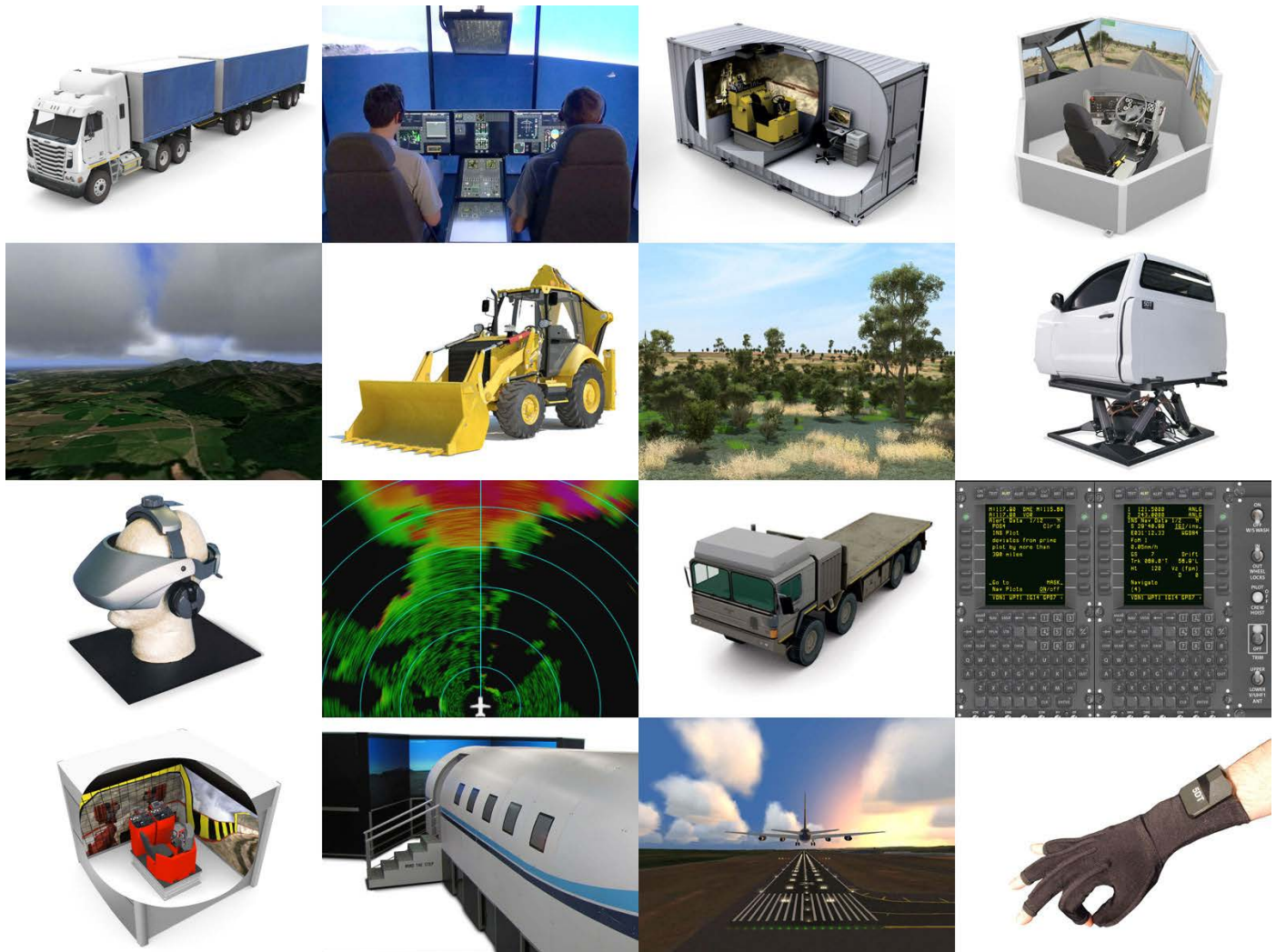


Aerospace & Defense (A&D) Division Training & Simulation Capability Overview



Presented by

5DT

Fifth Dimension Technologies

www.5DT.com

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1.0 Executive Summary

1.1 Purpose of Document

This document is a short-form overview of the Training and Simulation Capabilities of 5DT (Fifth Dimension Technologies).

1.2 Document Overview

The reasons why we believe you should choose 5DT as your **Training and Simulation Partner** are highlighted in Section 2.

5DT's **Training Simulators** are presented in Section 3.

5DT's **Visual Display Systems** (VDSs) are presented in Section 4.

Aerospace and Defense **Software Applications** developed by 5DT are presented in Section 5.

5DT's **Modelling Capabilities** are presented in Section 6.

5DT's experience with the instrumenting of and interfacing with **Instruments** are presented in Section 7.

5DT's **Project/Program Management Capabilities** are presented in Section 8.

5DT's **Software Development Capabilities** are presented in Section 9.

5DT's **Machine Learning Capabilities** are presented in Section 10.

5DT's **Graphics Development Capabilities** are presented in Section 11.

5DT's **Mechanical Hardware Development and Manufacturing Capabilities** are presented in Section 12.

5DT's **Electronics and Optics Design Capabilities** are presented in Section 13.

5DT's ability to design and implement **Training Centers** and **Mobile Training Solutions** is presented in Section 14.

5DT's **Virtual Reality and Simulation Hardware** are presented in Section 15.

The 5DT **Point of Contact** details are provided in Section 16.

2.0 About 5DT

Our Slogan is:

Experience Tomorrow Today!™

The 5DT Vision is:

We make operators Safer, more Productive and less Destructive!™

We invite you to join us on our quest.

Here are some reasons why we believe you should choose 5DT as your Training & Simulation Partner:

2.1 Strong Training & Simulation Capability

5DT provides a full Turnkey Training System Design and Implementation Capability, serving the following industries:

- Aerospace & Defense
- Mining & Construction
- Trucking
- Virtual Reality (VR), Augmented Reality (AR), Extended Reality (XR) & Simulator Hardware

5DT also provides Support for its training solutions.

2.2 Strong Track Record

5DT has been in the international training systems business for more than **25** years.

2.3 Global Presence

5DT has operations in **4** countries, that is, Australia, India, South Africa and the United States. We have representatives all over the world.

2.4 Wide Customer Base

We have more than **200** simulator units deployed worldwide.

Some of our key customers include:

- | | | |
|-------------------|---------------------------|-------------------|
| - Airbus (EADS) | - Alpha Natural Resources | - Anglo American |
| - Arm Scor | - BHP Billiton | - Denel |
| - Ecuadorian Army | - Glencore | - Luminant |
| - Peabody Energy | - South African Air Force | - S. African Army |
| - US Army | - Vale | |

2.5 Strong Relationships with Original Equipment Manufacturers (OEMs)

5DT has already produced training simulators for machines by more than thirty **35** different original equipment manufacturers (OEMs).

