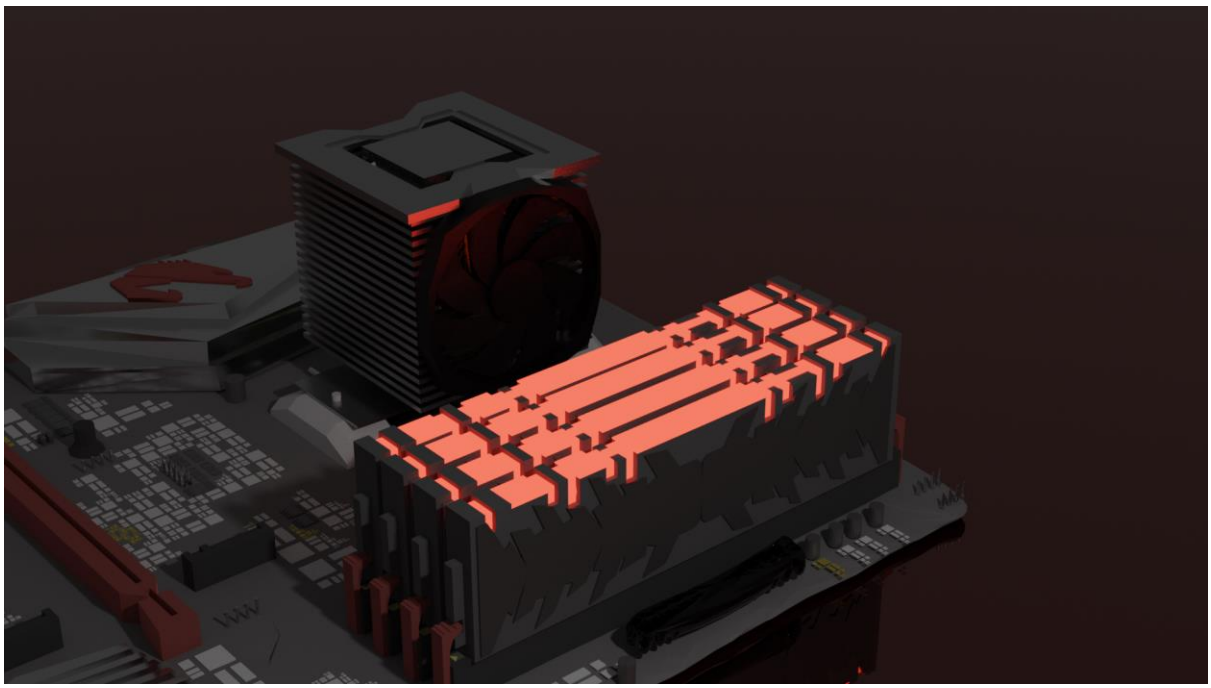
Technical Classes Simulator

Simulators are a very important element of education, for example, pilots, cosmonauts, surgeons, etc. use them in training. Many branches of science and industry use such solutions to prepare best people to perform activities that in real conditions are difficult to learn from scratch, because it may result in threat to human’s health or life or damage of very expensive equipment. Taking into account the fact how difficult it is to carry out experiments in today's reality with remote education we came up with a solution of a computer assembly simulator and a high voltage laboratory. This project allows, using virtual reality, to assemble a properly functioning central unit and perform electrical experiments such as: air electrical strength testing, oil electrical strength testing, and the user has the opportunity to test the operation of the lightning rod.



Virtual reality guarantees safety, protects against being electrocuted and excludes the occurrence of failures such as, for example, burning of one of the components, which may result in the need of purchasing a new component. When using the simulator, we are able to acquire the necessary knowledge in assembling a working computer, such as: the location of individual components of the central unit, information on the parameters of individual components and their compatibility with others, as well as making the user aware of the diversity of parts available on the market. During the simulation, the user has several dozen different components at his disposal. Each of them has assigned parameters, among others, responsible for its compatibility with others, which results in the need to analyze the available resources in order to select the appropriate matching parts.



Our application also allows you to master and understand the test of the electrical strength of air and the electrical strength of oil, or allows the user to check the principle of operation of the lightning rod. Before the course of individual

experiments, the user has the opportunity to change their parameters, which is associated with a different final result. The results are presented in the form of a data table in Microsoft Excel. Thanks to this, it is possible to analyze the obtained results on the basis of given initial parameters. The High Voltage Laboratory is a reproduction of an actual laboratory located at the Silesian University of Technology. All experiments are carried out in accordance with the real safety standards in force in this laboratory. Our project is based on the Leap Motion module, which ensures incredible precision of mapping hand movements in virtual reality.

We believe that it is an innovative solution that allows to prepare students and employees in a very realistic way to work with physical equipment. The aim of our project is to enable students and employees to obtain the necessary knowledge in the field of computer assembly and electrical basis in a simple and, most importantly, safe way. Especially in times of the coronavirus pandemic, when it is not possible to organize practical classes. When creating our application, we tried to present everything in the simplest possible way so that every user, even a person who had nothing to do with the activities included in the simulations, would have no problem understanding and operating our software.

Virtual reality is becoming more and more popular, it is becoming more and more common, and it also offers many new opportunities to transfer
teaching and training content. One of the biggest advantages of virtual
reality, is the possibility to create your own controlled environment with the functionality specified by us with the help of widespread tools.

In the future, we plan to develop our project with new modules related to other technical faculties (e.g. mechatronics technician) to make it easier for other target

groups to acquire new competences. Using virtual reality, we are able to map and create simulations of each production line, which could be used to train new employees without exposing them to loss of life or health, eliminating the risk of damage to the equipment.