

## Flint Systems - Virtual Reality Training Simulator

*customisable universal hardware platform, able to reflect training on every machine*

### *the challenge*

Port areas, as well as other sectors, present challenging work environments, especially when it comes to safety of freshmen. Several factors contribute to the difficulty of training employees in port conditions.

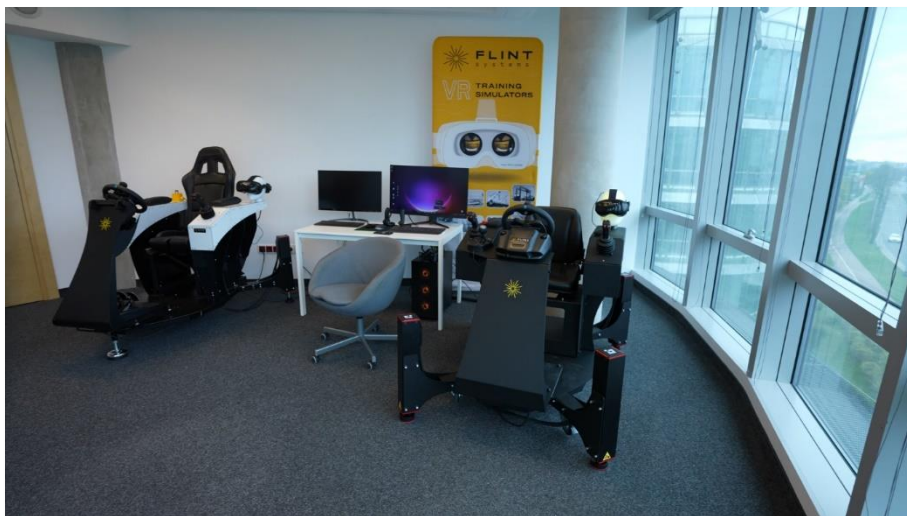
Ports are frequently bustling with heavy machinery, including cranes, forklifts, and cargo handling equipment. When not operated correctly, these machines pose a significant risk, leading to accidents, injuries, and even fatalities. Moreover, the constant flow of various vehicles, such as trucks, container handlers, ships, and trains, increases the risk of collisions and accidents unless proper traffic management and safety measures are in place.

Ports handle a wide range of cargo, some of which includes hazardous materials. Mishandling, improper storage, or transportation of these materials can result in chemical spills, fires, and other dangerous incidents. These challenges are further compounded by the diverse and ever-changing weather conditions that ports are exposed to, including strong winds, heavy rain, extreme heat, and fog.

Planting an untrained or still-learning operator in a real machine under these conditions is extremely accident-prone. It is true that all these factors contribute to the considerable difficulty, cost, and often the inherent danger associated with training people to operate port machinery. The safety of human lives and equipment is at stake, making training in these conditions both essential and complex.

### *the innovation*

Considering the safety issues described in the previous section, Flint Systems decided to answer them, creating a VR training simulator.



VR training simulator is a training device, consisting of software and hardware. We have developed a universal hardware platform, able to reflect the training on every machine. We can customize this platform by adding/removing a steering wheel, joysticks, etc.



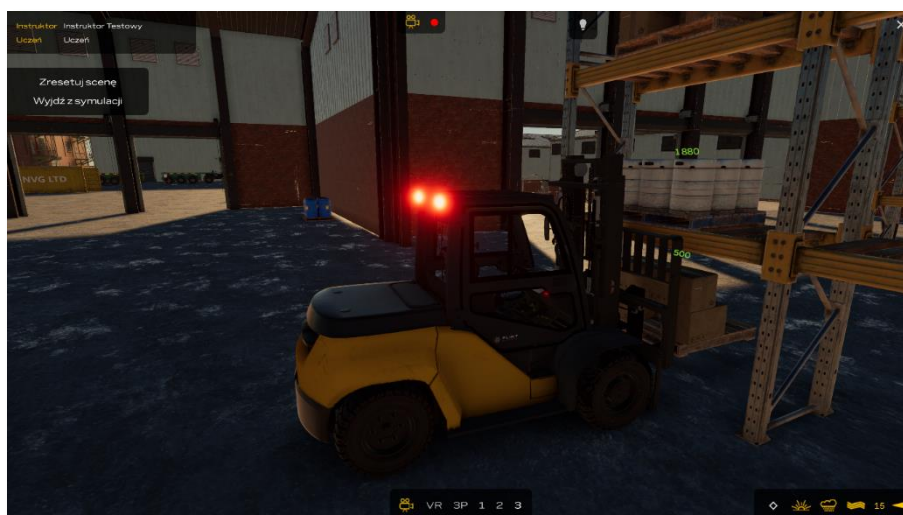
The software side is fully integrated with the hardware platform. The machine we create in VR is a twin of the real one, reflecting physics, features, sounds, and all that is vital for the simulation.

