



i-Drive VR

Stealth Products



i-Drive VR Driving Simulator

Owner's Manual



Stealth Products is committed to 100% customer satisfaction. Your complete satisfaction is important to us. Please contact us with suggestions or feedback to help us 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 Toll Free: (800) 965-9229

Fax: (512) 715-9954 Toll Free: (800) 806-1225

info@stealthproducts.com

www.stealthproducts.com



MDSS GmbH
Schiffgraben 41
30175 Hannover, Germany



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 or failure to follow instructions will void the warranty.

Immediately discontinue use if any function is compromised, parts are missing or loose, or any component shows signs of excessive wear. Contact your supplier for repair, adjustment, or replacement.

Important Information!

All persons responsible for 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, and
- maintain our products according to their care and maintenance instructions.

NOTICE

This product *is not* a medical device

Supplier Reference

Supplier:	
Telephone:	
Address:	
Purchase Date:	
Model:	
Notes:	

This manual was designed to guide users through the options and possibilities with their products.

The input, pictures, illustrations, and specifications presented in this manual are based on the information available at the time the document was published; the images and illustrations displayed are representative examples and are not intended to portray precise renderings of products or their component parts.

All suggestions, instructions, warnings, procedures, and notices recorded herein were developed with the expressed intent of use with standard configurations. This manual contains information regarding product care and safety, and discusses potential complications that could occur before and during product use.

For further assistance (or for more advanced product applications), please contact your product supplier, or contact **Stealth Products** at (512) 715-9995, or toll free at (800) 965-9229. *Do not dispose of this manual.* Keep it in a clean, safe place to ensure it can be referenced as necessary.

Ordering Documentation

Additional copies of this manual are available for download online. Copies can be accessed by visiting the **Stealth Products**' homepage (<https://stlpro.site/stealth-docs>) and entering "i-Drive VR Driving Simulator" in the search bar at the top of the page.

In Case of Product Failure

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

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

Warranty

Our products are designed, manufactured, and produced to the highest standards. Should 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 resulting from (but not limited to):

- Misuse, abuse, or misapplication of product, and/or
- Modification of product without written approval from **Stealth Products, LLC**.

Any alteration or lack of serial number, where applicable, will automatically void this warranty.

Stealth Products, LLC is liable for replacement parts only and is not liable for any incurred labor costs. No person is authorized to alter, extend, or waive these warranties.

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

Covers: **18 months**
Hardware: **5 years**
Electronics: **3 years**

The laptop provided 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 manufacturer-authorized service provider; or
8. By improper installation of end-user replaceable laptop manufacturer-approved parts if available for your 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 term 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 a system of a different make or model.

As a precaution against possible failures, alterations, or data loss, periodically create backup copies of the data stored on the hard drive or other storage devices. Before returning any hardware product for service, ensure its data has been backed up and any confidential, proprietary, or personal information has been removed.

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 at the time the hardware products were 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	vi
6.1 Warning Labels.....	vi
6.2 Limited Liability.....	vi
6.3 Testing.....	vi
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 Maintenance	12
11.1 Care and Maintenance.....	12
11.2 Safety.....	12
11.3 Updates.....	12
11.4 Technical Data.....	12

Warning Labels

6.1

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.



DANGER

Identifies an **imminent** situation which, if not avoided, may result in **severe injury, death, and property damage**.



WARNING

Identifies a **potential** situation which, if not avoided, may result in **severe injury, death, and property damage**.



CAUTION

Identifies a **potential** situation which, if not avoided, may result in **minor to moderate injury and 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

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 does not hold responsibility for final integration of final assembly of product to end user. **Stealth Products** is not liable for user death or injury.

Testing

6.3

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

7.1

The **i-Drive Virtual Reality (VR) Driving Simulator** is intended for use as a clinical tool to allow users to safely practice maneuvering their chairs via alternative drive controls in a realistic and immersive virtual environment.

The system is designed to accurately simulate drive control navigation in multiple environments and terrain settings, while also replicating obstacles and conditions users would find in real-world 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.

To request additional information on VR system packages, contact a **Stealth Products** sales representative.

Initial Setup

8.1

All necessary software will be pre-installed on the laptop included in either VR system package. Follow the instructions below to set up 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 will 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 it will be used to receive further updates.

Log-on Email Address: _____

Step 3: 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-Step 1". 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 the proper device communication has been confirmed.***

DO NOT EXIT OUT OF THE COMMAND PROMPT SCREEN.

