

i-Drive VR Driving Simulator

Owner's Manual for i-Drive VR Driving Simulator by Stealth Products



Stealth Products strives for 100% customer satisfaction. Your complete satisfaction is important. Please contact us with feedback or to suggest changes that may help improve the quality and usability of our products. You may reach us at:



Stealth Products, LLC 104 John Kelly Drive Burnet, TX 78611

Phone: (512) 715-9995 Fax: (512) 715-9954 info@stealthproducts.com Toll Free: (800) 965-9229 Toll Free: (800) 806-1225 www.stealthproducts.com

General

Read and understand all instructions prior to the use of the product. Failure to adhere to instructions and warnings in this document may result in property damage, injury, or death. Product misuse due to failure to adhere to the following instructions will void the warranty.

Immediately discontinue use if any function is compromised, if parts are missing or loose, or if any component shows signs of excessive wear. Consult with your supplier for repairs, adjustments or replacements.

Important Information

All persons responsible for the fitting, adjustment, and daily use of the device(s) discussed in these instructions must be familiar with and understand all safety aspects of the device(s). In order for our products to be used successfully, you must:

- read and understand all instructions and warnings;
- maintain our products according to our instructions on care and maintenance; and
- ensure devices are installed and adjusted by a trained technician.

All assemblies and configurations *must* be completed by a dealer or a trained technician.

This manual contains instructions and statements meant to be followed by dealers or trained technicians.

Supplier Reference

Supplier:	
Telephone:	
Address:	
Purchase Date:	

Model:	

This owner's manual is designed to guide you through your product's options and possibilities.

Instructions are written with the expressed intent of use with standard configurations. They contain important safety and maintenance information, as well as describe possible problems that can arise during use. For further assistance or more advanced applications, please contact your supplier or Stealth Products at (512) 715-9995 or toll free at (800) 965-9229.

Always keep the operating instructions in a safe place so they may be referenced as necessary.

All information, pictures, illustrations, and specifications are based on the product information that was available at the time of printing. Pictures and illustrations shown in these instructions are representative examples and are not intended to be exact depictions of the various parts of the product.

WARNING

These products are designed to be fitted, applied, and installed exclusively by a healthcare professional trained for these purposes. The fitting, application and installation by a non-qualified individual may result in serious injury.

Ordering Documentation

You can download additional copies of this user manual by accessing the Stealth website (www.stealthproducts.com) and searching "i-Drive VR Driving Simulator" in the search bar at the top of the page.

In Case of Product Failure

In the event of product failure covered by our warranty, please follow the procedures outlined below:

- 1. Call Stealth Products at (512) 715-9995 or toll free at (800) 965-9229.
- 2. Request a Return Authorization (RA) form from the Returns Department and follow documentation instructions.

Warranty

incurred labor costs.

Our products are designed, manufactured, and produced to the highest standards. If any defect in material or workmanship is found, Stealth Products, LLC will repair or replace the product at our discretion. Any implied warranty, including the implied warranties of merchantability and fitness for a particular purpose, shall not extend beyond the duration of this warranty. Stealth Products, LLC does not warrant damage due to, but not limited to:

- misuse, abuse, or misapplication of products; and/or
- modification of products without written approval from Stealth Products, LLC.

Any lack or alteration of serial number, where applicable, will automatically void this warranty. Stealth Products, LLC is liable for replacement parts only. Stealth Products, LLC is not liable for any

No person is authorized to alter, extend, or waive the warranties of Stealth Products, LLC.

Stealth Products, LLC warrants against failure due to defective materials or workmanship:

Covers/Soft Goods: 18 months

Hardware: 5 years

Electronics: 3 years

The laptop is under a limited warranty from its manufacturer and does not extend to any hardware product from which the serial number has been removed, or a hardware product that has been damaged or rendered defective

1. as a result of an accident, misuse, liquid spills, abuse, contamination, improper or inadequate maintenance or calibration, or other external causes;

2. by operation outside the usage parameters stated in the user documentation shipped originally with the laptop hardware product;

3. by software, interfacing, parts or supplies not supplied by the laptop manufacturer;

4. by improper site preparation, maintenance, or environmental conditions that do not conform to laptop manufacturer site specifications;

5. by virus, infection, worm, or similar malicious code not introduced by the laptop manufacturer; 6. by loss or damage in transit;

7. by modification or service by anyone other than the laptop manufacturer-authorized service provider; or

8. by improper installation of end-user replaceable laptop manufacturer-approved parts if available for your laptop manufacture hardware product in the servicing country or region.

