



Simulation Design Team



REAL UNREALITY

Since date of its foundation SDT has been focused on creating high quality and complex projects in the area of training equipment and simulators. Also company is engaged in the field of systems modeling and interactive communication with 3D objects.

Solutions offered by SDT to its customers could be applied in different areas, serve to different purposes and could be performed in wide range of complexity.

The most ambitious projects that STD team develop for its customers are driven by our desire to be in the focus of the latest advanced technical achievements and our passion for cutting edge technologies and innovations. Very often projects developed by STD experts open particularly new opportunities that exceeds expectations of our customers.

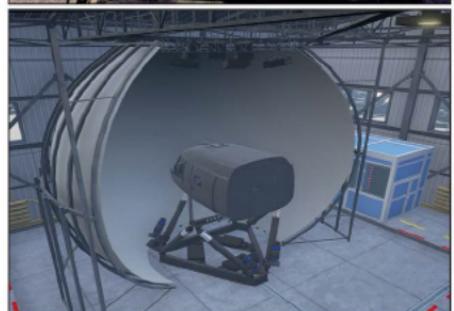
STD team is proud to be highly qualified, experienced and always ready for new challenges and new complex projects on the field of virtual reality systems, simulation and modeling.

Following market trends we have aimed on several major areas in which STD is offering most advanced solutions.

Focus area:

- ▲ Training equipment and simulators
- ▲ Interactive tactical shooting ranges and virtual battlefield systems
- ▲ 3D simulation and modelling
- ▲ Interactive systems of visualization







Nawadays ships, vessels and floating crafts are being equipped with automatic operational and guidance systems which facilitate control and ensure safety during navigation in different sailing areas and weather conditions.

Training and practice of proper operation of such systems is the main task of the personnel training centers. Any mistake that could occur on the real vessel during real mission could cause a serious accident and even tragedy. And proper knowledge and skills could save lives both mariner and passengers in real situation.

Application of marine operational trainers and simulators is the most ultimate approach for proper personnel training and education. It allows simulate different accidents and situations and assures that staff will take proper actions when it is required.

Present day marine operational trainers and simulators allow training of skilled personnel for standard procedures for their daily rigors activity and their action in case of emergency making sure that theoretical knowledge and skills they have will be applied correctly in reality.



For customers SDT experts are ready to develop and implement projects both in outfitting of complex marine specialists training centers and single purpose operational trainers and simulators of naval and auxiliary equipment items.

All provided solution take into consideration requirements of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) with 1995 amendments, resolution of International Marine Organization (IMO), regulations of international and national organizations and bodies.

Today SDT is proudly offering such solutions as:

- ▲ Electronic Chart Display and Information System, ECDIS operational trainer and simulator
- ▲ Radar operational trainer and simulator
- ▲ Global Maritime Distress & Safety System, GMDSS operational trainer and simulator
- ▲ Ship power plant control system operational trainer and simulator
- ▲ Complex navigation control simulator and trainer



All marine operational trainers and simulators could be equipped with true to live and functional imitation of the ship's control board; satellite navigation systems (GPS/GLONASS); auxiliary utilities, indication and signalization.

The main purpose of the ship power plant system operational trainer is training for personnel to be authorized prior to the work and watchkeeping in the engine and boiler room, and central control room of the modern vessel of high level of automation, also for mastering testing for marine engineers including ship's power plant engineers.

This operational trainer should meet requirements of the International



STCW Convention 78/95 and IMO courses: 2.07; 2.08; 7.02; 7.04.

- ▲ Acquiring of fundamental and applicative technical knowledge
- ▲ Familiarization of the staff with equipment of Engineroom
- ▲ Study of the systems' symbolic circuits and line components mnemonic diagrams
- ▲ Machine and systems operation
- ▲ Personnel behavior in the watch keeping
- ▲ Employee training and education and in-service training of the qualified personnel
- ▲ Professional retraining and skill conversion of the personnel
- ▲ Knowledge and skills updating
- ▲ Getting trainings for individuals, teams and crews and experience in command and control
- ▲ Competence evaluation
- ▲ Practicing skills and knowledge

The purpose of the complex navigation trainer is organization of practical training of personnel in virtual radar and visual information of surface picture, control of the radio, navigation and vessel facility located on the navigation bridge by means of computer aided learning under supervision of instructor

Multifunctional navigation trainer enables to organize training activity of navigators and pilots on following disciplines:

Control and maneuvering a ship;

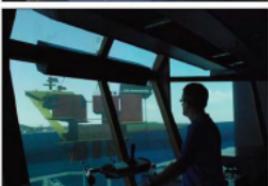
Pilot bridge navigation watch keeping organization;

Radar observation and plotting the course;

Application of Automatic Radar Plotting Aids (ARPA);

Application of Electronic Chart Display and Information Systems;

Performance of rescue and salvage operations.