Step Five: Plug the VR goggles into the laptop. This includes connecting:

- 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 6: On the laptop's desktop, double-click the icon labeled "07-Step 2". 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".

Step Eight: To end the VR session:

- Press the Windows button  on the keyboard;
- Go to the Unity symbol  on the task bar at the bottom of the screen;
- Right-click and choose "Close Window".

Step Nine: To change the Level of Play:

- Follow Step Eight to end the current VR session;
- Follow Step Six and Step Seven, then choose the new level you wish to play.

Step Ten: To change the Driving Method:

- Follow Step Eight to end the VR session and close the command prompt screen opened in Step Four;
- Connect the new driver control into the i-Drive and make any necessary changes to the i-Drive using the **I-Drive Config** application;
- Disconnect from i-Drive Config.;
- Follow Step Four and Step Six to start a new VR session with the new driver control.

Understanding the VR Driving Simulator

9.1

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

By 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 sub-level. Each sub-level has unique obstacles that arise in the course of completing the objective. In order to progress through the successive sub-levels of each platform level, the user must accomplish tasks required to complete the objective of each sub-level.

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

As the user commences with each sub-level, the VR system will generate that sub-levels environment on-screen. Positioned near the top of the screen, a score will be displayed. (The initial value of this 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 sub-level. Each time a user comes into contact with an obstacle, the displayed score will decrease.

Using the VR Driving Simulator

9.2

Level 1 takes place in a gymnasium. It consists of five scenarios, each requiring the user to successfully navigate obstacle courses and reach the objective.

Level 2 takes a step outside to a nearby woodland path. It consists of five scenarios, each requiring the user to navigate outdoor hazards and successfully reach its objective.

Level 3 delivers the user home to an apartment. It consists of four scenarios, each requiring the user to successfully navigate furniture and household items to reach its objective.

Level 1: Gymnasium

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

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

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

Obstacles: Objects around the perimeter of the gymnasium.

1B Objective: *Navigate the chair around the gym.*

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

In this scenario, 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, signifying success.

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

1C Objective: *Navigate the chair to avoid objects.*

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

In this scenario, 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.

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 through turns and obstacles.*

This objective helps users to practice executing tight left-hand and right-hand turns, as well as executing a U-turn.

In this scenario, 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.

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

1E Objective: *Navigate the chair and score a goal!*

This objective helps users practice free-form driving.

In the final scenario of Level 1, the user must navigate his or her chair and “kick” the 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 through the blue box.*

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

In this scenario, the 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.

Obstacles: Straying from the gravel path

2B Objective: *Navigate the chair through the blue box while avoiding obstacles.*

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

In this scenario, the 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 still than the path found in the preceding objective, 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.

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

2C Objective: *Navigate the chair over rough terrain and through the blue box.*

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

In this scenario, the user must 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 in the preceding objective, 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.

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

2D Objective: *Navigate the chair over rough terrain with distractions.*

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

In this scenario, the 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 still than the path found on the preceding objective, 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.

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

2E Objective: *Navigate the chair around obstacles, over terrain, downhill and through the blue box.*

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

In this scenario, the 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 in preceding scenarios, 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, while avoiding obstacles.*

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

In this scenario, the user must navigate down a narrow hallway, avoiding 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.

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

3B Objective: *Navigate the chair through constricted areas and into the blue box.*

This objective 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 scenario, 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 space bar 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.

Obstacles: Door; door frame; walls; bathtub

3C Objective: *Navigate the chair into the blue box at a table.*

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

In this scenario, 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.

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

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

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

In this scenario, 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.

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 ill.

The science behind all of this is complex, but what you feel is a fight between your different senses to figure out which signals are right: the vestibular inputs (concerned with balance and located in your inner ear), the visual inputs (associated with your eyes), and the kinesthetic inputs (which assist in movement). And that mix of contradicting signals is too much for your brain to digest simultaneously, 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 breaths.
- Remind yourself that what you're feeling is normal, and that you're going to be fine.
- Have a fan blowing air 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 Products** 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

Care and Maintenance

11.1

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

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

Safety

11.2

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.

Updates

11.3

Please check your email regularly for software updates or other notifications.

Technical Data

11.4

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.
Do not get the hardware wet, or operate with wet hands, as this poses an electrocution risk and can damage the hardware.

NOTICE

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



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Stealth Products, LLC · info@stealthproducts.com · www.stealthproducts.com
(800) 965-9229 | (512) 715-9995 | 104 John Kelly Drive, Burnet, TX 78611