Any laptop hardware product found to be overclocked after delivery from the laptop manufacturer will be excluded from the terms of this limited warranty other than damaged or defective components where the damage or defect is found to be unrelated to the overclocking. The laptop manufacturer is not responsible for any inoperability or compatibility issues that may arise when 1. products, software, or options not supported by the laptop manufacturer are used;

2. configurations not supported by laptop manufacturer are used, or

3. parts intended for one system are installed in another system of a different make or model.

YOU SHOULD MAKE PERIODIC BACKUP COPIES OF THE DATA STORED ON YOUR HARD DRIVE OR OTHER STORAGE DEVICES AS A PRECAUTION AGAINST POSSIBLE FAILURES, ALTERATION, OR LOSS OF THE DATA. BEFORE RETURNING ANY HARDWARE PRODUCT FOR SERVICE, BE SURE TO BACK UP DATA AND REMOVE ANY CONFIDENTIAL, PROPRIETARY, OR PERSONAL INFORMATION.

TO THE EXTENT PERMITTED BY LOCAL LAW, THE LAPTOP MANUFACTURER IS NOT RESPONSIBLE FOR DAMAGE TO OR LOSS OF ANY PROGRAMS, DATA, OR REMOVABLE STORAGE MEDIA. TO THE EXTENT PERMITTED BY LOCAL LAW, THE LAPTOP MANUFACTURER IS NOT RESPONSIBLE FOR THE RESTORATION OR REINSTALLATION OF ANY PROGRAMS OR DATA OTHER THAN SOFTWARE INSTALLED BY THE LAPTOP MANUFACTURER WHEN THE LAPTOP-MANUFACTURED HARDWARE PRODUCT IS MANUFACTURED, SUBJECT TO ANY APPLICABLE UPDATES. MEMORY DATA MAY BE LOST DURING REPAIR.

1.0 Customer Satisfaction	i
2.0 Important Information	ii
3.0 Introduction	iii
4.0 Warranty	iv
5.0 Table of Contents	v
6.0 Warning Labels	vii
6.1 Warning Labels	vii
6.2 Limited Liability	vii
6.3 Testing	vii
7.0 Design and Function	1
7.1 Intended Use	1
7.2 Features	1
8.0 Setup	2
8.1 Initial Setup	2
9.0 Using the i-Drive VR Driving Simulator	4
9.1 Understanding the i-Drive VR Driving Simulator	4
9.2 Using the i-Drive VR Driving Simulator	4
10.0 Tips for Starting with VR	10

11.0 First-Time Use		12
	11.1 Dealer Assistance	.12
	11.2 User Testing	.12
	11.3 Conditions of Use	.12
12.0) Maintenance	13
	12.1 Care and Maintenance	.13
	12.2 Safety	.13
	12.3 Technical Data	.13
13.0) Notes	14

Warning Labels

Warnings are included for the safety of the user, client, operator, and property. Please read and understand what the signal words **DANGER**, **WARNING**, **CAUTION**, **NOTICE** and **SAFETY** mean, and how they could affect the user, those around the user, and property.

ADANGER	Identifies an imminent situation which, if not avoided, may result in severe injury, death, and/or property damage .
Awarning	Identifies a potential situation which, if not avoided, may result in severe injury, death, and/or property damage .
	Identifies a potential situation which, if not avoided, may result in minor to moderate injury and/or property damage .
NOTICE	Identifies important information not related to injury, but possible property damage .
SAFETY	Indicates steps or instructions for safe practices, reminders of safe procedures, or important safety equipment that may be necessary.

Limited Liability

6.2

6.3

Stealth Products, LLC accepts no liability for personal injury or damage to property that may arise from the failure of the user or other persons to follow the recommendations, warnings, and instructions in this manual. Stealth Products, LLC does not hold responsibility for final integration or final assembly of product to end user. Stealth Products, LLC is not liable for user death or injury.

Testing

Initial setup and driving should be done in an open area free of obstacles until the user is fully capable of driving safely.

