Product Installation Guide

Version 7

Geospecific simulation with game quality graphics™

MVRsimulation

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Printed in the United States of America. December 2025

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Preface

This installation guide describes how to install all MVRsimulation products and the required components needed to run the products. In general, installing an MVRsimulation product entails completing the following steps:

1. Install one or more MVRsimulation products as described in Chapters 1 and 2.
2. Install the security dongle as described in Chapter 3.
3. Install a multi-axis user input device to use with Virtual Reality Scene Generator® (VRSG®) and test its operation, as described in Chapter 4.
4. Optionally, run a 3D benchmarking test to examine the effectiveness and performance of the graphics card on your PC when it runs VRSG, as described in Chapter 1.

If you need technical assistance…

MVRsimulation is committed to providing you with a high quality product experience. If you encounter a problem with this product, first try to determine whether the problem stems from an underlying problem with your system:

- Make sure that your machine meets the system requirements listed at www.mvrsimulation.com/products/vrsg/vrsgsystemrequirements.html.
- Run benchmark tests to identify any 3D accelerator problems as described in Chapter 1 in the section, “Benchmarking your system’s 3D performance.”

Completing these steps might solve many problems and often eliminates the need for further assistance.

Contacting MVRsimulation support

If you need further assistance, contact MVRsimulation support services via email at support@mvrsimulation.com with details about the sequence of actions that led to the problem and any resulting error messages. Attach any screenshots that might help to illustrate the problem.

In addition, supply the following information:

- The product version number.
- The operating system and version number.
- Any special hardware or software configuration that might affect the problem.

- The contents of the appropriate log file (such as VRSG's VrsgError.txt and VrsgInfo.txt files).
- The product dongle ID or LicenseID-A reference number.

Most email to MVRsimulation support services is answered within 24 hours, Monday-Friday 9:00 am to 5:00 pm ET.

Returning a damaged dongle

If you have a damaged VRSG dongle, MVRsimulation will replace it upon request, as described in the Return Merchandise Authorization (RMA) instructions on the website at: www.mvrsimulation.com/howtobuy/returns.html.

To return a damaged dongle for replacement:

1. Notice the dongle ID number located on the sticker that is affixed to the dongle. This dongle ID number contains information about what the dongle is licensed for (product and product maintenance). You must supply this dongle ID number in any communication you have with MVRsimulation regarding your damaged dongle.
2. Email rma@mvrsimulation.com with a request to obtain an RMA number for the return of your damaged dongle.
3. Send to MVRsimulation the damaged dongle or, at a minimum, the metallic unit (which houses the electronic circuit board and memory chips) along with the RMA number. MVRsimulation will *not* replace a dongle for which you only return the purple plastic holder without the corresponding metallic unit.

For more information about MVRsimulation and its products, visit the website at: www.mvrsimulation.com.

About this manual

This manual describes how to install MVRsimulation software products and maintain product licenses, and how to install a multi-axis user input device to use with VRSG.

MVRsimulation values any feedback you have on this manual. Email any comments or suggestions to: support@mvrsimulation.com.

CHAPTER 1

Installing VRSG

The core visualization component of the MVRsimulation product line is VRSG. If you need recommendations for an optimal system configuration for running VRSG, see www.mvrsimulation.com/products/vrsg/vrsgsystemrequirements.html.

Before you begin

Before you install VRSG, make sure that:

- Your system runs the Microsoft Windows 11 or 10 64-bit operating system and has at least 1.1 TB of disk space for installation and for the archiving of the installation media.
- Any files (cultural feature files, scenario project files, site-specific models, and so on) in the installation directory that you want to retain from the product's previous release have been backed up.
- You *must* uninstall VRSG version 6 or older using the Uninstall tool located in the Windows Control Panel. In the VRSG Uninstall tool, the options to uninstall VRSG, Scenario Editor and the 3D model libraries should be selected. See the section "Removing VRSG software from your computer" in this chapter for details.
- Be sure to install VRSG with administrator privileges, if you plan to run VRSG on a computer shared by multiple users. Administrator privileges are needed for installing VRSG on a shared computer for installing system components like the HASP driver and the Microsoft Visual C++ Redistributable (x64) runtime files. These components and others will be installed in directories that are shared by all users of the given computer.
- Consider turning off any anti-virus program running on your system for the duration of the VRSG installation. Some anti-virus programs interfere with the installation.
- If you are performing a brand new VRSG installation (not an upgrade to a new version), locate the HASP security dongle for VRSG. You will need to have it available for inserting into a USB port on the computer *at the end of* the VRSG installation.

