

# Driver Simulation Review Report

Alice H. Wright  
December 2002

Disclaimer:

"The enclosed information was gathered at the request of the Professional Development Program Advisory Committee. The committee is the advisory board for training and development programs supported by the North Carolina Department of Transportation/Public Transportation Division. The committee neither endorses, nor disapproves any of the products reviewed."

Simulation is a field that has been around for a long time and is growing each day. It has a strong background in flight and military training by offering hands-on training experiences without the multiple costs of training in an actual vehicle. The interest in driver training simulation is spreading, but is primarily focused on large vehicles such as over-the-road transport trucks and buses. There are not many simulation options for the rural driver who operates 15-passenger vans and cutaways. This report will summarize these options currently available.

There are different types of simulation products on the market. Simulators are referred to as open-loop video, low-end, mid-range or high-end simulators. Open-loop video simulators, like the Doron unit NCDOT currently owns, are not interactive. The driver reacts to the motion of the vehicle on the video screen. The simulator tests such things as reaction time and direction of reactive action. Low-end simulators are computer-based programs that offer the consumer an interactive simulation training and, sometimes, assessment tool without having a large separate unit to find room for and maintain. This type of simulator is more portable and more of a turnkey system than the larger, separate simulation training units.

Mid-range simulators are a step above low-end simulators, but in a unit similar to the open-loop units. These simulators are interactive, more complex and expensive than the other simulators, but also provide a more real driving experience. High-end simulators will not be discussed due to the complexity and cost of the system. This type of simulator primarily benefits metro bus drivers and transport truck drivers. There are options available if the request is made for further research in the future.

There are so many different designs of simulators that some of those products on the market will not be mentioned in this report. The only simulators mentioned are those that would be most compatible with existing driver training programs within the transit systems throughout North Carolina. The goal of this report is to relay gathered information about simulation training options for drivers so a decision can be made about how to proceed.

**driVR™**  
**By**  
**Imago Systems, Inc.**

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**I. Company Profile and History**

Imago Systems, Inc. is a leader in the driving simulation industry by providing affordable technology worldwide. The company was founded by Linda Hirsekorn, the current president. Imago Systems, Inc. developed a PC-based driver training program called driVR™ to be used for research, rehabilitation and training.

**II. Products of Interest**

A. driVR™II

1. Brief Description

driVR™ II allows the driver to enter and travel around in a realistic 3D artificial world creating an interactive and immersible driving experience. The driver is guided through the program by visual and auditory signals.

2. Components

Computer	Pedals
Software package	Steering wheel
Virtual reality (VR) headset (optional)	

3. Curriculum

12 Scenarios  
Practice Course Module  
Tactical and Strategic thinking skills

4. Features

Dataviewer	Integrated Help Menu
Playback Viewer	Route Builder
Scenarios Library	World Environment Selector

5. Media

PC based 3D graphics software on CD-ROM

- 6. Modes
  - Single driver
- 7. Performance Management
  - Dataviewer
  - Playback Viewer
- 8. Programming Capabilities
  - Customize routes                                 Replay driver's actions
  - Customize driving conditions                 Monitor skill development progress
- 9. Special Effects
  - Buildings                                             Fog
  - Road surface                                         Season
  - Time of day                                         Weather conditions
- 10. System Specifications
  - Pentium® II Processor PC,                     3D Graphics Accelerator Card
  - 300 MHz, 64 Mbytes                             Monitor (15" minimum)
  - PCI sound card for 3D sound                 Sound Blaster Card compatible game
  - Windows™ 95/98                                 card
- 11. Usage
  - Evaluate driver skills
- 12. Vehicles
  - None specified

### **III. Expected Results/Benefits**

Using the driVR™ product, drivers could improve tactical and strategic thinking skills through the assistance of being able to rehearse and be given immediate feedback on their performance. The program also focuses on cognitive, psychomotor and visual perception skills. Agencies using this simulation program could experience lower insurance premiums and a decrease in the number of accidents in which drivers are involved.

### **IV. Capabilities/Stand-outs**

driVR™ compliments any fleet driver training program by allowing the curriculum to be specifically designed towards the agency's needs.

### **V. Customers**

Michelin Driving School

### **VI. Product Pricing**

A. driVR™ II Basic Software	\$3,898
User Manual	
Software CD	
B. Complete System w/o computer	\$5,998
User Manual	VR Headset
Steering Controls	Software CD
C. Add Dell computer to complete system	\$1,599

## VII. Summary

This seems to be a valuable tool for training and assessing driver skills. This program is a realistic possibility for the transit systems. It is not terribly expensive and is easy to install and implement. driVR™ can be used with the Elumens® VisionStation® to provide the driver with a wider and more realistic field-of-view.

