

5DT (Fifth Dimension Technologies)

Training Simulators for the Mining Industry

1.0 Introduction

5DT (Fifth Dimension Technologies) is a high technology company specializing in Virtual Reality. 5DT develops, produces and distributes Virtual Reality hardware, software and systems. **5DT's primary focus is Virtual Reality Training Simulators.**

For more info about 5DT, please refer to our Company CD-ROM:

"The Fifth Dimension"

or visit our website at:

www.5DT.com

For more info about 5DT's mining activities, please refer to our Mining CD-ROM:

"Training Simulators for the Mining Industry"

This CD-ROM includes:

- Documents
- Images
- Videos

5DT currently offers the following Training Simulators for the Mining Industry:

Surface Mining

- Haul Truck Training Simulator
- Shovel/Excavator Training Simulator
- Wheel Loader Training Simulator
- Dragline Training Simulator

Underground Mining

- Continuous Miner Training Simulator
- Long Wall Training Simulator
- Roof Bolter Training Simulator

General

- Driving Simulator (for cars and highway trucks)
- Forklift Training Simulator

The following systems are currently *under development* at 5DT:

- Sequential Coal Mining Visualizer and Management Game
- Surface Mine Visualizer

5DT may develop custom Training Solutions to satisfy your training requirements. Apart from our State-of-the-Art Simulator Technology, we also have a strong Computer Based Training (CBT) development capability. We also have a full development capability for Multimedia Productions like training videos, training manuals and interactive animations.

2.0 Applications of Training Simulators

2.1 Training of new operators

A Training Simulator allows an instructor to train new operators in a controlled and safe environment. The operation skills of a trainee are developed systematically. The trainee may be exposed to very complex and/or life-threatening scenarios without risk of injury or risk of damage to equipment.

2.2 Evaluation and re-training of existing operators

A Training Simulator is ideal for the evaluation of qualified operators, since all actions performed by the operator may be recorded with the simulator. The skills and performance of an operator may be analyzed in detail, and re-training or corrective training may be applied to those areas where the operator exhibited sub-optimal skills and performance.

A supervisor in an operational mine may find that a specific operator does not perform optimally. The supervisor may then schedule corrective simulator training for this operator.

2.3 Screening of New Employees

New Machine Operator Applicants may be screened with the Training Simulator to determine whether they are optimally suited for the task. This ensures that unsuitable persons are not trained at a high cost. It also gives new applicants a much better idea of what the real job will be like, before they make key decisions about their careers.

2.4 Research and Development

A Training Simulator may be used to try new procedures in virtual reality first, before validating these procedures in reality. A Training Simulator is an ideal tool for the development and implementation of best practices.

2.5 Familiarization and Induction tool

It is often the case that a large portion of the personnel at a mine has not experienced any time underground or in the surface mine (pit) itself. This often leads to unsatisfactory understanding of the relevant mining process, which, in turn, leads to sub-optimal management and administration. A Training Simulator is ideal to expose administrators and managers to the ***cutting edge of their industry***.

2.6 Marketing and PR

A Training Simulator could be used to show visitors what it is like to work in a real mine, without exposing them to the real environment. This is ideal for open days.

3.0 Benefits of Training Simulators

3.1 Increased safety awareness

- a. With a Training Simulator trainee operators are able to experience the results of their actions. The Training Simulator continuously evaluates the safety awareness of operators.
- b. The response of an operator in an emergency is mostly based on instinct and experience. A Training Simulator can provide trainees with

emergency response experience without exposing the trainee to the danger of a real emergency. The correct response to an emergency may be practiced over and over again.

3.2 Reduced loss of production during training

- a. With a Training Simulator it is not necessary to interrupt production to do basic skills training. It will also not be necessary to “borrow” machines from production for the purpose of basic training. The basic skills are taught in a very realistic virtual environment under controlled conditions.
- b. A Training Simulator also facilitates training without reducing the productivity of other machines in the circuit.

It is important to note that 5DT (Fifth Dimension Technologies) does not propose that Virtual Reality [VR] training replaces reality-based training in totality:

"Virtual Reality is not intended to replace reality-based training. It is a powerful medium intended to supplement and enhance reality-based training."

3.3 Shorter operator training periods

The 5DT Training Simulators have been designed to minimize the training cycle whilst maintaining a very high standard in terms of skills development and safety awareness. A pre-simulation module teaches the user how to optimally use the controls of the relevant machine. The trainee operator is then exposed to several training scenarios, ranging from elementary scenarios to very complicated scenarios. The simulator system continuously evaluates the trainee, and weak spots may be identified very quickly.