Note: Any user-developed VRSG 5.x plugins must be compiled (or recompiled, in the case of upgrades) for 64-bit and DirectX 11 to run with VRSG version 7. A user-developed plugin that extends VRSG's Dashboard interface with a property sheet (that is, a tab on the VRSG Dashboard) must be built with Visual Studio 2019.

The latest version of Scenario Editor is installed automatically when you install VRSG. Like VRSG, Scenario Editor requires Windows 10 or 11 operating system on a 64-bit system.

Installation procedure

Install the VRSG software using the provided standalone installation program. This installation program first checks your configuration. During the configuration check, the

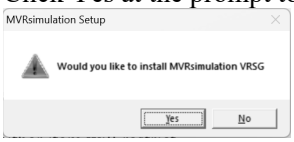
installation might need to install the HASP dongle device driver, DirectX, and/or Microsoft Visual C++ Redistributable runtime files. Then the installation program asks where you want to install the VRSG software (and the terrain and the model libraries that are delivered with it), and then installs the VRSG software and terrain and model libraries.

VRSG is delivered with large libraries of 3D models and 3D terrains of Kismayo, Somalia, a portion of the Kabul province, Afghanistan, Hajin, Syria, and Mischief Reef in the Spratly Islands, South China Sea.

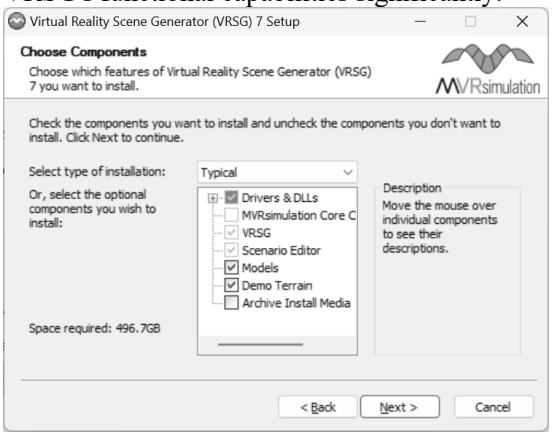
Note: Before you install VRSG, *be sure to back up* all custom files, scenarios, and settings files stored in the VRSG directories that you want to retain for further use in VRSG.

To install the VRSG software from the MVRsimulation VRSG software USB drive:

1. Plug in the VRSG software USB drive.
2. Locate the file Setup.exe on the drive and double-click it to start the installation program.
3. Click Yes at the prompt to install VRSG.

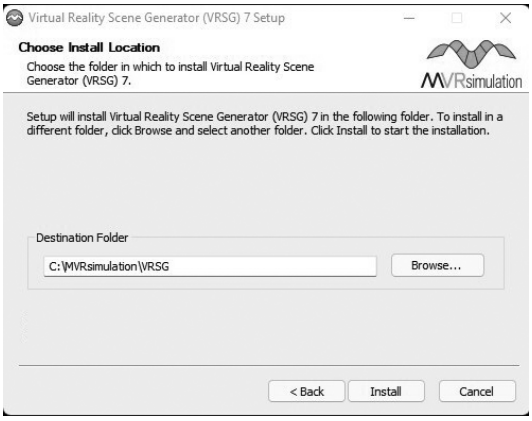


4. When the installation begins, follow the onscreen instructions.
5. On the Choose Components screen, MVRsimulation recommends you choose the Typical installation type and strongly recommends you leave the Models and Demo Terrain checkboxes selected as shown in the next example. Unselecting either item will restrict VRSG's functional capabilities significantly.



6. Optionally, click the Archive Install Media checkbox to have the installation program copy all the installation files to \MVRsimulation\VRSG\Install Media (for example, C:\MVRsimulation\VRSG\Install Media). You can use this directory to reinstall the product at a later time by simply double-clicking the Setup.exe file located in the \Install Media subdirectory. If you do not select the Archive Install Media checkbox, this directory will contain only the installation log, an uninstaller executable, and the readme.txt file.
7. Optionally, choose a directory for the installation. For a new VRSG installation the installation program suggests the directory path C:\MVRsimulation\VRSG by default, and for systems that are upgrading to a newer VRSG release the installation program will suggest the directory path where VRSG was previously installed. In each case you can specify a different path for the installation directory. VRSG Scenario Editor will be

installed in a directory parallel to \MVRsimulation\VRSG – that is, in \MVRsimulation\Scenario Editor.