We use real OEM parts in our simulators to ensure maximum realism.

5DT has produced training simulators for aircraft, vehicles or machines by (inter alia) the following OEMs:

- | | | |
|-----------------|-------------------|----------------|
| - Airbus (EADS) | - AugustaWestland | - Bell |
| - Boeing | - Caterpillar | - Cessna |
| - Denel | - Hitachi | - Freightliner |

- International
- John Deere
- Joy Global
- Komatsu
- Liebherr
- Lockheed
- Mercedes Benz
- Sandvik
- Scania
- Terex
- Thales (Shorts)
- Toyota

2.6 Wide Range of Available Aircraft, Vehicle or Machine Models

5DT has already developed training simulators for more than **125** different aircraft, vehicle or machine models.

It is therefore likely that 5DT has already developed simulators for the aircraft, vehicle or machine that you need a simulator for. If not, 5DT is capable of developing training simulators for a new aircraft, vehicle or machine very rapidly.

2.7 Strong Aerospace & Defense Knowledge Base

5DT has a well-established Aerospace & Defense Knowledge Base.

We understand the acronyms, terminology and the different processes. When you deal with 5DT you won't have to waste valuable time to explain how a specific process, aircraft, vehicle or machine works.

2.8 Highly Talented and Qualified Personnel Complement


5DT consists of a group of about 80 highly talented and qualified individuals working cohesively as a team. The team comprises very strong Engineering & Software Development (43%), Technician (14%) and Graphics (15%) groups.

Most of 5DT's development is done in South Africa, providing for very cost effective solutions.

2.9 Integrated Training Plans

5DT has the capabilities to offer Integrated Training Plans over the entire training spectrum, not merely Training Simulators.

Our training plan has been developed to provide a systematic development of the student's knowledge and skills. A five (5) stage training plan is generally proposed for each aircraft, vehicle or machine. Please refer to the table below.

No	Image	Training Element Description
a.		<p>Visualizer</p> <p>Teaches the trainee where the specific aircraft, vehicle or machine fits into the overall process. Gives the trainee a big-picture, holistic view.</p> <p><i>Knowledge Development</i></p>

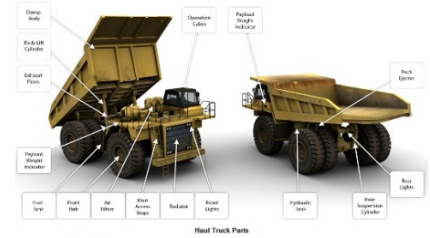



No	Image	Training Element Description														
b.	<p>2.2.3 Machine Parts and Functions</p>  <table border="1" data-bbox="239 448 766 593"> <thead> <tr> <th>Part</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Air Filter</td> <td>Prevents dust from the outside environment from entering the engine and causing engine damage.</td> </tr> <tr> <td>Air Tank</td> <td>Provides compressed air to various components in the haul truck such as the horn and brake system.</td> </tr> <tr> <td>Body Lift/Hoist Cylinder</td> <td>Lifts or lowers the dump body.</td> </tr> <tr> <td>Differential</td> <td>Balances the power applied to each wheel equally allowing the inside and outside wheels to rotate at different speeds which is useful when travelling on slippery roads.</td> </tr> <tr> <td>Dump Body (Tray)</td> <td>Carries the payload during haul truck operation.</td> </tr> <tr> <td>Exhaust Pipes</td> <td>Discharges burnt waste gasses when the engine is running.</td> </tr> </tbody> </table>	Part	Description	Air Filter	Prevents dust from the outside environment from entering the engine and causing engine damage.	Air Tank	Provides compressed air to various components in the haul truck such as the horn and brake system.	Body Lift/Hoist Cylinder	Lifts or lowers the dump body.	Differential	Balances the power applied to each wheel equally allowing the inside and outside wheels to rotate at different speeds which is useful when travelling on slippery roads.	Dump Body (Tray)	Carries the payload during haul truck operation.	Exhaust Pipes	Discharges burnt waste gasses when the engine is running.	<p>E-Learning (Computer Based Training [CBT])</p> <p>Teaches the trainee the theory, basics and terminology of a specific aircraft, vehicle or machine.</p> <p><i>Knowledge Development</i></p>
Part	Description															
Air Filter	Prevents dust from the outside environment from entering the engine and causing engine damage.															
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Dump Body (Tray)	Carries the payload during haul truck operation.															
Exhaust Pipes	Discharges burnt waste gasses when the engine is running.															
c.		<p>Walk-Around Inspection Trainer</p> <p>Teaches the trainee how to perform walk-around inspections of an aircraft, vehicle or machine.</p> <p><i>Knowledge Development</i></p>														
d.		<p>Pre-Simulator (Part-Task Trainer)</p> <p>Teaches the trainee the controls of a specific aircraft, vehicle or machine, so that no time is wasted teaching controls on the main simulator.</p> <p><i>Skills Development</i></p>														
e.		<p>Simulator</p> <p>Submits the trainee to training scenarios, ranging from easy to difficult. Teaches the trainee how to handle the aircraft, vehicle or machine during emergencies.</p> <p><i>Skills Development</i></p>														

Table 1 – The 5DT Training Plan

During the **1st Stage** a Visualiser is used to teach the trainee where a specific aircraft, vehicle or machine fits into the overall process. The trainee gets a big-picture view and his/her **Knowledge** is developed.

During the **2nd Stage** an E-Learning (Computer Based Training [CBT]) system is used to teach the trainee the theory, basics and terminology of a specific aircraft, vehicle or machine. The **Knowledge** of the trainee is developed.

During the **3rd Stage** a Walk-Around Inspection Trainer is used to teach the trainee how to perform walk-around inspections of an aircraft, vehicle or machine. The **Knowledge** of the trainee is developed.

During the **4th Stage** a Pre-Simulator (Part-Task Trainer) is used to familiarise the trainee with the controls of a specific aircraft, vehicle or machine. The **Skills** of the trainee is developed.

During the **5th Stage** a Training Simulator is used to subject the trainee to training scenarios. The trainee's **Skills** are honed further.

5DT has *the Technology, the Will* and *the Resources* to make a huge success of your project!

We are capable of offering Turnkey Solutions!

3.0 Training Simulators

3.1 Simulator Types

5DT offers the following simulator types.

- Full Mission Simulators (FMSs)
- Training Devices
- Part Task Trainers
- Pre-Simulators
- Team Trainers
 - Navigation, Search & Rescue, AWAC
 - Air Defense
- Joint Force Trainers
 - Air Force
 - Navy
 - Army
 - Marines

3.2 Air

5DT offers the following air-related training simulators.