## **Profiler™ By Research Triangle Institute (RTI)**

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bward@rti.org

### I. Company Profile and History

Mission Statement: Research Triangle Institute (RTI) is dedicated to improving the human condition through multidisciplinary research, development and technical services that meet the highest standards of professional performance.

RTI is a worldwide organization that conducts research and development. It provides technical support in the areas of education and training, environment, health and pharmaceuticals, and technology commercialization. In 1958, North Carolina Universities founded RTI as the first scientific organization in the Research Triangle Park and made it the centerpiece of the park.

### II. Products of Interest

#### A. Profiler™ Driving Assessment Station

##### 1. Brief Description

Profiler™ is a low cost, computer based driving simulator and valuable evaluation tool for driver skills assessment. This is a self-administered program involving a 15-minute simulation with real-time feedback, personalized results and a diagnostic graph.

##### 2. Components

Color Printer	Computer
Pedals	Steering Wheel

##### 3. Curriculum

Accuracy	Audio responsiveness
Decision-making	Hazard perception
Reaction testing	Scanning
Steering	

##### 4. Features

Add scores to national database  
Exportable data for comparable studies and risk assessment  
Instructor's toolkit allowing  
    point-and-click setup  
    data management  
    test interpretation  
    graph printing  
    instructor specified options  
On-line purchase of tests  
Receive latest norm files  
Web access

5. Media  
    CD ROM
6. Modes  
    Single driver
7. Performance Management  
    Diagnostic color graph  
    Driver performance database
8. Programming Capabilities  
    N/A
9. Special Effects  
    N/A
10. System Specifications  
    16-bit Windows® compatible sound card and speakers  
    19" Monitor (recommended)  
    250 MB of Disk Space  
    64 MB RAM (128 MB recommended)  
    At least one system per site should have a 28.8k modem  
    CD-ROM or DVD drive  
    Color printer (recommended)  
    Direct input force feedback steering wheel with foot pedals (accelerator and  
    brake)  
        - Logitech Wingman Formula Force (recommended)  
        - Microsoft® Sidewinder Force Feedback  
    Microsoft® compatible mouse and keyboard  
    PCI or AGP Video Card with a 4 MB Video RAM  
    Pentium® III-500 Processor or better  
    Windows® 95/98
11. Usage  
    As an objective third party for evaluation of drivers  
    To identify immediate issues  
    Acts as a review, training and improvement tool  
    On-going alertness activity  
    Demonstrates distraction impacts  
    Reduces tunnel vision

## 12. Vehicles

Ambulance	Fire Engine
Patrol car	School bus

### III. Expected Results/Benefits

The Profiler™ program does not teach or measure motor skills. It is a tool to measure and correct skills such as decision-making, hazard perception, multi-tasking, reaction time, tunnel vision and scanning. The program helps to increase best practices while decreasing training and overall costs.

### IV. Capabilities/Stand-outs

Profiler™ allows the instructor to perform ongoing evaluations of drivers, show demonstrations, increase risk management and allow for safe competition between drivers. Feedback of the driver's performance is immediately available through a printed graphical output of assessment. This allows the instructor to interpret what skills need the most work. An instructor's toolkit is also included on the CD-ROM. This gives the instructor a chance to personalize setup, manage data from drivers' tests, interpret the tests, print graphs and specify options.

### V. Customers

Birmingham, Alabama Police Department	Chapel Hill, NC Police Department
FLETC	Mountain Driving Instructor's School
North Carolina State Highway Patrol	Southpeak Interactive
The Ranch	Wake County Public School System

### VI. Product Pricing

#### A. Profiler™ Assessment Station

Includes:

19" Monitor	Limited license	\$2,998
Color printer	(20-50 drivers)	
Computer		
Profiler™ license package		
Software CD	Annual license	\$4,998
Speakers	(unlimited drivers)	
Steering wheel		

#### B. Software only choices

Starter Kit	10 tests	\$ 99.50
Limited License	100 tests	\$ 499
Annual License	Unlimited # of tests	\$2,499

#### C. Logitech Force Feedback Wheel/Pedals

\$ 100

### VII. Summary

Profiler® is the most compatible and impressive driver skills assessment tool reviewed thus far. It would be a great asset to NCDOT in any form or fashion. The program is compatible with the Elumens® VisionStation®, which provides a different driving experience.