8. VRSG software is authenticated using a physical HASP dongle. The dongle (which you will plug into a USB port after the VRSG installation as described later in this chapter) requires a Sentinel HASP dongle device driver. The installation program will install the device driver on your system if it is not already installed.
9. If the installation program detects that DirectX components are missing, it will offer to install the missing components. If you are prompted to do so, click OK to have the installation program install the missing components before continuing with the VRSG installation.
10. VRSG requires the presence of Microsoft Visual C++ Redistributable runtime files. If your system does not have these files, the VRSG installer will install them.
11. The installation program checks for whether this VRSG installation is on a virtual machine. If so, it will install VMware vSphere PowerCLI, a component for communication between the virtual machine and the host computer.

    Note: MVRsimulation does not have the facility to test VRSG on virtual machine configuration. However, some customers have noted that they use VRSG in a virtual machine environment.
12. Once the above requirements have been verified or installed as necessary, the installation program displays a message that states no further user input is needed. Click OK to have the installation continue automatically. *Note:* This installation will take a couple of hours or more to complete due to the inclusion of nearly 500 GB of MVRsimulation's 3D content.
13. When the final installation screen appears, click Finish to complete the VRSG installation. Also on this screen you can optionally click the checkbox to display the Readme file, and click the link to display the “What's New in VRSG” page on MVRsimulation's website.

Note: To install VRSG on multiple networked machines, create an installation image on the network by copying the entire contents of the VRSG installation USB drive to a single folder on the network. Then, run the installer from that folder.

The installation places (or updates) MVRsimulation program and documentation shortcuts on the Start menu, as shown in the following example:

What to do next …

After installing VRSG, plug the HASP dongle for VRSG into a USB port on the computer on which you installed VRSG, as described in the chapter "Installing and Updating the Dongle."

To install the optional 6DOF controller to use with VRSG, simply plug the device into a USB port on the computer on which you installed VRSG.

VRSG documentation is distributed in .PDF format, and requires use of Adobe Reader or another PDF reader.

If your site is a U.S. domestic customer and you plan to use VRSG with its physics-based IR features, you must obtain an unlock code from MVRsimulation to enable that option. You can also set up your own physics-based IR using a 3rd-party model, as described in the *MVRsimulation VRSG User's Guide*. International and non-resident alien customers (including those serving in the military of a foreign nation) can request unlock codes from MVRsimulation to use VRSG's Radar simulation features, but must obtain ITAR approval to use VRSG's physics-based IR capability.

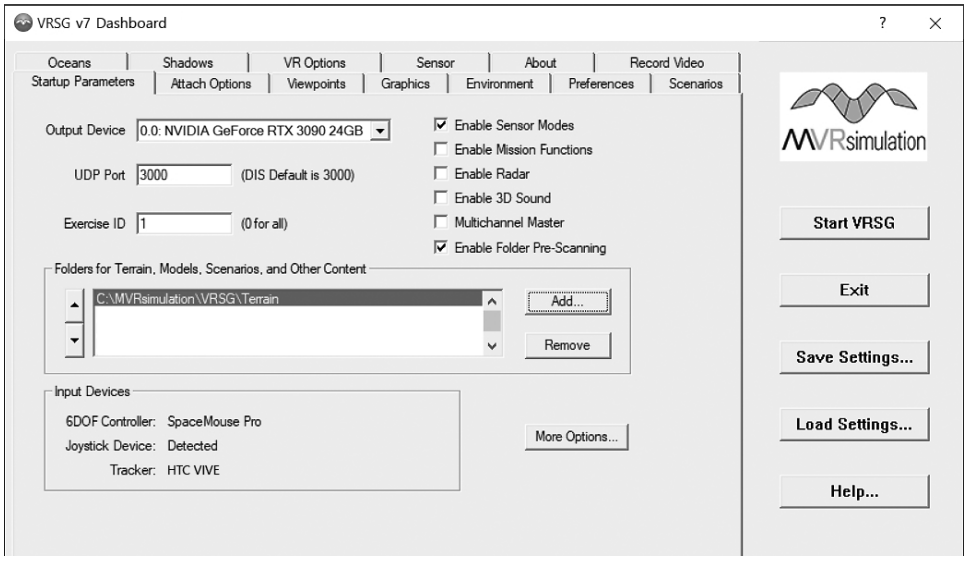
If your site intends to stream VRSG's simulated video feed and requires a simple low-latency remote viewer that decodes and displays UAV KLV metadata, you can install MVRsimulation's Video Player as described later in this chapter. The player is distributed with VRSG, with its own separate installation. The installation program (Install-MVR-VideoPlayer-YYYYMMDD.exe) is located on the distribution media in the \Utilities directory.