Multifunctional navigation trainer provides initial trainer preparation, in service training, and special simulator based learning system for mariners determined by requirements of the International STCW Convention 78/95 (chapters A I, A II, A IV) and meet requirements of following courses of training:

- ▲ Radar observation and course plotting (RADAR), chapters A I/12 4, A II/1 3, A II/2 6
International STCW Convention 78/95;
- ▲ Automatic Radar Plotting Aids (ARPA) equipment and systems, chapters A I/12 5, A II/1 3, A II/2 6 International STCW Convention 78/95;
- ▲ Electronic Chart Display and Information Systems, chapters A I/12, A II/1 1, A II/2 1
International STCW Convention 78/95;
- ▲ Training and preparation for certification of masters and chief mates, deck officers due to mandatory minimum requirements described in chapter A II/2
International STCW Convention 78/95;
- ▲ Training and preparation of ratings as able seafarer deck due to specification of minimum standards of competence described in chapters A II/1 2, A II/1 4, A II/1 5
International STCW Convention 78/95;
- ▲ Continuing Education of masters and chief mates, deck officers and ratings due to mandatory minimum requirements described in chapters A II/12, A II/1 4, A II/1 5, A II/2 International STCW Convention 78/95;
- ▲ Training for certification of GMDSS radio operators due to minimum requirements described in chapters A IV/2 International STCW Convention 78/95.



Full Mission Flight Simulator (FMFS) – it is a flight simulator designed for ground training of aircraft pilots. FMFS is modeling flight aeronautical dynamics and systems' of an aircraft with the aid of special models realized in software of FMFS computing system.

FMFS pilot training – one of the most important elements of safe operation management of an aircraft. As simulation minimizes an effect of human factor and allows minimizing crews' misoperation.

At the moment level of modern FMFS allows to provide even more enhanced training than training during real flight. As in real flight crew is to spend a lot of time for routing operations that are outside the framework of the training course and specific goals of the drilling.



At the same time FMFS software allows immediately change flight conditions: weather, geographical position, stop or terminate missions for postflight debriefing, etc.. Also, flight simulator allows organization of the crew's emergency in flight training without any limitations, which is normally dangerous or prohibited for real aircraft by regulations. Also, FMFS pilot training approach is much more cost effective.

Members of SDT developed projects in close cooperation with ENTERPRISE ANTONOV and have practical skills, knowledge and qualifications for operation and maintenance of solutions manufactured by: BARCO, MOOG, E2M and Bosch REXROTH. SDT is ready to provide for its customers solutions of different complexity in this area.



Due to investigations of the Institute of Simulation and Training in Orlando (USA), utilization of simulation on facilities with hazardous working conditions allows to decrease level of technical incidents up to 35-70% and level of occurrence rate of industrial injuries up to 25-45%. One of the most important fields of its interest SDT considers simulation training systems of mining facilities and machineries, and crane operation simulation stands.



Operation of one mining track is not very dangerous, but if one puts a dozen or hundreds of large dimensioned equipment into enclosed space it becomes extremely hazardous. In this case confident and close teamwork of every participant of the process is very important. Application of simulation training systems of various complexity and its consolidation into one virtual mission, allows simulate ideal conditions for training teamwork and drill actions in case of emergencies.

Similar goal is settled while using crane operation stands. Crane operator sometimes is given a complex challenges while placing crane load correctly in enclosed or limited space under condition of limited visibility.

Simulation allows to model bad weather conditions and helps operator to work out set of required skills and knowledge for safe crane operations.

Application of motion generation systems in simulation stands recreates ultimate reality for operator sense and as result of it provides an opportunity to elaborate muscle memory for operator.

INTERACTIVE TACTICAL SHOOTING GALLERIES AND
VIRTUAL BATTLEFIELD SYSTEMS

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Nowadays sophisticated technologies applied not only in the civil areas but also widely used for military purposes: for combat units training and modeling of the military campaigns. It is quite difficult in time of peace to provide real combat training conditions for a soldier or member of a Special Forces unit and enhance their mental and combat training. Even large-scale military exercises have certain limits.



Interactive tactical shooting galleries specially developed for simulation of realistic combat environment and drill certain skills of the conduct of combat. Such complex simulation systems also could be enforced by usage of characters (criminal, terrorist, civilian, etc.) with artificial intellect that makes every mission unique and unpredictable.