No	Image	Training Simulator
a.	 <p>The image block contains two photographs. The top photograph shows the exterior of a large, white, cylindrical simulator structure with a blue stripe and a set of stairs leading to an entrance. The bottom photograph shows the interior cockpit of the simulator, featuring two blue seats, a central instrument panel with multiple screens, and a large panoramic window displaying a simulated sky and terrain.</p>	<p>Aircrew Team Trainer – Fixed Wing Reconfigurable to accommodate the following aircraft:</p> <ul style="list-style-type: none"> - Boeing B707 - Douglas C47 (Dakota) - Lockheed C130 - Cessna C208






No	Image	Training Simulator
b.		<p>Aircrew Team Trainer – Rotary Wing Reconfigurable to accommodate the following aircraft: - AgustaWestland SuperLynx Maritime Helicopter</p>
c.		<p>Fiber Optic Guided Missile Training Simulator - Airbus/EADS Polyphem</p>
d.	-	<p>Attack Helicopter Part Task Trainer - Denel Red Hawk ('Rooivalk')</p>
e.	-	<p>UAV Ground Station Training Simulator - Denel Seeker</p>
f.	-	<p>Air Traffic Control (Demonstrator)</p>

Table 2 – Air-Related Training Simulators by 5DT

3.3 Land

5DT offers the following land-related training simulators.

No	Image	Training Simulator
a.		<p>Trucks – Rigid - Mercedes Benz, International, Toyota</p>
b.		<p>Trucks – Tractor-Trailer Semi-Trailer (1 Trailer) & Interlink (2 Trailers) - Freightliner, Mercedes Benz, Scania</p>
c.		<p>Construction Machines - Excavator [Backhoe] (Caterpillar & Komatsu)</p>
d.		<p>Construction Machines - Dozer [Tracked and Wheel Type] (Caterpillar & Komatsu)</p>

No	Image	Training Simulator
e.		Construction Machines - Grader (Caterpillar & Komatsu)
f.		Construction Machines - Front-End Loader (Caterpillar)
g.		Construction Machines - Tractor-Loader-Backhoe (TLB) (Caterpillar)
h.		Construction Machines - Telescopic Handler (Telehandler) (Manitou)
i.		Construction Machines - Rough Terrain Crane (Terex)
j.	-	Air Defence Crew Trainer - Thales Starstreak Missile


No	Image	Training Simulator
k.		Armor & Artillery (General Capability)

Table 3 – Land-Related Training Simulators by 5DT

3.4 Sea

5DT has the capability to offer the following sea-related training simulators.

- Ship Bridge Simulators
- Periscope Simulators
- Ship Defense Simulators


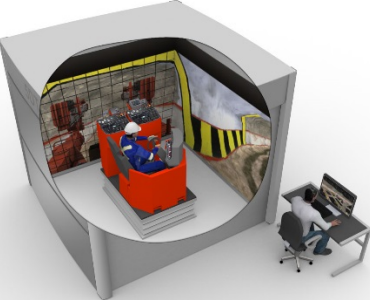
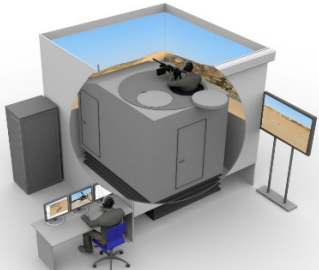
4.0 Visual Display Systems (VDSs)

5DT offers a wide variety of VDSs, ranging from single screen solutions to multi-screen, stereo solutions. The VDSs include projection-type as well as LCD/LED/OLED displays. The 5DT VDSs include both the hardware as well as the associated multi-screen software.

Some of the 5DT display solutions includes Interactive Screen functionality where one can write and annotate on the display screen, either with instrumented pens or with one's fingers (Virtual Whiteboard).

4.1 Visual Display Systems (VDSs)

5DT offers the following Visual Display Systems (VDSs)

No	Image	Visual Display System (VDS)
a.		Simulator Base System (SimBASE™) – Hexagon
b.		Simulator Base System (SimBASE™) – Cube
c.		Simulator Base System (SimBASE™) – Cube Enclosed Capsule

No	Image	Visual Display System (VDS)
d.		Curved Screen
e.		Cylindrical Screen
f.		Head Mounted Display (HMD)
g.		Virtual Binoculars & Virtual Laser Range Finders (OLED) Integrated into original equipment manufacturer's (OEM's) shells or into 5DT's generic shell.
h.	-	Tablet Devices and Smartphones

Table 4 – Visual Display Systems (VDSs) by 5DT

4.2 Roll-In & Roll-Out Display Systems

5DT offers two different, truly modular, rapid swap-out, roll-in & roll-out solutions, as shown below. These solutions consist of a Simulator Base System (SimBASE™) and Simulated Cabins

(SimCABS™) that can be rolled into or out of the SimBASE™ on transport trolleys (dollies). The swap-out process takes less than 3 minutes and no tools or a crane are required.

4.2.1 Simulator Base System (SimBASE™) – Hexagon

A 5DT Hexagon Simulator consists of a Simulator Base System (SimBASE™) and a Simulated Cab (SimCAB™) as shown in the following image.

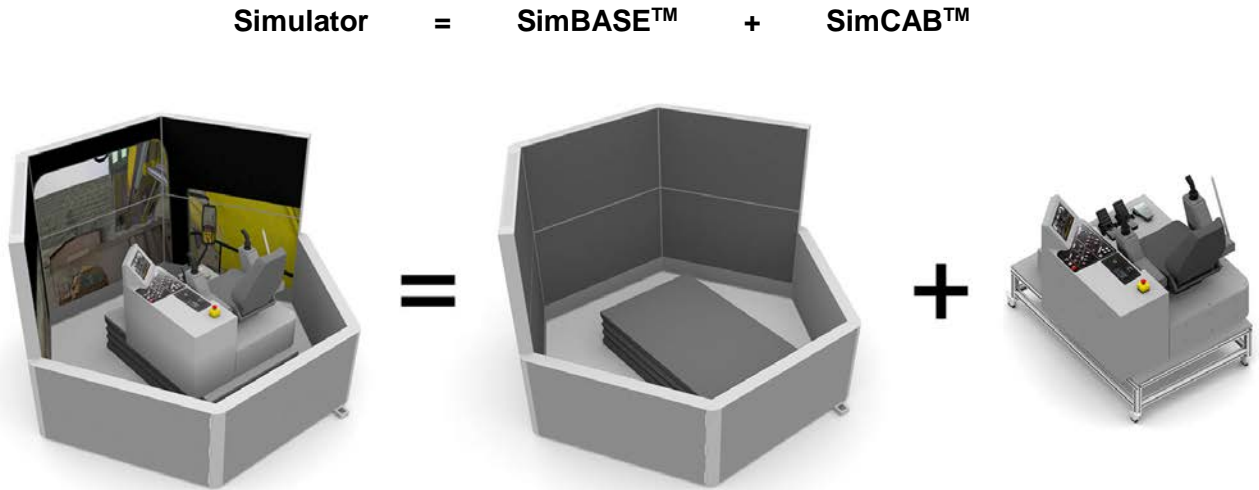


Figure 1 – Simulator Elements: Hexagon

A single 5DT SimBASE™ may accommodate several different SimCABS™, as shown in the following image.