Starting VRSG

To start VRSG, do one of the following to display the VRSG Dashboard:

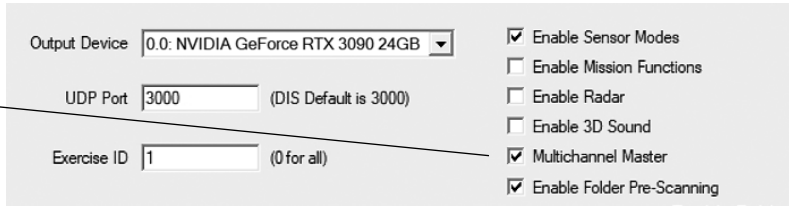
- Choose VRSG 7 from the MVRsimulation VRSG 7 program folder on the Windows Start Menu.

- Double-click the Vrsg.exe executable located in the \MVRsimulation\VRSG\Bin directory. The VRSG Dashboard appears, as shown:



To run VRSG in multiple-channel mode, select the Multichannel Master option on the Startup Parameters tab of the VRSG Dashboard, as shown:

Select this option to use VRSG as a multichannel stealth or to test a multi-channel configuration without the simulation host model.



Click Start VRSG to launch the terrain specified in VRSG's search path, which is initially, by default, the Afghanistan terrain installed with VRSG.

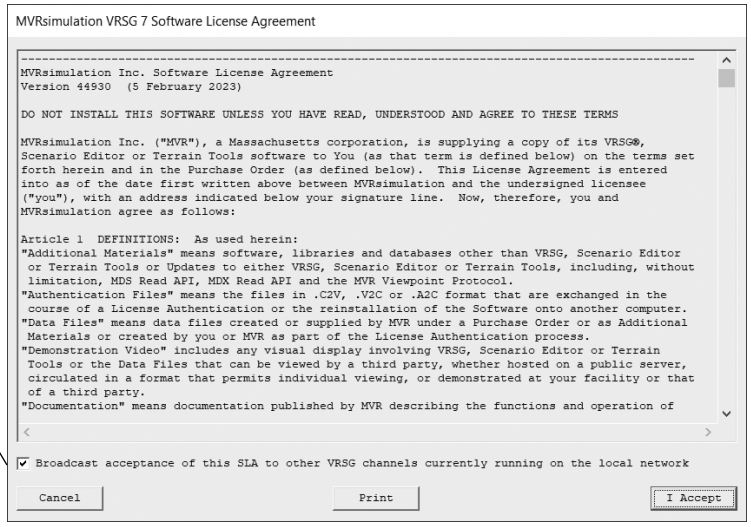
VRSG can be launched from a remote desktop connection, on systems that are running Windows with the Fall 2020 Windows 10 Update or better.

Note: Periodically, the MVRsimulation software will issue an automatic message prompting you to agree to the Terms of Use of the software as specified in its Software License Agreement (SLA). This message is displayed for one of the following reasons:

- Starting the software for the first time after installation.
- Following an update of the application executable or dongle programming.
- When one year has elapsed since the SLA was last accepted.
- On the first day of software use after your software maintenance has expired.

If you administer and maintain a large number of VRSG licenses all connected to a local network such that they can see each other, you can approve the SLA once on one machine, and have VRSG broadcast that acceptance to all other local machines. Click the Broadcast checkbox at the bottom left of the SLA window, as shown:

Select this option to accept the VRSG SLA for all machines running VRSG on a local network.



As long as VRSG is running on all the other local network machines, it will dynamically accept and apply that SLA acceptance to all networked machines.

Starting VRSG Scenario Editor

To start VRSG Scenario Editor, do one of the following:

- Choose the Scenario Editor executable from the MVRsimulation folder on the Windows Start menu.
- Browse to the \MVRsimulation\VRSG\Terrain\ directory, choose one of the terrain subdirectories, locate the \Scenarios subdirectory, and double-click a *.vrsgproject file to open one of the scenarios. For example, \MVRsimulation\VRSG \Terrain\Somalia\Kismayo\Scenarios\KismayoFlyover.vrsgproject.
- From within the VRSG Dashboard, click the Scenarios tab, and then click the Launch Scenario Editor button.

In addition to installing the Scenario Editor executable and associated configuration files, the Scenario Editor installation includes textures, effects, animations, and example scenarios. By default, Scenario Editor uses the models and effects that are installed with VRSG.

The first time you start Scenario Editor, the MVRsimulation Software License Agreement (SLA) appears; you must accept it in order to run Scenario Editor.

When you start Scenario Editor, the workspace appears, showing a list of available VRSG projects in the left panel, or displaying the project you opened. For information about how to use Scenario Editor, see the *MVRsimulation Scenario Editor User's Guide.*

Accessing the 3D model libraries

VRSG is delivered with MVRsimulation's substantial libraries of high-resolution 3D models. All models are in MVRsimulation's model format. The model libraries are installed automatically in the VRSG \Models directory when you run the installation program.