Intended Use

The i-Drive Virtual Reality (VR) Driving Simulator is intended for use as a clinical tool to evaluate power wheelchair viability and to allow users of i-Drive systems to safely practice maneuvering their chairs in a realistic, immersive virtual environment.

The system is designed to accurately simulate alternative drive control navigation in multiple environment and terrain settings, while also replicating obstacles and conditions users would find in real-life chair navigation scenarios.

Features

7.2

The i-Drive VR system includes a high-performance laptop with the driving simulator software installed, and a VR headset with hand controls.

Typically, VR systems will also include an i-Drive interface. Additionally, customers can choose between either a VR system package that includes four proximity sensors and four switches, or a package that includes a standard joystick and four switches.

For more information on VR system packages, contact a Stealth Products sales representative.

Initial Setup

All necessary software will be pre-installed on the laptop included in the VR system package. Follow the instructions below to setup and initiate the i-Drive VR Driving Simulator.

Step One: Connect the laptop to a power source. The laptop must be connected to a power source while using the i-Drive VR Driving Simulator.

Step Two: Turn the laptop on. You should be taken to a login screen displaying a Microsoft email account and an empty input box labeled "PIN". Input the number 2223.

 Make note of this Microsoft email address. Information regarding the VR system will be mailed to this address, and the address will be used to register your system for further updates.

Step Three: Plug the i-Drive interface into the laptop. This includes connecting:

- the USB to the laptop
- the mini USB to the i-Drive interface
- the control input (joystick/switch) to the i-Drive interface. (*Note*: The i-Drive interface only accepts Hirose micro-miniature interface connectors. i-Drive interfaces come with two compatible dongles.)
- the 12V i-Drive power cord to the i-Drive interface
- the 12V i-Drive power cord to the power source (e.g., wall outlet)

DO NOT PLUG IN THE VR GOGGLES AT THIS POINT.

Step Four: On the laptop's desktop, double-click the icon labeled "06-Step1". This will open a command prompt.

- The prompt will require the "port index or full name". Input the number 1 and press "Enter" on the laptop keyboard.
- The command screen will now display an ongoing series of zeros. Try moving the
 joystick or activating the switch connected to the i-Drive interface -- if this alters the
 series of zeros, the joystick/switch is communicating properly with the laptop and the
 i-Drive interface.
- *Minimize* the command screen when proper device communication has been confirmed.

- the goggles' HDMI plug to the laptop's HDMI port
- the goggles' USB plug to the laptop's USB port

When the VR goggles are properly connected to the laptop, a screen titled "Mixed Reality Portal" will appear. *Minimize* this screen.

Step Six: On the laptop's desktop, double-click the icon labeled "07-Step2". This will launch the i-Drive VR Driving Simulator.

• When the *i*-Drive VR Driving Simulator appears, use the laptop mouse to click anywhere on the screen. You will now be able to control the "i-Drive VR Driving Simulator" cursor with the laptop keyboard arrow keys, or with the joystick/switch you've connected to the *i*-Drive interface.

Step Seven: Use the laptop keyboard arrow keys or the connected joystick/switch to scroll the cursor to the button labeled "Play". Use the laptop mouse to click "Play".

Understanding the VR Driving Simulator

The driving simulator is divided into three platform levels: **Level 1**, **Level 2**, and **Level 3**. Each of these levels is comprised of sublevels. Different platform levels have different numbers of sublevels.

Maneuvering the cursor of the home screen, a user may select any of the three platform levels. After a user has selected the desired level, he or she is virtually transported to the starting position of the main level's first constituent sublevel. In order to progress through the successive sublevels of each platform level, the user must accomplish the tasks required to complete the objective of each sublevel. Additionally, each sublevel has unique obstacles that arise in the course of completing the objective.

The driving simulator has no time limits; a user may take as much time as is necessary to complete sublevel objectives.

As a user commences with each sublevel, the VR system will generate that sublevel's environment on-screen. Positioned near the top of the screen, a score will be displayed. (The initial value of the score will always be 100.) The score display serves to reflect how successfully a user is able to avoid coming into contact with obstacles throughout each sublevel. Each time a user comes into contact with an obstacle, the displayed score will decrease.