**STISIM Drive™**  
**By**  
**Systems Technology, Inc. (STI)**

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Hawthorne, CA 90250

Phone (310) 679-2281  
www.systemstech.com

**I. Company Profile and History**

Systems Technology, Inc. (STI) was founded in 1957 as a research and development company. It is now a research and consulting company concentrating on the subjects of vehicle dynamics, manual/automatic controls, and human factors of aerospace and ground vehicles. For the past 20 years, STI has conducted research in driver behavior associated with different types of impairments, visibility, traffic control devices, intersection complexity, decision making and vehicle control situations. The company's product design is based on over 40 years experience in research and simulation.

**II. Products of Interest**

A. STISIM Drive™ Simulation System

1. Brief Description

This is a fully interactive program that measures driver performance. It offers regular or wide field-of-view and head mounted display options.

2. Components

Brake and throttle pedals w/ optional manual transmission

Desktop Computer

Driving display monitor

Head-mounted display unit (optional)

Simulator operator display (optional)

Steering unit w/ additional input controls and optional speed sensitivity

3. Curriculum

Passing

Pedestrians/hazards

Reaction testing

Situation awareness

Speed control

Steering and braking

Steering control

Stop/go decisions

Turning

4. Features

Cab design and ergonomics available

Interactive driving

5. Media

Simulation software CD

Windows™ compatible

6. Modes

Single driver

7. Performance Management

Accidents

Driver performance

Driving time

Response/reaction time

Speed limit violations

Time-to-collision measurement



- Vehicle performance                      Vehicle Dynamics Analysis, Non-Linear
8. Programming Capabilities
    - Adapt simulator and scenarios to certain needs
    - Program driver tasks and events
    - Scenario Definition Language (SDL)
    - Simulator configuration options
    - Windows™ user interface
  9. Special Effects
    - Immediate visual and auditory feedback
  10. System Specifications
    - CD ROM
    - Game port (analog to digital) and high resolution digital interface
    - High fidelity sound processing
    - High speed graphics accelerator w/ texturing, shading and lighting
    - Intel (min 400 MHz)
    - Minimum 128 MB RAM
    - Pentium® based computer
    - Simulation hardware
    - Windows™ operating system
  11. Usage
    - Assess human cognitive and psychomotor ability
    - Driver Evaluation and training
    - Human factors research
    - Measure and document driver performance and progress
    - Medical research
    - Research and Development
  12. Vehicles
    - Validated high-fidelity, non-linear, vehicle and tire models
    - Range from automobiles to heavy trucks to articulated vehicles

### **III. Expected Results/Benefits**

One benefit of STISIM Drive™ is its ease of operation and maintenance.

### **IV. Capabilities/Stand-outs**

With the STISIM Drive™ program, the instructor/trainer can configure the simulation experience based on driver needs. Examples of configuration changes available are vehicle dynamics, visual scene, sound and driving controls. This program also provides a measurement of driver performance and it also includes a vehicle and tire dynamics simulation model, Vehicle Dynamics Analysis, Non Linear (VDANL).

### **V. Customers**

No information available

### **VI. Product Pricing**

No information available

## **VII. Summary**

This driver training simulation software seems to offer the training concepts needed rural transit systems around NC. More information is needed about the product including product pricing.

# FAAC, Inc.

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## I. Company Profile and History

FAAC, Inc. is a privately owned company that has been providing products to the United States government, as well as the private industry for over 30 years. The corporate headquarters is stationed in Ann Arbor, Michigan. The company's first commercial product was an interactive, reconfigurable truck-driving simulator, the developed Driver Training System (DTS)<sup>™</sup>.

FAAC, Inc. has a strong history of providing quality products throughout the US and the world. Since 1971, FAAC, Inc. has contracted with the US Department of Defense. In 1991, they were the first company to present a full-mission tractor-trailer simulator to the market. The US Marine Corps operates 36 of FAAC, Inc.'s driving simulators daily while Mexico's Department of Education has 24 simulators by FAAC, Inc.. Over the years FAAC, Inc. has delivered 120 plus simulators worldwide and has trained over 53,000 drivers using the DTS<sup>™</sup> products.