Accessing the 3D terrain that is installed with VRSG

Installed with VRSG are four demonstration terrain databases in MVRsimulation's round-earth terrain format: Hajin, Syria; Mischief Reef, South China Sea; Kismayo, Somalia; and a village in Afghanistan's Kabul province. These databases, which are subsets of larger terrain sets available on request, are delivered with demo scenarios you can run in VRSG to get a sense of some of VRSG's capabilities. These databases are installed in the directory \MVRsimulation\VRSG\Terrain.

You can read about these terrain databases at:

- www.mvrsimulation.com/index.php/products/terrain/urban/hajin.html
- www.mvrsimulation.com/products/terrain/asia/mischief_reef.html
- www.mvrsimulation.com/index.php/products/terrain/urban/kismayo_terrain.html
- www.mvrsimulation.com/products/terrain/urban/afghan_village.html

VRSG Scenario Editor was used to create all the scenarios that are delivered with VRSG. To play these scenarios, choose one on the Start menu from the VRSG Demos group within the MVRsimulation folder. Alternatively, on the VRSG Dashboard, click the Scenarios tab, and then select a scenario and click Play.

For more information about loading terrain into VRSG's search path, see the chapter "Loading Content into VRSG" in the *MVRsimulation VRSG User's Guide*.

Installing VRSG plugins

Several plugins are delivered with VRSG to extend the functionality of the product for use with VR and XR headsets, display systems, real-time recording/streaming, and so on. These plugins are located in the directory \MVRsimulation\VRSG\Plugins.

For information about how to install VRSG plugins, see the *MVRsimulation VRSG User's Guide*.

Installing MVRsimulation's video player

If your site wants to stream VRSG's simulated video feed and you need a simple low-latency remote viewer that decodes and displays UAV KLV metadata, you can install MVRsimulation's Video Player. The player is distributed with VRSG, with its own installation (Install-MVRsimulation-VideoPlayer-2023xxxx), which is located on the distribution media in the \Utilities directory.

To install MVRsimulation's Video Player, run Install-MVRsimulation-VideoPlayer-2023xxxx.exe on the system on which you intend to run the video player. By default the video player will be installed in \MVRsimulation\Video Player. DirectX 11 must be present on the system running the Video Player. If it is not detected on the system, the installer will install it.

Using VRSG with a VR/XR headset

VRSG can be used with virtual reality (VR) or mixed reality (MR) head-mounted displays (HMDs). When you look through the headset, the scene is displayed as it would be on any

display system, and you move eyepoint in the visualized scene with the 6DOF SpaceMouse controller.

When you plug in a supported VR / MR headset or another tracking system to the computer running VRSG, VRSG automatically detects the system and displays the name of identified VR / MR tracking system on the Dashboard's Startup Parameters tab.

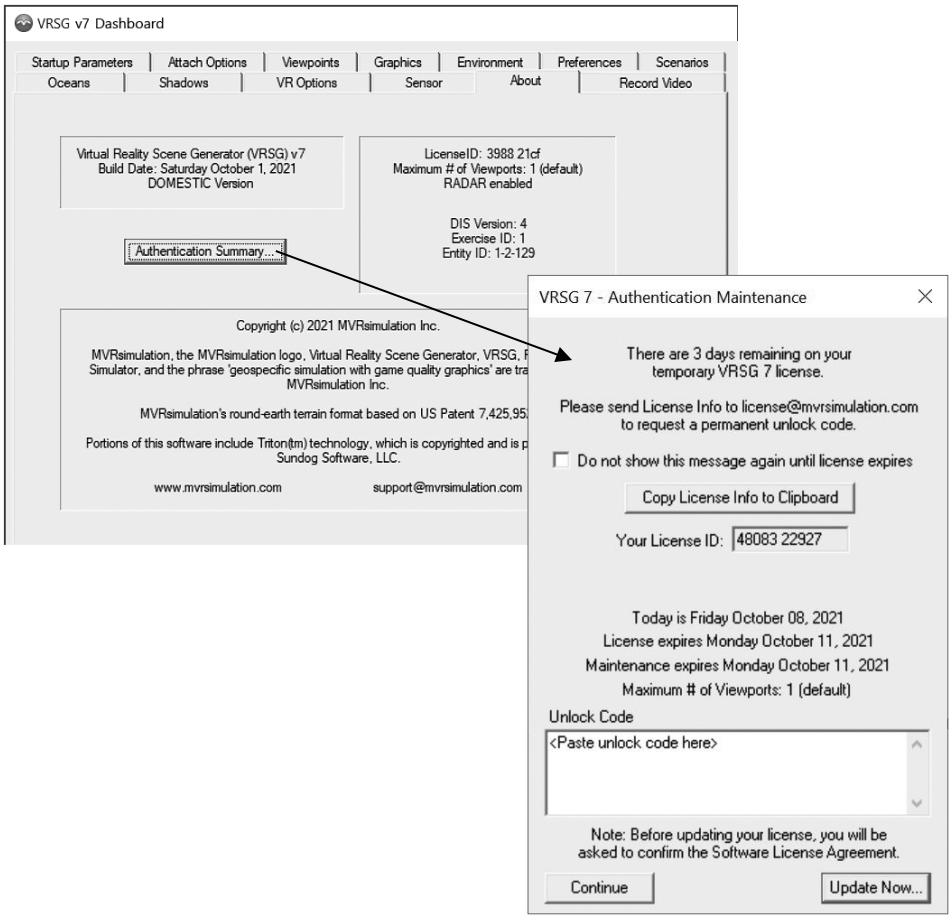
Use of VRSG with a VR or MR system is nearly the same for all systems. Most require two viewports; the Varjo XR-1 and XR-3 each require four viewports. Settings include whether to render the scene in a single pass, render the controllers and/or base station, and resolution refinements for foveated rendering. You control various settings on the Dashboard; either on the VR Options tab or through a specific tab displayed by a VRSG HMD plugin, as in the VarjoHMD.dll, which displays two Varjo tabs of controls.
For more information, see the chapter "Using VRSG With VR Systems, Trackers, and Simulated Military Devices" in the *MVRsimulation VRSG User's Guide*.