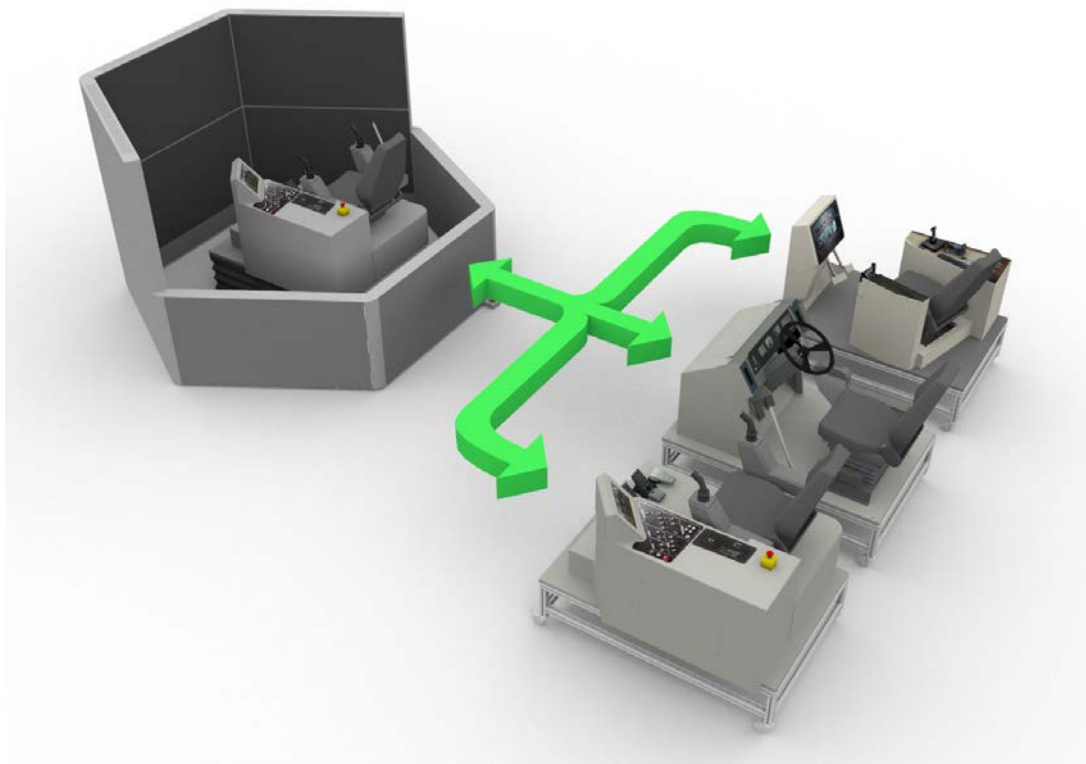


Figure 2 – Single Hexagon SimBASE™ – Many Different SimCABS™

The Swap-Out process for the SimBASE™ – Hexagon is shown in the following image.

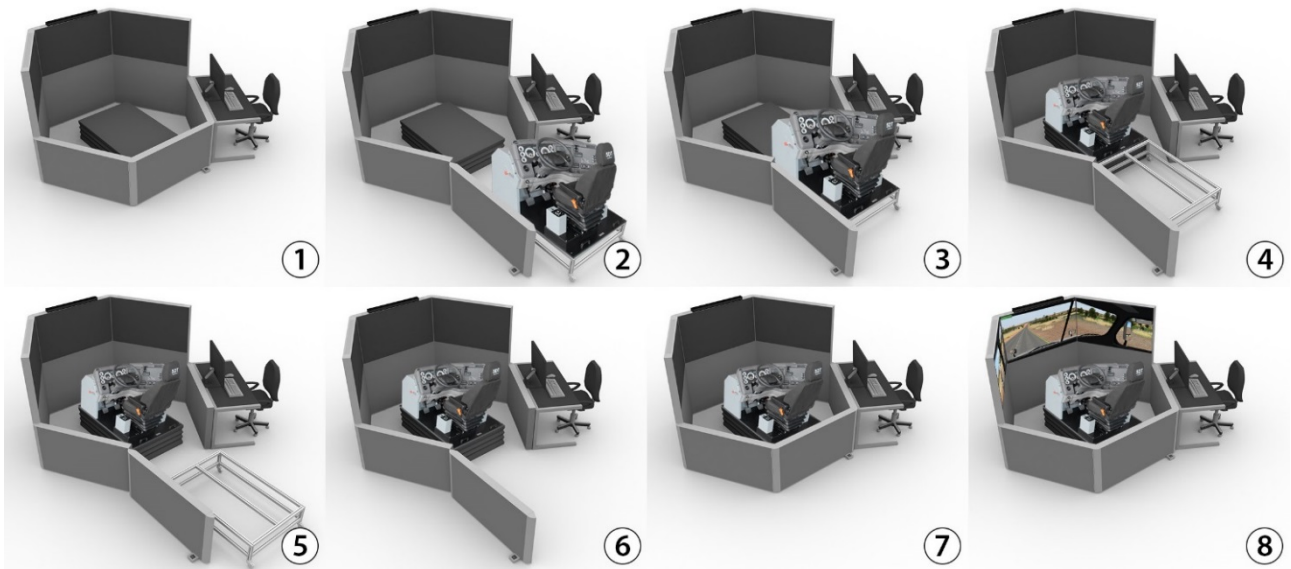


Figure 3 – SimCAB™ Swap-Out in Less Than 3 Minutes (For the 5DT SimBASE™ Hexagon)

4.2.2 Simulator Base System (SimBASE™) – Cube (3m x 3m) (2.1m x 2.1m in shipping container)

A 5DT Cube Simulator consists of a Simulator Base System (SimBASE™) and a Simulated Cab (SimCAB™) as shown in the following image.