## II. Products of Interest

- A. Paratransit Simulator MB-1000-V5 and MB-1000-V1
1. Brief Description  
Interactive simulation system
  2. Components

Computers	Instructor Operator Station
Koll-Morgan Steering System	Open-air cab
Remote closed-circuit camera	Tethered instructor keypad
Networked desktop driving station (instructor)	
  3. Curriculum  
Customized training scenarios available
  4. Features  
Equipment racks  
High resolution displays  
Integrated equipment racks with canopy
  5. Media  
N/A
  6. Modes  
Networkable  
Single driver
  7. Performance Management  
Replay/redrive
  8. Programming Capabilities  
N/A
  9. Special Effects  
Different views for replay/redrive

Rear view information is presented by viewport insets embedded in forward display monitors

10. System Specifications

Image generators  
Modem  
Networkable

11. Usage

Assess driver skills  
Overall driver training  
Right-side clearance

Observe mirror usage  
Rehearse driving practices  
To better understand pivot points

12. Vehicles

Different types

B. Desktop Simulator

DT-1000-V1

1. Brief Description

It is available as a desktop mount or floor standing model.  
Interactive

2. Components

29" high-definition monitor  
Brake  
Headlight switch  
Main application computer  
Turn signals

Accelerator  
Gear selector  
Keyed Ignition  
Speedometer/Tachometer  
Hydraulically dampened driving controls

3. Curriculum

Customized training scenarios available

4. Features

Rugged steel construction  
Steering feedback

5. Media

N/A

6. Modes

Network multiple drivers  
Single driver use

7. Performance Management

N/A

8. Programming Capabilities

N/A

9. Special Effects

N/A

10. System Specifications

Image generator

11. Usage

Certification  
Entertainment  
Record and replay  
Role-play bad drivers

Education  
Focus on driver behavior  
Research

- |                             |                                        |                              |
|-----------------------------|----------------------------------------|------------------------------|
| 12. Vehicles                | Automobiles                            | Commercial trucks            |
|                             | Emergency vehicles                     | Helicopter (joystick mode)   |
|                             | Public transit vehicles                | Trucks and SUVs              |
| C. Scenario ToolBox™        |                                        |                              |
| 1. Brief Description        | Simulator world manipulation software. |                              |
| 2. Components               | Workstation option                     |                              |
| 3. Curriculum               | New or remedial training               |                              |
| 4. Features                 | 2D map of all entities                 | 3D simultaneous view         |
|                             | Export scenarios on disk               | Mouse or joystick control    |
|                             | Windows® menus                         |                              |
| 5. Media                    | CD Software                            |                              |
|                             | Windows® compatible                    |                              |
| 6. Modes                    | Single user (instructor/trainer)       |                              |
| 7. Performance Management   | No information available               |                              |
| 8. Programming Capabilities | Control traffic elements               | Control pedestrians          |
|                             | Control weather conditions             | Control navigational hazards |
|                             | Create custom training missions        | Create library of scenarios  |
| 9. Special Effects          | Hazards                                |                              |
|                             | Traffic                                |                              |
| 10. System Specifications   | No information available               |                              |
| 11. Usage                   | Preview training missions              | Reconstruct accidents        |
|                             | Record and replay                      | Shared agency scenarios      |
|                             | Supports CBT kiosks                    | Supports Intranet usage      |
| 12. Vehicles                | No information available               |                              |

### III. Expected Results

The benefits of FAAC, Inc.'s products such as, the Driver Training System (DTS)™ have been experienced by its customers and have proven results. FAAC, Inc.'s products allow the drivers to receive comprehensive training by introducing real hazards and allowing training scenarios to be repeated to improve lesson reinforcement. Some customers have shared the benefits of using FAAC, Inc.'s DTS™ and other products compared to using only traditional training methods. The US Army has estimated that the DTS™ training method is three times

faster. Accident percentage has decreased for several of customers using FAAC Inc.'s products. A 19% decrease in accidents was reported by the German Army while North American Van Lines reported a 22% decrease and New York City Transit reported a 43% decrease in preventable accidents. Some other benefits of FAAC, Inc.'s products are improved fuel economy, lower costs of training, accidents and insurance. There is also an obvious increase in the life span of actual vehicles.

#### **IV. Driver Training System (DTS)<sup>TM</sup> Capabilities/Stand-outs**

There are capabilities that the DTS<sup>TM</sup> has which most other simulator providers don't offer. FAAC, Inc. offers interchangeable cabs with their DTS<sup>TM</sup> product. A driver can maneuver the vehicle anywhere in the virtual environment. The instructor has the capability to configure scenarios and define specific parameters for each training session. Simulators are available for many types of vehicles including sedans or SUVs and buses (articulated or straight).

#### **V. Customers**

The following is a list of FAAC, Inc.'s customers from over the years.