Downloading and installing incremental updates

Users on active maintenance for their VRSG license can download incremental updates in the form of VRSG patches, new models added to the 3D content libraries, and so on. Contact MVRsimulation at downloads@mvrsimulation.com for more information.

Renewing product maintenance and technical support

The maintenance expiration (and renewal) of an MVRsimulation software license is tracked through the product's dongle. The dongle is delivered with the purchase of a software license and can be updated by entering an unlock code provided by MVRsimulation. To apply the update, enter this unlock code in the Authentication Summary dialog box, which you can access from the About tab, as shown:



See the chapter “Installing and Updating the Dongle” for more information about updating the dongle upon the renewal of a license’s maintenance and technical support plan.

Removing VRSG software from your computer

Before removing VRSG from your system, be sure to copy or move any items you want to retain from the VRSG directory tree, such as any HPX models you created and want to preserve, customized cultural feature files (vrsg.clt), settings files (INI and JSON), and so on.

If you use Scenario Editor, be sure to copy or move your scenarios you want to retain.

To remove VRSG software manually from your system: from the Windows Start Menu, choose Control Panel, select Uninstall a Program, right-click on MVRsimulation Virtual Reality Scene Generator from the list of programs, and click Uninstall. This action launches the VRSG Uninstall tool, which removes the VRSG software, including Scenario Editor, from your system. In the VRSG Uninstall tool, *be sure to select all the components of VRSG that you want to uninstall including user-generated files, settings, snapshots, 3D models, and demo terrain.*

If you are removing VRSG version 6.x or 5.x, the process of uninstalling VRSG 6 or VRSG 5 removes all files that were originally installed but leaves behind a few files in a \VRSG 6 or

\VRSG 5 directory that were user-generated after installation. For example, files that were generated while you were running VRSG, or plugins you installed to extend VRSG functionality (such as any DLL that was moved from a \VRSG 6\Plugins subdirectory to reside directly in the \Plugins directory), or models that you added to the model directories, will remain after the product has been removed. After removing the VRSG program, you can either remove the\VRSG 6 directory from your system or retain the directory to preserve any files you might need later.

Note: You do not need to remove the hardware dongle to upgrade to a new version of VRSG. The device driver is separate from the VRSG software and is not uninstalled when you uninstall VRSG.

About multi-channel hardware setups

MVRsimulation software runs on most commercial Windows-based PC graphics systems.

In addition to offering the VRSG software, MVRsimulation offers a complete rackmount system, which consists of one or more visual channels and a simulation host-capable computer. The simulation host computer contains two network cards and runs either VRSG multi-channel synchronization or an application-specific simulation host. Hardware configuration changes are frequent to keep pace with industry innovation. For a current configuration, check the MVRsimulation website at www.mvrsimulation.com/products/hardware/complete-solutions.html.