The trainee needs to sit on the simulator's seat, put on the goggles and can dive into the safe, virtual world of training.



Flint Systems' VR simulators offer several advancements of safety, including:

- Safety of the trainees – the training takes place in safe environment
- Safety of other people – no one can be hurt by someone training in VR, contrary to conventional training taking place next to real operations
- Safety for cargo and machines
- Trainees who spent an exact number of hours on the simulator are allowed to train on real machines, which increases the safety level of training
- Trainees can train the unexpected by some dangerous scenarios lessons – e.g. working in collision with another crane, or breaking the rope, etc.



### *how it was implemented*

Our first series of simulators was installed at the New Competencies Center, which was operational at the Port of Gdańsk during 2019-2020.

We delivered five simulators that work on three different platforms:

- RTG
- Reachstacker
- STS
- Rail port crane
- Mobile crane

The training center continues to use our simulators, providing training to numerous operators for the nearby ports of Gdańsk and Gdynia.

In fact, our client's business has expanded significantly since our initial delivery. We have collaborated on various projects, including the most recent one – the Crew Transfer Vessel (CTV) simulator, designed to train captains of CTVs operating in the wind farms off the coast of Poland that will be build in the next few years.

#### *result*

Since 2019 and 2020, many people have undergone training using VR training simulators at the New Competencies Center.

Unfortunately, we do not know the exact number, as it is confidential information belonging to our client and is crucial for their business. However, another client shed light on the exam pass rate.

The introduction of a tower crane simulator, supplied to Maukran, one of the tower crane rental companies in Poland, between September 2021 and June 2023, achieved a success rate of 90%. This means that 9 out of 10 individuals trained on our simulator successfully passed the exam conducted by the government's technical institution. This marks an incredible advancement in terms of efficiency, cost-effectiveness, and, most importantly, safety.

#### *conclusion*

Virtual reality simulators can significantly advance the safety of training and the safety of operators performing various tasks for several reasons:

- Risk-free environment: VR simulators provide a controlled and risk-free environment for training. Operators can practice and learn in a virtual setting without the potential dangers associated with real-world tasks.
- Realistic training scenarios: VR simulators can recreate highly realistic training scenarios, mirroring real-world conditions, which helps operators prepare for a wide range of situations. This realistic training enhances their ability to respond effectively when faced with actual operational challenges.
- Skill development: Operators can refine their skills and techniques in a controlled environment. This allows for gradual skill progression and mastery, reducing the likelihood of errors and accidents when transitioning to actual work tasks.
- Repetition and practice: VR simulators enable operators to repeat and practice tasks as many times as needed without the constraints of time, cost, or safety concerns. This extensive practice helps build muscle memory and competence, which can enhance safety.
- Scenario customization: Training scenarios can be customized to specific work environments, industries, or tasks. This adaptability ensures that operators are well-

prepared for the particular challenges they will encounter in their job, increasing overall safety.

- Emergency response training: VR can be used for emergency response training, allowing operators to practice their reactions to hazardous situations without exposing them to real risks.
- Psychological comfort: Virtual reality can help alleviate anxiety and fear associated with high-risk jobs by gradually acclimating operators to challenging conditions. This psychological comfort can lead to better decision-making and reduced stress, contributing to safety.

LINK: <https://flint.systems/>