Using the VR Driving Simulator

The three platform levels (and the sublevels that comprise them) are structured as follows:

- **Level 1** features a gymnasium as its setting. It consists of five sublevels, each requiring the user to successfully execute its objective. The sublevels for this level are *1A*, *1B*, *1C*, *1D*, and *1E*.
- Level 2 features a woodland path as its setting. It consists of five sublevels, each requiring the user to successfully execute its objective. The sublevels for this level are 2A, 2B, 2C, 2D, and 2E.
- Level 3 features an apartment as its setting. It consists of four sublevels, each requiring the user to successfully execute its objective. The sublevels for this level are
- 4 3A, 3B, 3C, and 3D.

9.1

Level 1: Gymnasium

1A Objective: Navigate the chair into the blue box.

This sublevel allows users to orient themselves to and familiarize themselves with the drive control mechanisms of their virtual wheelchairs.

In this sublevel, a user must execute a 180° turn then guide his or her chair into a bright blue box displayed at the opposite end of the gymnsasium's basketball court. When the user has successfully positioned his or her chair into the box, a large trophy will appear on the screen, signifying completion of the objective.

Obstacles: Objects around the perimeter of the gymnasium

1B Objective: Navigate the chair into the blue box.

This sublevel allows users to practice driving straight and executing right-hand (clockwise) turns.

In this sublevel, a user must navigate his or her virtual chair around the gym clockwise, making four right-hand turns and maintaining the chair's placement between a path consisting of a white line (to be kept on the user's left side) and a yellow line (to be kept on the user's right side). Following the final right-hand turn, the user must position his or her chair into a bright blue box, where a large trophy will appear on the screen.

Obstacles: Straying from the path between the yellow and white line; objects around the perimeter of the gymnasium

1C Objective: Navigate the chair into the blue box.

This sublevel allows users to practice driving straight and executing left-hand (counterclockwise) turns.

In this sublevel, a user must navigate his or her virtual chair around the gym counterclockwise, making four left-hand turns and maintaining the chair's placement between a path consisting of a yellow line (to be kept on the user's left side), and a white line and clapboard signs (to be kept on the user's right side). Following the final turn, the user must position his or her chair into a bright blue box, where a large trophy will appear on the screen.

Obstacles: Straying from the path between the yellow and white line; clapboard signs; objects around the perimeter of the gymnasium

1D Objective: Navigate the chair into the blue box.

This sublevel allows users to practice driving executing tight left-hand and right-hand turns, as well as executing a U-turn.

In this sublevel, a user must slalom through a line of four orange cones, navigating to the right of the first cone, to the left of the second cone, etc. After passing the final cone, the user must position his or her chair into a bright blue box, then execute a 180° turn in the box. Upon successful completion of the U-turn, a large trophy will appear on the screen.

Obstacles: Orange cones; objects around the perimeter of the gymnasium

1E Objective: Maneuver the soccer ball into the goal.

This sublevel allows users to practice free-form driving.

In this sublevel, a user must navigate his or her chair and propel a soccer ball into a goal on the opposite end of the gymnasium. When the user has scored a goal, **Level 1** is complete.

Obstacles: Objects around the perimeter of the gymnasium

Level 2: Woodland Path

2A Objective: Navigate the chair into the blue box.

This sublevel allows users to practice driving straight and performing gradual turns in an outdoor setting.

In this sublevel, a user must navigate a winding gravel path in the woods. Straying from the path causes the user's score to decrease. At the end of the path is a bright blue box, through which the user must maneuver his or her chair. Upon passing through the box, a large trophy will appear on the screen.

Obstacles: Straying from the gravel path

2B Objective: Navigate the chair into the blue box.

This sublevel allows users to practice driving straight and performing gradual turns in an outdoor setting.

In this sublevel, a user must again navigate a winding gravel path in the woods. Straying from the path causes the user's score to decrease. The path is narrower than the path found on the preceding sublevel, and over the course of the path, the user will encounter shadows and a large sand pit, which the user must avoid. At the end of the path is a bright blue box, through which the user must maneuver his or her chair. Upon passing through the box, a large trophy will appear on the screen.

Obstacles: Shadows; sand pit; straying from the gravel path

2C Objective: Navigate the chair into the blue box.

