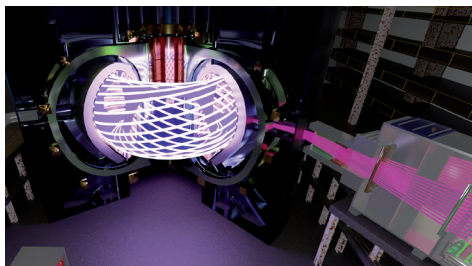




VIRTUAL NUCLEAR POWER PLANT CENELÍN

Cenelín is a long-term student project whose objective is to create a virtual nuclear power plant for educational purposes and to promote nuclear energy among the public. The power plant is being built at the Faculty of Mechanical Engineering of the Czech Technical University in Prague with the cooperation of students from the Department of Energy Engineering, pedagogues, and experts from practice.



The Cenelín project (an abbreviation from CENEN – Czech Nuclear Education Network and endings referring to the Temelín nuclear power plant) is an effort to create a virtual nuclear power plant with a VVER 1000 pressurized water reactor, the model of which is the one located at the Temelín nuclear power plant. Individual components and systems are created by students and teachers as part of the semester work.

Currently, there is a version for personal computers and a version for virtual reality glasses Oculus Quest 2. The latest version already contains the complete primary circuit of a nuclear power plant - reactor, steam generators, main circulation pumps, and also pressurizer, hydroaccumulators, bubble condenser, and relevant pipe routes. Practically everything is accompanied by technical labels and a brief explanation of the component's function. The icing on the imaginary cake is the ability to gradually uncover the outer layers of objects and look inside at individual parts of larger structural units. In the near future, the graphical interface will be enriched with the possibility to control the power of the reactor.

The development of the environment started initially in CAD programs. Gradually, however, the path of creating components (apart from the previous designer's calculation) was chosen in the polygonal modeling

software Blender and subsequent conversion to the Godot game engine. Both of these software solutions are available under GPL or MIT license and free of charge. In the future, it is also planned to publish the source data of the project.

The project is created in parallel in two development branches. The first is a relatively detailed PC version that can run on regular computers and contains all components in high quality with informative labels. The second development branch gradually separated from the one for PC and is a version for virtual reality glasses. This version requires specially optimized component models due to the limited computing power of the used headset, which, however, allows greater freedom of movement and, above all, a more "immersive" experience from visiting the virtual environment.

Along with the model of the Cenelín pressurized water reactor, we have now also newly released the first version of our DEMO tokamak model called Fúzelín. The model is based on the currently considered dimensions of the device, the individual components are constructed according to the latest designs from scientific publications. We have now released the first version of the model and also a video tour of the tokamak from the Fúzelín model, available on YouTube.

CONTACTS