$$\text{Simulator} = \text{SimBASE}^{\text{TM}} + \text{SimCAB}^{\text{TM}}$$

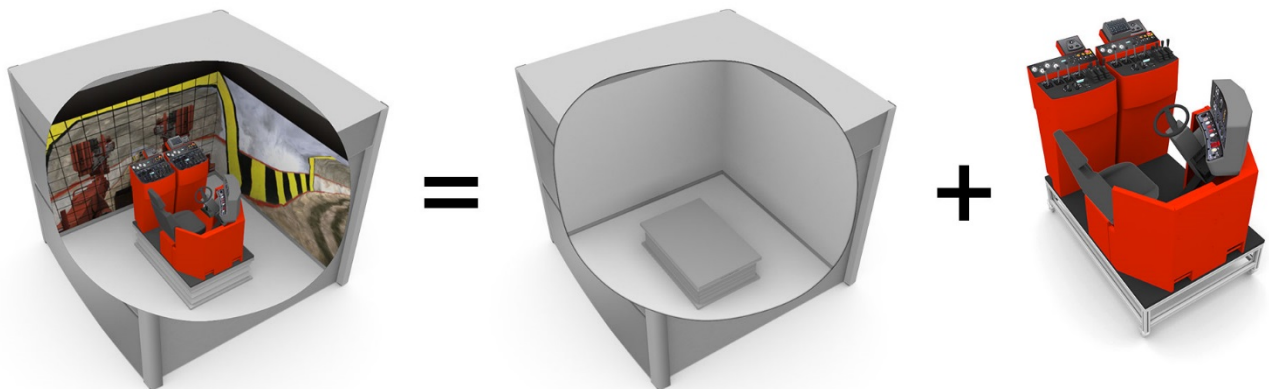


Figure 4 – Simulator Elements: Cube

A single 5DT SimBASE™ may accommodate several different SimCABs™, as shown in the following image.

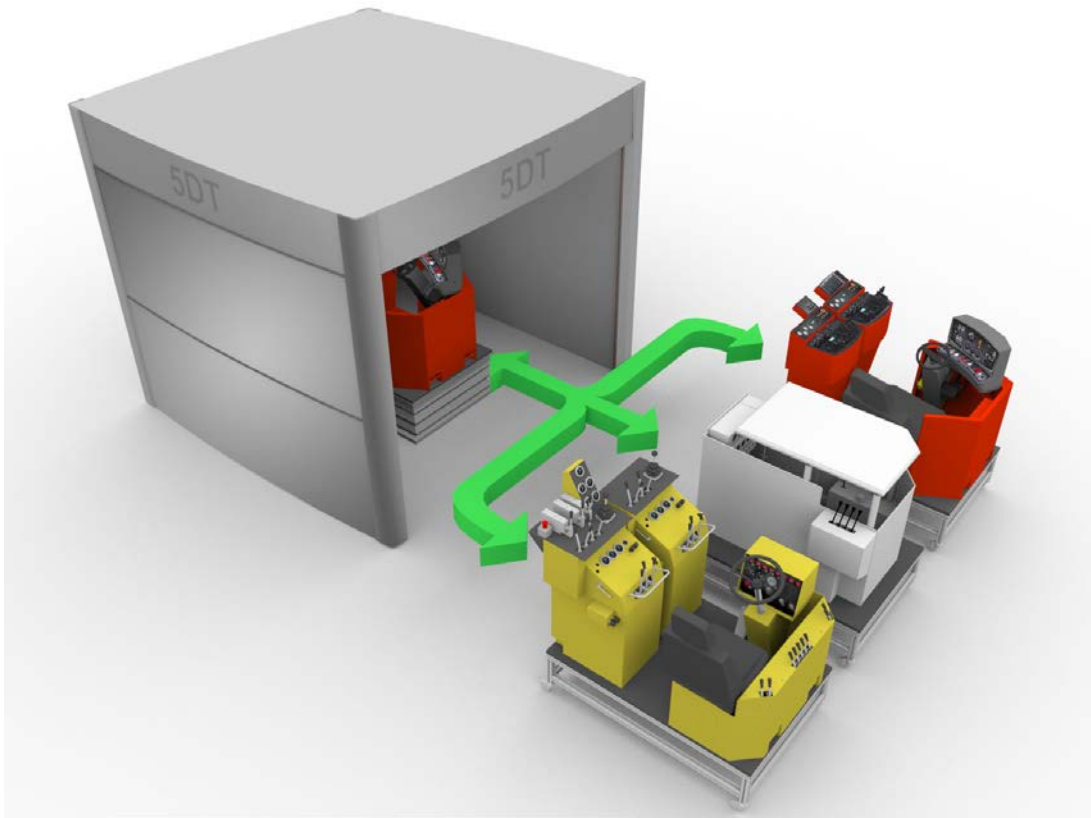


Figure 5 – Single Cube SimBASE™ – Many Different SimCABs™

The Swap-Out process for the SimBASE™ – Cube is shown in the following image.

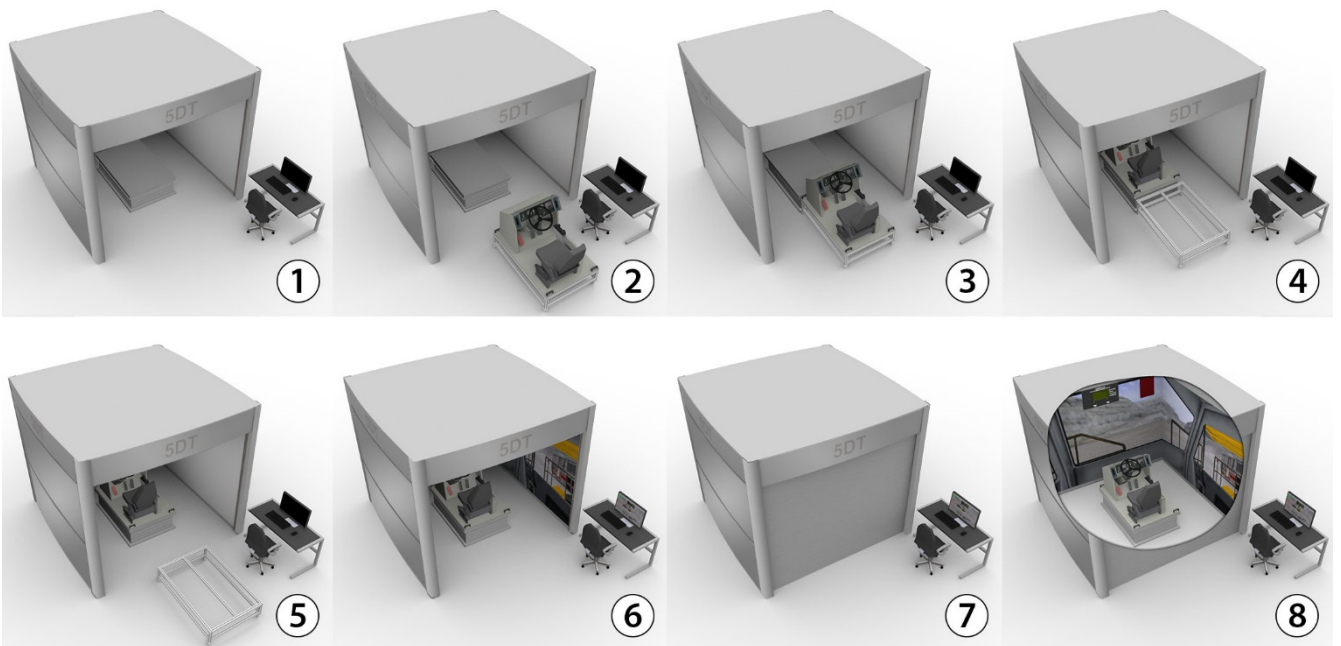
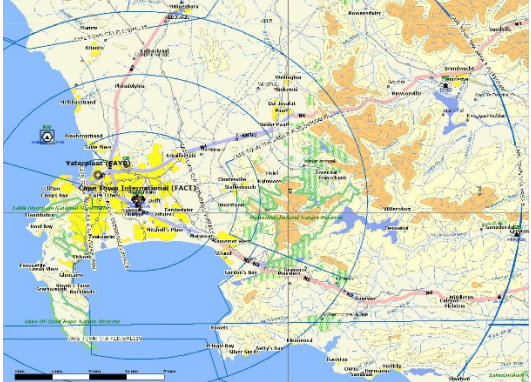
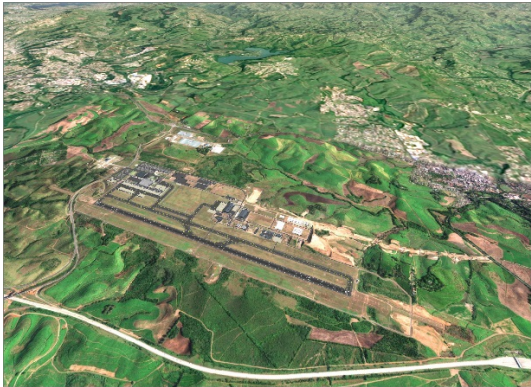