Hardware setup tips

The following are some general guidelines for working with a rackmount multichannel visual system delivered as a complete system by MVRsimulation:

- Position the cabinet at its final location prior to adding all the pieces that it will hold (VRSG channels, terrain server, and so on). You should be able to position your monitor, keyboard, and mouse at a normal working height to simplify administration of multiple channels from a single console.
- The uninterruptible power supply (UPS) unit is typically installed in the bottom of the cabinet. This unit is very heavy – its placement on the bottom shelf helps to keep the center of gravity and moment of inertia of the unit very low to the ground. The UPS slides into preinstalled telescoping racks.
- If your system includes a terrain server, place it at the lowest position, just above the UPS unit. This position is best for the stability of the number of hard drives with the server, and it is the coolest temperature location.
- Maintain the color-coding consistency of the network cables. MVRsimulation systems are shipped with color-coded cables for easy identification (including cables for graphics synchronization if your channels are equipped with graphics cards with genlock capabilities).
- To ensure sustained and successful operation, all VRSG multi-channel synchronization units delivered by MVRsimulation are tested in a full operational configuration for at least 96 hours in MVRsimulation’s assembly facility prior to delivery. Be sure to contact MVRsimulation if you have any questions regarding your VRSG multi-channel synchronization unit.

Note: MVRsimulation strongly advises against doubling up the projected scene per VRSG channel in multichannel systems (such as in curved displays). VRSG is designed to run with single channel per scene. When a system is configured such that two views from one visual channel are generated, the load on VRSG is such that some features (such as volumetric clouds, new 3D simulated oceans) cannot be displayed simultaneously while maintaining the required 60 Hz frame rate. Such a configuration also has an impact on the quality of rendering high resolution terrain databases.

Benchmarking your system's 3D performance

When you first install VRSG, consider running a diagnostics tool to examine the effectiveness and performance of the graphics card on your PC when it runs 3D graphics applications. Consider running these benchmark tests twice and compare the scores. If you see significant variation in the two scores, run two more tests and see whether the scores converge. If they do not, you might have a problem with your 3D accelerator.

A baseline report can be useful to compare with a later report if you need to troubleshoot VRSG performance problems on your system. This report is also useful for comparing performance benchmarks after installing a new computer system or a new graphics card.

You should rerun benchmarking tests periodically to ensure your machine is performing optimally. Although test results might vary slightly, a large decrease in test results indicates degradation in some part of your 3D system. The performance of an MVRsimulation product scales in direct proportion to this score; the higher the result, the better this product will perform on your machine.

For comprehensive benchmarking, MVRsimulation recommends PassMark PerformanceTest (www.passmark.com/products/performancetest/).

Although 3D graphics benchmark tests are good general tests, they do not reflect specific VRSG usage of the hardware. The best way to test this usage is to create your own benchmarks by setting up conditions common to how your site uses VRSG. For example, if your site uses a large number of characters in a scene, you might want to create a VRSG cultural feature (vrsg.clt) file with a lot of characters statically placed on a database and then a save a viewpoint to reproduce the exact conditions you want to benchmark. In contrast, this usage of VRSG differs from a tanker refueling application, or a driving simulation application, which would require a different setup to recreate. Keep in mind that different video cards might offer advantages in different VRSG usage situations.

CHAPTER 2

Installing Terrain Tools

MVRsimulation Terrain Tools requires Standard or Advanced license level of Esri® ArcGIS® Pro, version 3.1.3 or greater on a Windows 10 64-bit system for map configuration. Esri ArcGIS Pro with Basic level of licensing, version 3.1.3 or greater, can be used on machines designated only to build terrain. For more information, see the *MVRsimulation Terrain Tools for ArcGIS User's Guide*.

Terrain Tools and ArcGIS Pro can be run either on the same machine as VRSG or on a separate machine. Running them on the same machine provides convenience for reviewing the terrain. Running Terrain Tools and ArcGIS on a different machine from VRSG might result in slightly slower loading of terrain from a shared drive, depending on the hardware, but the performance should be acceptable.

Before you begin

MVRsimulation Terrain Tools version 3 requires a Standard or Advanced license level of ArcGIS Pro version 3.1.3 or newer for creating Mosaic Dataset layers and GIS work. Additional build machines only used for compilation can use a Basic license level of ArcGIS Pro.

Before you install Terrain Tools version 3:

- Make sure your system satisfies the system requirements as described at: www.mvrsimulation.com/products/terraintools/terraintools-systemrequirements.html The minimum required RAM for MVRsimulation Terrain Tools is 32 GB; recommended RAM is 64 GB. Note that storage requirements for MVRsimulation Terrain Tools for Esri ArcGIS Pro version 3 may require as much as twice the storage required for VRSG7 to store imagery and elevation source data and compiled terrain. Additional storage may also be needed to serve and/or compile a large number of round-Earth VRSG terrain architecture database tiles.
- All files in the \MVRsimulation\Terrain Tools for ArcGIS Pro directory that you want to retain from a previous version of Terrain Tools have been backed up.
- To remove any older release of MVRsimulation Terrain Tools from your system. Note: if the installation program detects an older version, it will require that you cancel the installation and uninstall the older version before you can install the version.
  - This does not include the legacy Terrain Tools version 2.1 or older for ArcGIS Desktop. These two products are designed to coexist on the same machine.
- Make sure ArcGIS Pro version 3.1.3 or newer is installed prior to installing Terrain Tools version 3. Close any instances of any ArcGIS software during the installation of Terrain Tools.