- Crash Rescue of Dallas Texas
- Dallas Area Rapid Transit (DART) – University of Massachusetts
- Department of Education in Mexico
- Detroit Metropolitan Airport
- Excel Driver Services of Denver, Colorado
- Federal Highway Administration – Office of Motor Carriers
- German Army
- Israel-US Bi-National Industrial Research & Development (BIRD) Foundation
- Landstar in New Orleans
- Metropolitan Community Colleges – Kansas City, MO
- Metropolitan Transit Authority of Harris County (Houston) Texas
- Montgomery County Texas
- MTA Driving Schools
- North American Van Lines
- Rochester (NY) – Genesee Regional Transportation Authority
- Schlumberger – Pipeline Division – US Land Division
- Star Mountain – in coordination with the Federal Highway Administration
- US Army
- US Army 131<sup>st</sup> Transportation Command in Mannheim Germany
- US Department of Energy – Transportation Safeguards Division
- US Marine Corps
- Ventura, CA Fire Department
- Visteon
- Washington (DC) Metropolitan Area Transit Authority

#### **VI. Product Pricing**

*V* in product name denotes number of high resolution (800 x 600) video display channels

<b>A. Paratransit Simulator</b>	
MB-1000-V5	\$150,000 / \$180,000 (upgrade)
MB-1000-V1	\$100,000 / \$115,000 (upgrade)
<b>B. Desktop Simulator</b>	
DT-1000-V1	\$50,000

C. Scenario ToolBox™	\$25,000
D. Options	
1. MOOG 6 DOF motion base	\$80,000
2. 3 DOF Motion (Seat Shaker)	\$40,000
3. Software Upgrade Program	\$10,000 / yr per site
4. Basic extended warranty	3% of product price per year
5. Full extended warranty	5% of product price per year
6. Interchangeable Driving Cabins	\$59,000 (standard), \$70,000 (custom or cut-down)

## VII. Summary

FAAC, Inc. is a company proven to provide quality simulation products. Their products would be beneficial to NCDOT transit systems throughout the state. The Paratransit simulator would be a great asset to the program, in the future. It is still aimed toward larger vehicles, which is not the primary need. The desktop simulator would be beneficial, however comparable products are available at a lower cost. The most impressive product is the Scenario ToolBox™.

# GE Capital I-Sim

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## I. Company Profile and History

GE Capital I-Sim is a leader in the world of driver simulation technology and training systems. The company provides programs for many types of industries. Emergency Vehicle Operators (EVO) agencies, fire departments, law enforcement agencies, long-haul freight carriers, motor coach carriers, private fleets and public transportation companies can all benefit from the programs GE Capital I-Sim has to offer. In 1991, GE Capital I-Sim was formed in Salt Lake City, Utah and became a part of GE Capital Commercial Equipment Financing in December 2000.

## II. Products of Interest

### A. TranSimVS™

1. Brief Description  
This simulator is geared toward bus and truck driving. It is an open seat simulator with realistic controls.
2. Components

Actual vehicle cabs	Functioning gauges
Motion base available	Open-seat driver station
Truck-like look	Truck-like ergonomics
3. Curriculum  
Multiple interactive driving scenarios  
Teach critical decision-making
4. Features  
Icon menu  
Special effects  
Visual databases
5. Media  
Windows™-based operating system
6. Modes  
Network with other stations  
Single Driver
7. Performance Management  
Performance evaluation package
8. Programming Capabilities  
Fully programmable
9. Special Effects  
Traffic features  
Weather conditions



- 10. System Specifications
  - Real-Time image generation
- 11. Usage
 

Bus driver training	Enhance judgement
Scenario rehearsal	Truck driver training
Improve learning and training retention	Year-round training
- 12. Vehicles
  - Artificial intelligence scenario vehicles

### III. Expected Results

With all of GE Capital I-Sim products, the customer can expect to see a decrease in the amount of accidents and an increase in the overall skills of the drivers within the system. The products also aid in reducing equipment maintenance/repairs and risk management expenses.

### IV. Capabilities/Stand-outs

The GE Capital I-Sim products are modular and can be upgraded depending on training needs. The simulators have an open-seat driver station with truck-like look and ergonomics and standard truck functioning gauges.