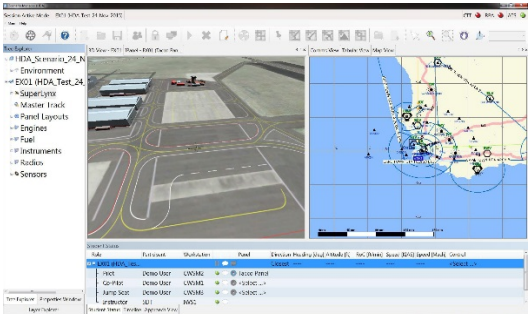
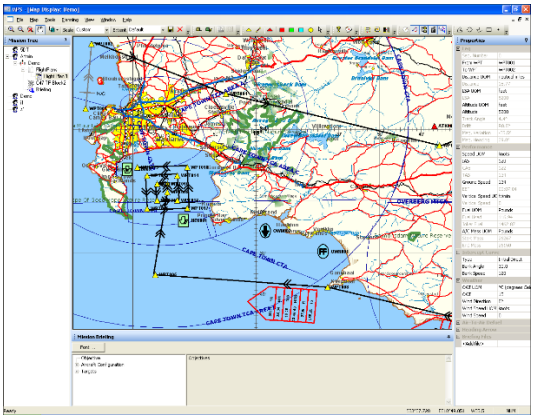
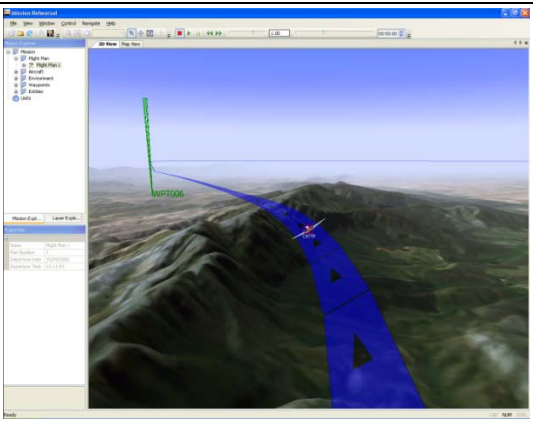
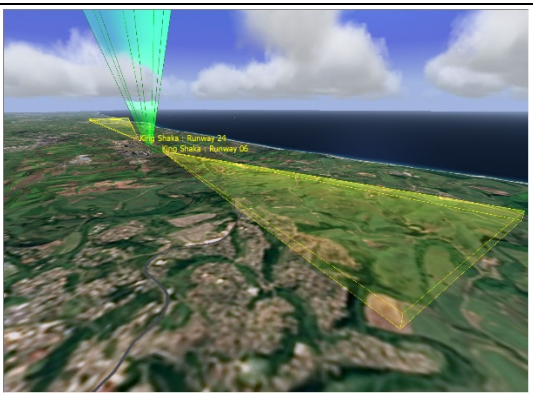
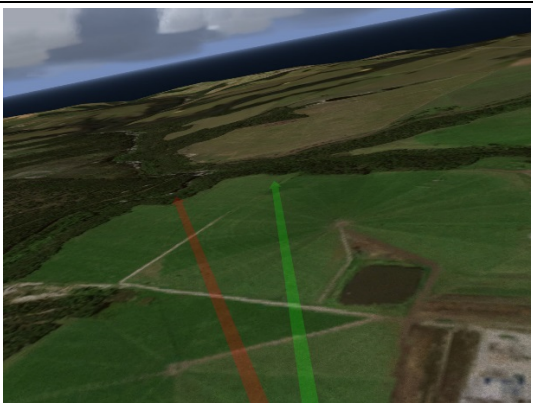


Figure 6 – SimCAB™ Swap-Out in Less Than 3 Minutes (For the 5DT SimBASE™ Cube)

5.0 Software Applications

5DT has developed the following application software as part of its simulator offerings.

No	Image	Software Application
a.		Map Displays
b.		3-D Displays
c.		Scenario Managers
d.		Hand-held Scenario Controllers (On tablet devices)

No	Image	Software Application
e.		Mission Planners
f.		Mission Rehearsal Systems
g.		Airspace Visualizers
h.		Track Made Good Indicators





No	Image	Software Application
i.		PAPI and VASI Landing Systems
j.	-	Autopilots
k.	-	Record & Playback Systems (After Action Review [AAR])
l.	-	Voice Communication Systems (VOIP)
m.	-	Voice Recognition Systems (Based on Windows Voice Recognition Toolkit)
n.	-	Online Briefing Systems
o.	-	Auto Evaluation Systems
p.	-	IFF Systems
q.	-	Electronic Warfare Systems

Table 5 – Application Software by 5DT

6.0 Modelling

6.1 Sensor Modelling

5DT has modelled a wide range of sensors, as shown in the following table.