"With the 5DT Training Simulators, the focus is on Smarter Production, not simply Increased Production."

3.4 Enhanced operator skills development

With a Training Simulator, operators may be exposed to a wide variety of conditions and environments, some which are life-threatening. The trainee is therefore prepared for much more than the average/normal.

The ability of a Training Simulator to exactly measure what a trainee is doing right or wrong, leads to enhanced skills development.

3.5 Improved application of best practices

A Training Simulator enables a mining group to *evaluate and optimize* their best practices. Once these have been established, the same Training Simulator may be used to *implement* these best practices in the workforce. Only the best techniques are taught.

3.6 Increase in production per machine

The production per machine may be increased significantly with a Training Simulator.

3.7 Reduced machine damage and wear and tear

The Training Simulator helps the operator to understand the relevant machine better. Increased operation skills generally lead to less damage to the machine. Increased operation skills also lead to less wear and tear on the machine. Operators that were taught with a simulator are generally more knowledgeable and skilled. This results in reduced unscheduled maintenance costs, leading to more machine up time.

3.8 Greater Training Flexibility

Driving conditions (e.g. day/night, fog, dust, rain, slippery roads), the number of vehicles in the circuit, load and dump locations, as well as a variety of other factors may be changed with mouseclicks. If an operator is experiencing difficulty with a specific procedure in reality, that procedure may be emulated in the simulator.

3.9 24/7 Training

The mindless efficiency of the Training Simulator offers training 24 hours a day, seven days per week, on site or off site.

3.10 Increased motivation

The combination of increased safety awareness, increased production, smarter production and reduced machine damage normally leads to a highly motivated employee.

4.0 Why 5DT?

There are several reasons why 5DT is ideally suited to supply or develop a Training Simulator for your mine or institution. The main reasons are:

4.1 5DT's primary focus is Training Simulators

5DT has already developed several state-of-the-art training simulators. For more detail other simulators developed by 5DT, please visit our web site at: www.5DT.com

4.2 5DT has a well established Mining Knowledge Base

5DT developers have spent a lot of time underground and in surface mines, interacting with real operators and real machines. We understand the terminology and the mining process. When you deal with 5DT you won't have to spend days to explain how a specific process or machine works.

4.3 5DT has already developed Training Simulators for the Mining Industry

5DT has extensive experience with training simulators for the mining industry.

5DT developed the following Training Simulators and Technology Demonstrators:

Surface Mining

- Haul Truck Training Simulator
- Shovel Training Simulator
- Wheeled Loader Training Simulator
- Dragline Training Simulator

Underground Mining

- Continuous Miner Training Simulator
- Long Wall Training Simulator
- Roof Bolter Training Simulator

4.4 5DT has a simulator networking capability

5DT is capable of networking their training simulators, e.g. a haul truck simulator may be networked with a shovel (or loader) simulator. This facilitates team training where a haul truck driver and a shovel operator works together to get a haul truck loaded.

4.5 5DT has the necessary hardware technology

5DT has developed a motion base for high performance simulations. 5DT also has extensive experience in instrumenting real controls (e.g. steering wheels, instruments or control levers) in order to interface with a simulation computer.

4.6 5DT has a Software Development Kit (5DT-SDK)

The 5DT-SDK is a library of C++ functions and simulator components. The SDK is fully documented and has been tested extensively. 5DT can therefore develop and configure training simulator applications very rapidly.

4.7 5DT offers the Best Graphics in the Industry

Our virtual mines and virtual machines look extremely real and provides for a very realistic training experience.

4.8 5DT supports their simulators

We are in this industry for the long run. We support our simulators. Some of our simulators have been in operation for more than 5 years, with more than 400 operators benefiting from it to date.

4.9 5DT has a Computer Based Training (CBT) Capability

Apart from our State-of-the-Art Simulator Technology, we also have a strong Computer Based Training (CBT) development capability. We also have a full development capability for Multimedia Productions like training videos, training manuals and interactive animations.

5DT has the **technology**, the **will** and the **resources** to make a huge success of your project.

5.0 Conclusion

"If a picture says more than a thousand words, a virtual reality experience says more than a million".

Virtual Reality is a technology that needs to be experienced. We would therefore like to invite you to come and try it for yourself.

You may either visit our booth at a tradeshow, or you may visit one of our facilities. We would like to demonstrate our state-of-the-art training simulators to you, and discuss your unique training requirements with you.

Please do not hesitate to contact us!

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