### V. Customers

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Ace Relocation Systems, CA</li> <li>Adanac Truck Training School, Toronto</li> <li>Alliance Corporation, NC</li> <li>Anderson Trucking Service, Inc., MN</li> <li>Applegate Drayage Co., CA</li> <li>Asplundh Tree Export Service, PA</li> <li>B.R. Williams Trucking Inc., AL</li> <li>Blue Ridge Community College, VA</li> <li>BlueLine Transportation, OR</li> <li>Bob Young's Transport Training Institute, Ontario</li> <li>Boise State University, ID</li> <li>Bordentown Driver Training School, NJ</li> <li>Builders Transport (Schneider), SC</li> <li>Butte College, CA</li> <li>C-1 Professional Training, IN</li> <li>California Truck School, CA</li> <li>Cargill, Inc., NE</li> <li>Carnegie Mellon Research Institute, PA</li> <li>Carrier Compliance Services, PA</li> <li>Celadon Trucking Services, Inc., IN</li> <li>Central Transport International, MI</li> <li>Classic Motor Lines, PA</li> <li>Commercial Trucking Academy, LA</li> <li>Corporate Express, TX</li> <li>Cresco Lines, Inc., IL</li> <li>D &amp; H Express, AZ</li> <li>D &amp; L Tractor-Trailer School, CT</li> <li>Dedicated Logistics, Inc., MN</li> </ul> | <ul style="list-style-type: none"> <li>Dekalb Technical Institute, GA</li> <li>Delta Beverage Group, LA</li> <li>Dependable Highway Express, CA</li> <li>Diesel Institute of America, MD</li> <li>Dirksen Transportation, CA</li> <li>ECS Risk Control, PA</li> <li>Evergreen Sanitation, WA</li> <li>Federal Express Corporation, TN</li> <li>Federal Highway Administration (FHWA), Washington, D.C.</li> <li>Fox Valley Technical College, WI</li> <li>Fresno P.D., CA</li> <li>Gary Olson Trucking, CA</li> <li>Georgia Driving Academy, GA</li> <li>Gypsum Express, NY</li> <li>Harris Transportation System, VA</li> <li>Harris/Culligan Water, CA</li> <li>Hughes Space Communications, CA</li> <li>HyVee Foods, IA</li> <li>Indian Hills Community College, IA</li> <li>J. &amp; R. Schugel Trucking, MN</li> <li>J.F. Fick &amp; Co., VA</li> <li>Johns Manville International, VA</li> <li>Kenneco Packaging, TN</li> <li>Key Power Inc., FL</li> <li>KKW Trucking, Inc., CA</li> <li>KLLM, Inc., MS</li> <li>Labor Leasing, Inc., IL</li> <li>Lambert Transfer Co., TX</li> </ul> |
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Lanter Company, IL  
 Logix Services, OH  
 Marcon, Inc., ID  
 Metro Truck Driving School, NY  
 Morgan Drive Away, IN  
 Motor Carrier Service, OH  
 Motor Transport Association, ID  
 National Tractor Trailer School, NY  
 North American Van Lines, IN  
 North Georgia Technical Institute, GA  
 Northeast Community College, NE  
 Orange Co. Sheriff's Dept., CA  
 PA Veri Trucking, Inc., Ontario  
 Parker Professional Driving School, MA  
 Parret Trucking, Inc., VA  
 Paschal Truck Lines, KY  
 Payne Trucking, Inc., VA  
 Penske Dedicated Logistics, PA  
 Physical Distribution Services, Inc., MN  
 Pitt Ohio Express, PA  
 Praxair, Inc., NY  
 Professional Safety Consulting, NE  
 ProFleet Transport, IN  
 R.J. Miles Company, CA  
 Raleigh P.D., NC  
 Raytheon Systems Co., CA  
 Richard's Truck Driving School, Ontario  
 Roadmaster Driving School, FL  
 Roberson Transportation, IL  
 Robert Hansen Trucking Robert Orr  
 Sysco, TN  
 Roehl Transport, Inc., WI  
 Ruan Transportation, IA  
 Ryder Integrated Logistics, FL  
 Safety Alert Network, LA  
 Safety Management Council, Idaho  
 San Antonio P.D., TX  
 San Diego P.D., CA  
 San Jose P.D., CA  
 Shawnee Community College, IL  
 Single Source Transportation, GA  
 Stidham Trucking Co., CA  
 Swift Transportation, AZ  
 Sysco Food Services, OR  
 Teresi Trucking, CA  
 The Connection Company, OH  
 The Men's Wearhouse, TX  
 TLC Services, CA  
 Transervice Logistics, Inc., NY  
 TransportSafe Learning Center, LA  
 Tree of Life, Inc., FL  
 Tri-State Motor Transit Co., MO  
 Truck Training Schools Association of  
 Ontario, Ontario  
 TruLine Corporation, NV  
 U.S. Express, TN  
 USF Logistics Services, WI  
 Utah Valley State College, UT  
 Valley National Gases, Inc.,  
 Vance Trucking, Inc., NC  
 Victory Express, OH  
 Warren Distribution, NE  
 Waste Management, Inc., IL  
 Watkins Truck Lines, Inc., FL  
 Welborn Transport, Inc., AL  
 Werner Enterprises, NE  
 West Covina P.D., CA  
 William Height Industries, CA  
 Wilsonart International, TX  
 Winsors Tractor Trailer Driving  
 School, NJ  
 Worldmaster/Trek USA, AR