No	Image	Sensor
a.		<p>Visible (Colour) Terrain databases: <i>from</i> 1km x 1km (.62 mi x .62 mi) <i>to</i> 1,500km x 1,500km (932 mi x 932 mi)</p>
b.		<p>Infrared (FLIR) This capability is based on actual temperature measurements conducted by 5DT for about 100 materials over a 24-hour period. These temperatures were then used to calculate the display intensities. This makes it possible to generate time-of-day infrared scenes showing differential transitions between different materials (e.g. runway tarmac versus surrounding concrete or ground). Scenery may be calculated for the 3-5 µm or 8-12 µm bands. The rendering includes black-hot & white-hot switching and noise addition (scanning noise or staring array noise).</p>
c.		<p>Night Vision Goggles (NVGs) NVG scenery is generated such that if viewed with real NVGs the correct image is seen. The rendering includes halo effects, flaring and low-light noise patterns.</p>

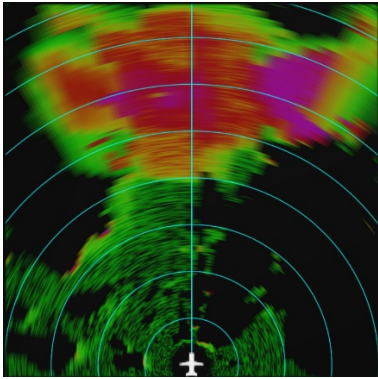
No	Image	Sensor
d.		RADAR - Normal Radar - Weather Radar
e.	–	Laser Range Finders
f.	–	Navigation Sensors & Processor Modelling - GPS - INS - R-NAV

Table 6 – Sensor Modelling by 5DT

6.2 Radio Communications Modelling

5DT has modelled the following radio communication systems, based on real-time Line of Sight (LOS) and Distance calculations.

- VHF Radios
- HF Radios
- VOR Beacons

6.3 Environmental Modelling

5DT has modelled the following environmental effects.

- Visibility (e.g. Runway Visual Range [RVR])
- Fog
- Dust
- Smoke
- Time of Day (Stars, sun and moon shown geospatially during day & night)

6.4 Computer Graphics Special Effects

The following special effects have been developed by 5DT.

- Explosions
- Launch Effects

6.5 Weather Modelling

5DT has modelled the following weather elements.

- Wind (Height, speed and direction configurable)
- Clouds (Height, cloud-type and movement configurable)
- Fog
- Rain
- Meteorological Databases

6.6 Dynamics Modelling

5DT has modelled the following dynamics of aircraft, vehicles or machines.

- Physics
- Engine & Drive Train
- Vehicle Dynamics
 - Wheels with Suspension
 - Caterpillar Tracks
- Flight & Performance Modelling
 - Fixed Wing (Turboprop, Jet)
 - Rotary Wing
 - Missile Simulation
 - Rocket Simulation
 - Ballistic Projectile Simulation

7.0 Instruments and Interfacing

7.1 Instruments

5DT is capable of providing the following instrument solutions for its pre-simulators and simulators.

- Real Instruments (CAN & ARINC Buses)
- Virtual Instruments (Touch Screen)
- Virtual Instruments (Buttons on side of screen)

7.2 Interfacing Experience

5DT has experience interfacing with the following buses or communication standards.

- Bluetooth
- CAN Bus
- Profi Bus
- Link ZA Bus

7.3 Interfacing with Control Hardware

5DT has instrumented and interfaced with the following control elements before.

- Joysticks
- Thrust Controllers
- Yokes
- Cyclic
- Collective
- Levers
- Pedals (Rudder & Yaw)
- Radios (Hardware in the Loop)

8.0 Project/Program Management

8.1 Project Management and System Engineering Capabilities

5DT has experience of the following Project Management and Systems Engineering elements. 5DT has successfully developed and implemented the following Management Plans.

No	Management Element	Management Plan
a.	Project/Program Management	Project/Program Management Plan (PMP)
b.	Hardware Development	Hardware Development Plan (HDP)
c.	Software Development	Software Development Plan (SDP)
d.	Quality Assurance Management	Quality Assurance Plan (QAP)
e.	Configuration Management	Configuration Management Plan (CMP)
f.	Safety Management	System Safety Management Plan (SSMP)
g.	Risk Management	Risk Management Plan (RMP)
h.	Logistics & Support Management	Logistics & Support Plan (LSP)
i.	Systems Engineering Management	Systems Engineering Management Plan (SEMP)
j.	Reliability, Availability and Maintainability Management	Reliability, Availability & Maintainability Plan (RAMP)
k.	Operational Test & Evaluation	Operational Test & Evaluation Plan (OT&EP)
l.	Subcontractor Management	Subcontractor Management Plan (SMP)
m.	Specification Development	Functional Specification (FS) System, Sub-System Specification (SSS) Sub-System Specifications

Table 7 – 5DT Project Management and Systems Engineering Capabilities

8.2 Project/Program Management Software

5DT has experience in working with the following management software.

- MS Project
- JIRA
- Smartsheet (Collaborative online distributed development)

8.3 Contracting Models

5DT has acted as both a Prime Contractor (Main Contractor), working directly with acquisition agencies or as a Subcontractor, responsible to a Prime Contractor.

9.0 Software Development Capabilities

9.1 Software Development Capabilities

5DT has extensive software development experience. We have developed more than 125 different simulators for aircraft, vehicles or machines by more than 35 original equipment manufacturers (OEMs).

We have general development capabilities for:

- Screen, Projector or Head Mounted Display (HMD) based software applications
- Virtual Reality (VR), Augmented Reality (AR) or Extended Reality (XR) based software applications

9.2 Coding Languages

5DT's *main* coding languages are shown below. We are also capable of developing mobile applications.

- C++
- LUA Scripting
- Also C#, Java

9.3 Software Development Kits (SDKs)

5DT has developed simulator software applications with both third-party as well as in-house software development kits (SDKs). Our in-house 5DT SDK is now in its third major version and we are maintaining the first and second versions. The SDK makes provision for screen/projector based, as well as virtual reality (VR) / head mounted display (HMD) software application development.

- Windows Based
- In-House 5DT SDK 1
- In-House 5DT SDK 2
- In-House 5DT SDK 3
- In-House Graphics Engine based on DirectX 11

9.4 Operating Systems

5DT is comfortable with the following operating systems, having developed applications in all of them.

- Windows
- Unix
- Linux

9.5 Sound Solutions

9.5.1 Standard Sound Output

The standard sound output of our simulators is 5.1 3-D Sound.

9.5.2 Voice Recognition Application

5DT has implemented a voice recognition system for a team trainer for navigators. This system recognizes a full navigator command vocabulary and inputs that to a virtual pilot module (auto-pilot) that then implements the commands of the navigator. The trainee navigator can therefore navigate a virtual aircraft within a virtual world.

9.6 Development Methodologies

5DT is comfortable with the following development methodologies, having developed major simulators (team trainers) with both. Our preference is the agile scrum development methodology, because of better customer interaction and an enhanced end-product for the customer.

- V-Model
- Agile Scrum Model

9.7 Standards

5DT has experience in working with the following standards:

- Networking between Simulators: High Level Architecture (HLA)
- Computer Based Training: SCORM
- Internal Coding Standards for C++ and LUA

10.0 Machine Learning Capabilities

10.1 Machine Learning Capabilities

A Machine Learning (Deep Learning) group was established within 5DT in 2017. This group consists of software developers/engineers and graphics developers.