This sublevel allows users to practice driving straight, performing gradual turns, and navigating terrain changes in an outdoor setting.

In this sublevel, a user must again navigate a winding gravel path in the woods. Straying from the path causes the user's score to decrease. The path is narrower than the path found on the preceding sublevel, and over the course of the path, the user will encounter shadows and a large sand pit, which the user must avoid. Additionally, the user must successfully maneuver through an area of rough terrain. At the end of the path is a bright blue box, through which the user must maneuver his or her chair. Upon passing through the box, a large trophy will appear on the screen.

Obstacles: Shadows; sand pit; terrain changes; straying from the gravel path

2D Objective: Navigate the chair into the blue box.

This sublevel allows users to practice driving straight, performing gradual turns, and navigating terrain changes in an outdoor setting with distractions.

In this sublevel, a user must again navigate a winding gravel path in the woods. Straying from the path causes the user's score to decrease. The path is narrower than the path found on the preceding sublevel, and over the course of the path, the user will encounter shadows and a large sand pit, which the user must avoid. Additionally, the user must successfully maneuver through an area of rough terrain, taking care not to become distracted by a group of birds along the edges of the path. At the end of the path is a bright blue box, through which the user must maneuver his or her chair. Upon passing through the box, a large trophy will appear on the screen.

Obstacles: Shadows; sand pit; terrain changes; straying from the gravel path

2E Objective: Navigate the chair into the blue box.

This sublevel allows users to practice driving straight, performing gradual turns, and navigating terrain and altitude changes in an outdoor setting with distractions.

In this sublevel, a user must again navigate a winding gravel path in the woods. Straying from the path causes the user's score to decrease. The path is narrower than the path found on the preceding sublevel, and over the course of the path, the user will encounter shadows and large sand pits, which the user must avoid. Additionally, the user must successfully maneuver through an area of rough terrain and a steep downward slope, taking care not to go too fast or become distracted by a group of birds along the edges of the path. At the end of the path is a bright blue box, through which the user must maneuver his or her chair. When the user successfully finishes this navigation, **Level 2** is complete.

Obstacles: Shadows; sand pits; terrain and altitude changes; straying from the gravel path

Level 3: Apartment

3A Objective: Navigate the chair into the blue box.

This sublevel allows users to practice measured driving and performing tight turns in an apartment setting with limited space.

In this sublevel, a user must navigate down a narrow hallway, avoiding coming into contact with its walls and a soccer ball on the floor. Then, the user must perform two 90° right-hand turns (through a doorway and immediately upon entrance in a living room), taking care to avoid chairs and walls. The user must then drive his or her chair forward a short distance and perform a 90° left-hand turn to navigate the chair into a bright blue box by a coffee table in the room's corner. Upon completion, a large trophy will appear on the screen.

Obstacles: Soccer ball; walls; door frame; chairs; coffee table

3B Objective: Navigate the chair into the blue box.

This sublevel allows users to practice measured driving and performing tight turns in an apartment setting with limited space. Additionally, users can practice activating switches attached to the i-Drive interface.

In this sublevel, a user must leave a bedroom by opening its door (using either a switch assigned to mode on the i-Drive interface, or by pressing the spacebar on the laptop keyboard). After exiting the room, the user must execute a 90° right-hand turn and navigate down a narrow hallway, then execute another 90° right-hand turn into a bathroom. Finally, the user must ease his or her chair forward into a bright blue box near a bathtub. After the user does this, a large trophy will appear on the screen.

Obstacles: Door; door frame; walls; bathtub

3C Objective: Navigate the chair into the blue box.

This sublevel allows users to practice measured driving and performing tight turns in an apartment setting with limited space.

In this sublevel, a user must exit a bedroom, go through a hallway and into a kitchen/ dining room, avoiding an incoming soccer ball in the hallway. Then, the user must ease his or her chair forward to a bright blue box situated at the edge of a dining table, taking care to avoid chairs. After the user's chair is in the box, a large trophy will appear on the screen.

Obstacles: Soccer ball; walls; door frame; chairs; kitchen counter; table

3D Objective: Navigate the chair into the blue box.

This sublevel allows users to practice parking their chairs in tight spaces and in manners allowing for successful chair transfers.