## **VI. Product Pricing**

A. TranSimVS™	\$86,000 (until 7/15/02)
Installation included	
B. Extended Factory Warranty	\$ 4,000
Replacement parts on exchange basis and phone support for one year	
C. Full Service Agreement	
One year	\$ 6,880
Two years	\$13,760
Three years	\$20,640

## **VII. Summary and Recommendation**

The TranSim VS™ is a high quality simulator. It can be geared toward rural transit systems, but would be more beneficial to the program in the future.

## **Doron Precision Systems, Inc.**

William Koran, Eastern Regional Sales Manager  
102 Carol Drive  
Washington Boro, PA 175282  
[www.doronprecision.com](http://www.doronprecision.com)

Phone (717) 872-7747

[doronprecision@doronprecision.com](mailto:doronprecision@doronprecision.com)

### **I. Company Profile and History**

Doron Precision Systems, Inc. was founded in 1973 and is a world leader in the development and manufacturing of driving simulation systems. The BUS currently has two (2) Doron L-301 simulators.

### **II. Products of Interest**

#### **A. DVD Conversion Package**

1. Components
  - DVD player
  - Code cable adapter
2. Modes
  - Networkable
  - Open-Loop
  - Single driver
3. Vehicles
  - Bus
4. Media
  - DVD
  - Old laser discs
5. Usage
  - Driver skills assessment
6. Features
  - Cleaner image than laser discs
  - Realistic display

### **III. Expected Results**

Doron Precision Systems, Inc. offers simulation products that help to reduce the amount of behind-the-wheel training for new drivers, therefore reducing training, fuel, and maintenance costs along with reducing the number of training vehicles needed. There is also a potential for reduced insurance costs for a company using the simulators.

### **IV. Capabilities/Stand-outs**

Doron Precision Systems, Inc. offers optional closed captioning for the hearing impaired. They also offer bar coding as an option.

## V. Customers

A.C. Transit, CA	New Jersey Transit, Maplewood, NJ
Cleveland Regional Transit, OH	New Orleans Regional Transit
Delaware Area Regional Transit, DE	Authority, LA
Greater Hartford Transit District, CT	Orange County Transportation
Greater Richmond Transit, VA	Authority, CA
Hampton Roads Transit, VA	SEPTA, PA
New Jersey Transit, Camden, NJ	TRANSPO, IN

## VI. Product Pricing

A. DVD Conversion Package		\$1,195.00
B. Installation/Setup	w/ maintenance agreement	\$ 270.00
	w/o maintenance agreement	\$ 810.00
C. Audio Visual Programs		\$ 495.00
Each w/ 15 year liscense		
Each when ordering 10 or more		\$ 390.00
D. Optional		
Closed Captioning Decoder Set		\$ 350.00
Bar Code System		\$ 550.00

## VII. Summary

The reason no Doron Precision, Inc. simulator products are reviewed is because they consist of what NCDOT already has in its position. The DVD conversion package would be beneficial if the company supplied updated or new scenarios/curriculum.

# Elumens® Corporation

Judy Umeck – Manager of Inside Sales  
Eric Knisley – Technical Coordinator/Systems Engineer  
1100 Crescent Green, Suite 211  
Cary, NC 27511  
www.elumens.com

Phone (919) 816-8787  
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judyu@elumens.com  
erick@elumens.com

## I. Company Profile and History

Elumens® Corporation is a world leader in advanced projection technology that includes the communication and presentation of digital information. This information includes 3D graphics, video, computer-aided design and real-time applications. The Elumens® Corporation was founded by Ray Idaszak and David Bennett and was incorporated in 1993 as the Alternative Realities Corporation.

## II. Products of Interest

### A. Visionstation® 800

#### 1. Brief Description

The Visionstation® 800 is a 1.5-meter hemispherical screen used to display images via a projector with 180° image span. The curved screen provides a more realistic image and expands the field-of-view.