5DT offers an end-to-end Machine Learning Development Service.

5DT also develops its own Machine Learning Applications.

10.2 Machine Learning Development Spectrum

5DT focuses on machine-vision-based (both 2-D and 3-D) Machine Learning.

5DT's Machine Learning development capabilities include the following:

- Data Generation (still images and video) utilising:
 - Computer graphics, motion capture and animation techniques
 - Terrain databases
 - Sensor modeling
- Training of Models with captured and/or generated data [Caffe, Caffe2]
- Development of Machine Learning Applications:
 - Detection of objects
 - Tracking of objects
 - Counting of objects
 - Detection of sequences or behaviors

10.3 Hardware Implementations

5DT has already implemented Machine Learning Applications on the following computer hardware:

- Personal Computers [Windows & Linux]
- Dedicated Processors (For example Nvidia Jetson 2) [Windows & Linux]
- Smartphones (Qualcom chipset and Qualcomm software development kit (SDK) [using both CPU as well as GPU]) [Android]

11.0 Graphics Development Capabilities

11.1 Graphics Development Capabilities

5DT has a strong graphics group with tool chains for rapid development of 3-D Entities and Virtual Worlds.

11.2 3-D Model Development Capability

5DT uses the following software and tools to develop 3-D models and animations. 5DT already has a wide range of 3-D entities for air, land and sea forces.

- 3-D Studio Max
- Adobe Photoshop
- Adobe Illustrator

11.3 Motion Capture Capability

5DT has an in-house 32-point motion capture capability to develop lifelike animations rapidly.

11.4 Terrain Database (Virtual World) Development Capability

5DT has a terrain development capability featuring the following elements.

- Varied Size & Resolution (From 1km x 1km up to 1,500km x 1,500km)
- Terrain Paging
- Level of Detail
- Visible/Infrared/NVG
- Digital Elevation Model (DEM)
- Shape File Format
- Satellites & Aerial Photos
- Custom & Synthetic Databases
- Vegetation (3-D Trees and Plants)
- Terrain Generation Tools
 - In-House Terrain Development Tool (Generates terrains using vector map data in conjunction with satellite images)
 - Third Party Terrain Development Tools

12.0 Mechanical Hardware Development & Manufacturing Capabilities

5DT has mechanical hardware development and manufacturing capabilities featuring the following elements.

- 3-D Scanning
- 3-D Printing
- Solidworks Computer Aided Design (CAD) Stations
- Solidworks EPDM Works Configuration Management System
- Parts Management System (Acctivate)
- Manufacturing Processes
 - 3-D Printing
 - Milling
 - Lathing
 - High Speed Routing
 - Welding
 - Laser Cutting
 - Powder Coating, Anodyzing

13.0 Electronics & Optics Development Capabilities

13.1 Electronics Development Capabilities

5DT has electronics development capabilities featuring the following elements.

- Analog and digital electronics design capability
- Printed Circuit Board (PCB) design capability (Normal & Surface Mounted)
- Existing Interface Boxes

Backplane and dedicated plug-in boards for the following

- Switches
- Lamps & Relays
- Dials
- Analog to Digital (A-D)
- Digital to Analog (D-A)
- Modulation (e.g. Pulse width modulation)
- CAN Bus

13.2 Optical Design Capabilities

5DT has basic optics and fiber optics integration capabilities. The optics for 5DT's virtual laser range finder was designed in-house. The 5DT Data Glove series utilizes optical fibers for the sensing of finger curvature.

14.0 Training Centers & Mobile Simulators

14.1 Training Center Design & Implementation Capabilities

5DT has designed and successfully implemented the following Training Center types before. In all cases 5DT was fully responsible for the design, construction and fitment phases.




No	Image	Training Center Type
a.		<p>Brick & Mortar Entire building with simulator rooms, briefing auditoriums, crew rooms, project offices, mission planning room, CBT rooms, restrooms, store rooms and mini workshop.</p>
b.		<p>Shipping Containers Entire container farm with simulator, pre-Simulator, classroom, office and storage containers.</p>

Table 8 – Training Centers by 5DT

14.2 Mobile Solutions (Shipping Container Mounted)

5DT offers the following container and trailer mounted training solutions, as shown in the following table.

No	Image	Container/Trail Mounted Training Solution
a.		<p>Simulator Containers</p>

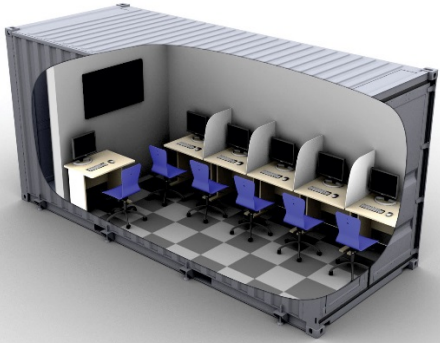



No	Image	Container/Trail Mounted Training Solution
b.		Computer Based Training (CBT) Containers
c.		Pre-Simulator and Office Containers
d.		Insulated Storage Containers
e.		Trailers

Table 9 – Container and Trailer Mounted Training Solutions by 5DT

15.0 Virtual Reality and Simulation Hardware

15.1 Data Gloves

5DT has been selling data gloves since 1994 and is the world's number one seller of data gloves.

The 5DT Data Glove Series includes the following data gloves.



No	Image	5DT Data Glove
a.		5DT Data Glove 5 5-Sensor Data Glove
b.		5DT Data Glove 14 14-Sensor Data Glove Pair Wireless Belt Pack
c.		5DT Data Glove MRI Magnetic Resonance Imaging (MRI) Data Glove (No metal or electrical circuits in glove itself)

Table 10 – The 5DT Data Glove Series

15.2 Motion Bases

5DT offers the following in-house-developed electrical motion bases.

No	Image	5DT Motion Base
a.		3-DOF Rotary Ultra Low Profile Standard Duty: 500kg (1,100 lbs)
b.		6-DOF Rotary Low Profile Standard Duty: 500kg (1,100 lbs)
c.		6-DOF Linear Standard Duty: 500kg (1,100 lbs)
d.		6-DOF Linear Medium Duty: 1,500kg (3,300 lbs)

Table 11 – Motion Bases by 5DT

15.3 Head, Hand and Body Tracking Systems

5DT has comprehensive experience with the following tracking systems. These systems has been used to calculate different virtual camera viewpoints (as a trainee moves his/her head around) or to implement virtual look-to-aim or look-to-designate systems.

- Optical Tracking Systems (Camera Based, Active and Passive Sources)
- Magnetic Tracking Systems (AC and DC Magnetic Fields)
- Acoustic Tracking Systems

16.0 Points of Contact (POCs)

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