In this sublevel, a user must navigate a narrow hallway and perform a 90° left-hand turn into a bedroom. In the bedroom, the user must ease his or her chair forward, perform a 90° right-hand turn, then reverse the chair into a bright blue box located between a bed and a wall, taking care to avoid contact with any obstacles. When the user has done this successfully, **Level 3** is complete.

Obstacles: Walls; door frame; bed

Virtual reality (VR) motion sickness occurs when your eyes tell your brain you're moving around in an immersive environment, but your body feels like it's sitting in a chair or standing still.

Motion sickness is common for people not accustomed to mixed signals acting on their inner ears while receiving information from multiple sources of motion. If you're experiencing motion sickness, it's because your inner ear cannot tell whether you're moving or not moving.

When you enter VR, your eye perceives the virtual world as being a physical space, because of how closely your head motion correlates to what's in the display. It's why your brain gets mixed signals: Your eyes detect motion while your inner ear doesn't detect any motion at all. This is compounded by the nearly imperceptible lag between commands and responses, causing you to feel sick.

The science behind all of this is complex, but what you feel is a fight between your different senses to figure out what signals are right: the vestibular inputs (concerned with balance and located in your inner ear), the visual inputs (associated with your eyes), or the kinesthetic inputs (which assist in movement). And that mixture of contradicting signals is too much for your brain to digest at once, resulting in nausea and other unpleasant symptoms.

WARNING: You may experience sensations such as nausea, dizziness, headaches, sweating, and/or excessive salivating.

Here are some tips for handling VR motion sickness:

- Start out slowly, allowing time for proper immersion.
- At any moment motion sickness occurs, shut your eyes and take short breaks.
- Remind yourself that what you're feeling is normal, and that you're going to be fine.
- Try having a fan aimed at you when using a VR system.

Being such an exciting new technology, virtual reality is improving daily. As VR improves, more and more tools are being established to help combat motion sickness. Stealth Products will continue to do our best to keep our users informed about new methods of handling motion sickness. We also understand that VR isn't for everyone – remember, the Stealth driving simulator also works as a non-VR training device. We look forward to working with professionals in our industry to continue to improve user experience.

Further Reading:

- Columbia University School of Engineering and Applied Science.
 "Fighting virtual reality sickness." ScienceDaily. ScienceDaily, 14
 June 2016. www.sciencedaily.com/releases/2016/06/160614121922.htm
- University of Waterloo. "Virtual reality motion sickness may be predicted and counteracted." ScienceDaily. ScienceDaily, 27 September 2018. www. sciencedaily.com/releases/2018/09/180927083336.htm

Dealer Assistance

During first-time use by the client, it is advised that the dealer or service technician not only assembles the components, but also explains the configurations or positioning to the customer (i.e., the user and/or the attendant). If needed, the dealer or service technician can make final adjustments.

User Testing

It is important that the customer is fully aware of the installation of the i-Drive VR Drive Simulator, how to operate it, and the ways in which it can be adjusted to fit the specific needs of the client. A dealer should explain and demonstrate the necessary installation steps, and should explain the functions of the device's components.

- Explain and demonstrate the initial setup of the VR system, and explain the functions of all attached equipment.
- Demonstrate how to use the driving simulator.

Conditions of Use

The i-Drive VR Driving Simulator is intended for use as installed by Stealth Products, in accordance with the installation instructions in this manual.

- The foreseen conditions of use are communicated by the dealer or service technician to the user and/or attendant during the first-time use.
- If the usage conditions change significantly, please contact your dealer or a qualified service technician to avoid unintended damage.

11.2

Care and Maintenance

Ensure the hardware used stays in working order by caring for and maintaining it.

- Keep elecronics dry.
- Periodically check any hardware for loose screws or worn parts. Replace or repair the parts as necessary.

Safety

Avoid getting electronics wet. Do not use electronics with wet or damp hands, as doing so presents an electrocution risk, which could result in personal injury and/ or product damage.

Technical Data

The i-Drive interface was tested and found to be in compliance with the required criteria and met the standards of IEC60601-1-2:2014 (Edition 4.0); RESNA WC-2:2009.

SAFETY Replace or repair parts as needed.

NOTICE

Periodically calibrate any joysticks used with the VR system to verify they are functioning properly.

12.1

12.3

Notes	13.0

Notes	13.0