#### 2. Components

1.5 meter hemispherical screen	HDIS Monitor Cable Extension
Mouse cable extension	Power cables
Projector w/ trutheta lens	Storage desk for projector
User's guide	

#### 3. Curriculum

N/A

#### 4. Features

180° Field of view  
Usable with many types of media

#### 5. Media

Compatible with any basic computer

#### 6. Modes

Single user

#### 7. Performance Management

N/A

#### 8. Programming Capabilities

N/A

#### 9. Special Effects

N/A

#### 10. System Specifications

Projector

Display Technology: LCD Poly-Silicon TFT; active-matrix

Display Resolution: SVGA 800 x 600 (480,000 pixels)

Input Resolution(s): SXGA, XGA, SVGA, and VGA

Color Reproduction: 16.7 million colors (24 bit)  
Contrast Ratio: 400:1  
Brightness: 1100 ANSI lumens  
Vertical Frequency: 50-85 Hz  
Power: AC 100 to 240V 50/60Hz; 350W  
Lamp: 150 W (user replaceable estimated 1000 hrs)  
Inputs: HD15, S-Video, Video, Audio (R/L)  
Remote Control: Keystone, Source select, and Image settings

Standard Software

Image Stitch/.AVI Out: TruFrame Spherical Correction Utility

Open-GL: SPIclops API 1.0 for Winows® NT/2000 & IRIX

Performer: SPI Performer for IRIX

DirectX 7&8:SPI-API 1.0 for Windows® 2000

Video Codec: TruMotion® for Windows® 98/2000 by On2

Standard Equipment

1.5 Meter Hemispherical Screen

Projector with trutheta Lens

Storage Desk for Projector and User Guide

Power Cables

HD15 Monitor Cable Extension

Mouse Cable Extension

11. Usage

In conjunction with simulation software packages

Simulate routes, vehicles, and buildings

12. Vehicles

N/A

**III. Expected Results/Benefits**

With Elumens® products, the user can expect more realistic visual effects and a tool for different types of training.

**IV. Capabilities/Stand-outs**

One of Elumens'® products is a hemispherical display system that's portable and cost-effective.

**V. Customers**

Wake County Public School System

**VI. Product Pricing**

A. Visionstation® 800 \$21,000

**VII. Summary of Findings**

The Elumens® VisionStation® is a product that would be beneficial to the NCDOT. It is compatible with most simulation software programs and would provide another perspective of driving in a virtual reality world.

## PRODUCT PRICING SHEET

### OPEN-LOOP VIDEO SYSTEMS

#### **Doron Precision Systems, Inc.**

A. DVD Conversion Package		\$1,195
B. Installation/Setup	w/ maintenance agreement	\$ 270
	w/o maintenance agreement	\$ 810
C. Audio Visual Programs		
Each w/ 15 year liscense		\$ 495
Each when ordering 10 or more		\$ 390
D. Optional		
Closed Captioning Decoder Set		\$ 350
Bar Code System		\$ 550

### LOW-END SIMULATORS

#### **driVR™ by Imago Systems, Inc.**

A. driVR™ II Basic Software		\$3,898
User Manual		
Software CD		
B. Complete System w/o computer		\$5,998
User Manual	VR Headset	
Steering Controls	Software CD	
C. Add Dell computer to complete system		\$1,599

#### **Profiler™ by Research Triangle Institute (RTI)**

A. Profiler™ Assessment Station		
Includes:	<i>Limited license</i>	\$2,998
19" Monitor	(20-50 drivers)	
Color printer		
Profiler™ license package	<i>Annual license</i>	\$4,998
Speakers	(unlimited drivers)	
Steering wheel		
B. Software only choices		
Starter Kit	10 tests	\$ 99.50
Limited License	100 tests	\$ 499
Annual License	Unlimited # of tests	\$2,499
C. Logitech Force Feedback Wheel/Pedals		\$ 100



**STISIM Drive™ by Systems Technology, Inc. (STI)**

Brake and throttle pedals w/ optional manual transmission

Desktop Computer

Driving display monitor

No Product Pricing information available

Head-mounted display unit (optional)

Simulator operator display (optional)

Steering unit w/ additional input controls and optional speed sensitivity

**FAAC, Inc.**

A. Scenario ToolBox™ \$25,000

Software CD

B. Desktop Simulator DT-1000-V1 \$50,000

29" high-definition monitor

Accelerator

Brake

Gear selector

Headlight switch

Keyed Ignition

Main application computer

Speedometer/Tachometer

Turn signals

Hydraulically dampened driving controls

**MID-RANGE SIMULATOR UNITS**

**FAAC, Inc.**

Paratransit Simulator

MB-1000-V5

\$150,000 / \$180,000 (upgrade)

MB-1000-V1

\$100,000 / \$115,000 (upgrade)

**GE Capital I-Sim**

TranSimVS™

\$86,000 (until 7/15/02)

**DISPLAY UNITS**

**Elumens® Corporation**

Visionstation® 800

\$21,000