Interactive tactical shooting galleries provided by SDT go outside the frameworks of typical solution and could be also completed with intercommunication with tactical mission. Application of the latest innovations from the simulation building industry such as Omni Directional treadmill or return fire simulation systems in solutions provided by SDT allowed us to elaborate the concept of high realistic individual shooting simulation system that has no equals in the world.



For group instruction we have developed small-arms weapon simulators with integrated locomotion control for virtual reality, and thus let shooter to control tactical mission during training. We can use topographical maps and architectural drawings of the buildings in the process of location landscape development, and in this way enhance combatant training before sending a soldier to real military operation. Such graphical systems have realistic simulation of the physics of objects intercommunication.

At the moment we are developing simulation of heavy machine guns mounted on the armed vehicles and sea patrol boats.





Building simulators of different type, interactive tactical shooting galleries and being an expert in this area - SDT was challenged to gather different simulators within one tactical mission inside virtual battlefield system.

On the basis of this solution and following simulation market trends we have launched development of VIRTUAL BATTLEFIELD SYSTEM for some of our customers.

This system is intended to integrate different existing simulators and simulators that will be built in future for different tactical missions within one virtual battlefield. Instructor can assign for every participant tasks or this can be defined by simulation system function.



This particular technology allows customer to provide full-scale military

operations and exercises of different type: starting from theatre level up to tactical level due to its versatility. And as for the concept of this system - it allows to create and put into battlefield not only such participants as armed vehicle, tanks and aircrafts but also infantry units by means of use the interactive tactical shooting galleries.

Recent development in the areas of 3D modeling, high speed reliable communication lines and computing facilities allows us to state fare that Virtual Battlefield System could be applied nowadays for combined exercises of different arms of service. And battles simulation will take place simultaneously on the ground, in the air and on the sea.

In this way sophisticated technologies could be an excellent tool in the military training process of the armed forces of different countries. Reliable Army – this is not only call of the time but country's image as well.

One more area of SDT's expertise is 3D modeling and industrial modeling. Growing market for virtualization of different objects and systems creates a demand for high precision and realistic modeling. SDT have a huge expertise and experience in design and that fact allowed company to pose its place on this market offering both simple modeling and complex models with inter-communication features.



3D modeling is intended for creation visualization of detailed three-dimensional models of objects and environment.

3D modeling allows solve wide range of problems on the stage of design and engineering of the objects, objects scheming, process optimization and analysis, employee training.

3D modeling features:

- ▲ creation of virtual items and objects;
- ▲ creation of landscapes and interiors;
- ▲ creation of virtual dwelling houses, cities, museums;
- ▲ organization of general sightseeing tours for education;
- ▲ organization of tourist tours;
- ▲ application of virtual models for information portals;
- ▲ creation of virtual models of cities, regions, separate buildings;



Industrial 3D modeling features:

- ▲ simulation of emergencies;
- ▲ organization of general virtual sightseeing tours;
- ▲ organization of preliminary development of engineering service for enterprise;
- ▲ development of enterprise plan of modernization;
- ▲ development of enterprise security systems modernization;
- ▲ visualization of influence of hazardous wastes on environment;
- ▲ organization of line-operated command training for enterprise engineering service;
- ▲ employees' training and in-service education.



Recently development of the technologies resulted not only by the fast evolution of software tools of Computer-Assisted Design, but also by wide implementation of the specialized visualization systems both for individual work and collaboration. Here we are to highlight technology of 3D objects intercommunication, that created new class of visualization systems.

It is commonly known that 70% of information human being accepts by visual sense. Individual visualization tools - monitors, for instance, very limited in function, when one speak of visualization for collaboration on 3D modeling or when there is a necessity to check 3D model from inside.

Working with different types of modeling or virtual space creation ultimate realistic three-dimensional data visualization is required that could be reached by using individual or collaborative projection centers of virtual reality.



Utilization of trekking-system allows user to intercommunicate with virtual space and models in it, and that enhances functionality and as result increases system's efficiency. User friendly and volume representation of different data allows group of users rapidly accept object's or environment's information, carry out visual analysis and gather experience, take decisions.

The purpose of immersive visualization systems - is to put user inside virtual (modeled) environment or object.

Area of application of such solutions is very wide. Such systems could be found in designing bureaus and centers of decision-making, operational rooms of oil companies, educational centers and microsurgery clinics.



SDT specialists are ready to develop and integrate visualization system of different complexity for intercommunication with 3D objects and take into account all aspects and requirements of every customer.