- If you are performing a brand new Terrain Tools installation (not an upgrade to a new version) on a machine without MVRsimulation VRSG already installed, locate the HASP security dongle for VRSG. You will need to have it available for inserting into a USB port on the computer at the end of the installation. Do not install the HASP security dongle prior to installation.
- MVRsimulation recommends installing VRSG7 to visually render the latest features in Terrain Tools.

Installation procedure

To install the MVRsimulation Terrain Tools for ArcGIS Pro software:

1. Do one of the following:
   a. Plug in the provided MVRsimulation software installation media.
   b. Download the then-current Terrain Tools installer and Sample Project files from dowloads.mvrsimulation.com located in the folder /Software/Terrain Tools/Terrain Tools v3.0/:
   - Install-TerrainTools-3.0.XX-YYYYMMDD.exe
   - MVRsimulation-TerrainTools-SampleProject-YYYYMMDD.7z

   It is critical that the .exe and .7z files reside in the same directory for the installation to work properly.

   You may request download account credentials by completing the request form at: www.mvrsimulation.com/contact/requestdownloads.html
2. When installing Terrain Tools from the files from the installation media or those which you downloaded from MVRsimulation's download server, browse to and double-click Install-TerrainTools-3.0.XX-YYYYMMDD.exe to start the installation.
3. When the installation program begins, follow the on-screen instructions.
4. Optionally choose a directory for the installation. The installation program defaults installation to the directory C:\MVRsimulation\Terrain Tools for ArcGIS Pro, but you can specify a different directory. MVRsimulation recommends installing Terrain Tools in the default directory for ease of use of the included ArcGIS Pro project template.
5. Terrain Tools software is authenticated using a physical USB HASP security dongle. The installation program checks whether a HASP dongle device driver has already been installed on your system. (If you had a previous version of Terrain Tools or have another MVRsimulation software installed on the same system on which you are installing the Terrain Tools, the driver will already be present on the system.)

   If the device driver is not detected, the installation program will automatically launch the HASP device driver installation program to install the driver. Follow the on-screen instructions to install the HASP device driver.
6. When the final installation screen appears, click "Finish" to complete the Terrain Tools version 3 installation.

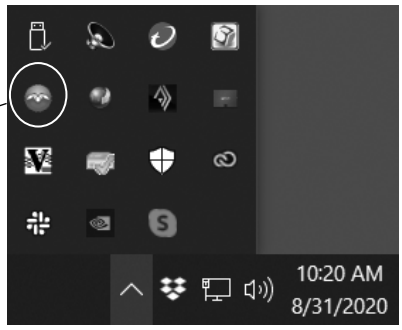
After the installation is completed, you must plug the HASP security dongle for MVRsimulation Terrain Tools into a USB port on the machine which you installed Terrain Tools. You cannot run Terrain Tools without the dongle.

The installation program places an MVRsimulation program folder on the Start menu, or if there already is one, updates it with an entry for the Terrain Tools Build Manager and updates

the documentation shortcuts to include MVRsimulation Terrain Tools User's Guide and the MVRsimulation Product Installation Guide.

The Terrain Tools Build Manager is an executable that is separate from the Terrain Tools extension to ArcGIS; it is for configuring and managing the process(es) that build terrain tiles, potentially on multiple machines. The Build Manager is automatically started when the Terrain Tools installer completes, and for all subsequent reboots. The Build Manager is also available from the system tray area of the Windows taskbar.

Terrain Tools Build Manager.



Note: Some applications that use the Windows system tray (also called *notification area)* are hidden by default, unless they are displaying messages. To ensure the Build Manager icon is always displayed, click on the double up-arrow on the system tray and choose Customize. Find the icon for the Build Manager (BuildManager.exe) and set the corresponding behavior to "Show icon and notifications."

What to do next …

The ability to run an MVRsimulation product and manage its maintenance plan renewal is handled by the authentication software associated with the product's dongle. To run MVRsimulation's Terrain Tools for ArcGIS Pro product once you have installed it, you need to update its dongle with an unlock code that you obtained from MVRsimulation. (The unlock code is an alphanumeric string.)

To obtain and enter the unlock code after installing Terrain Tools:

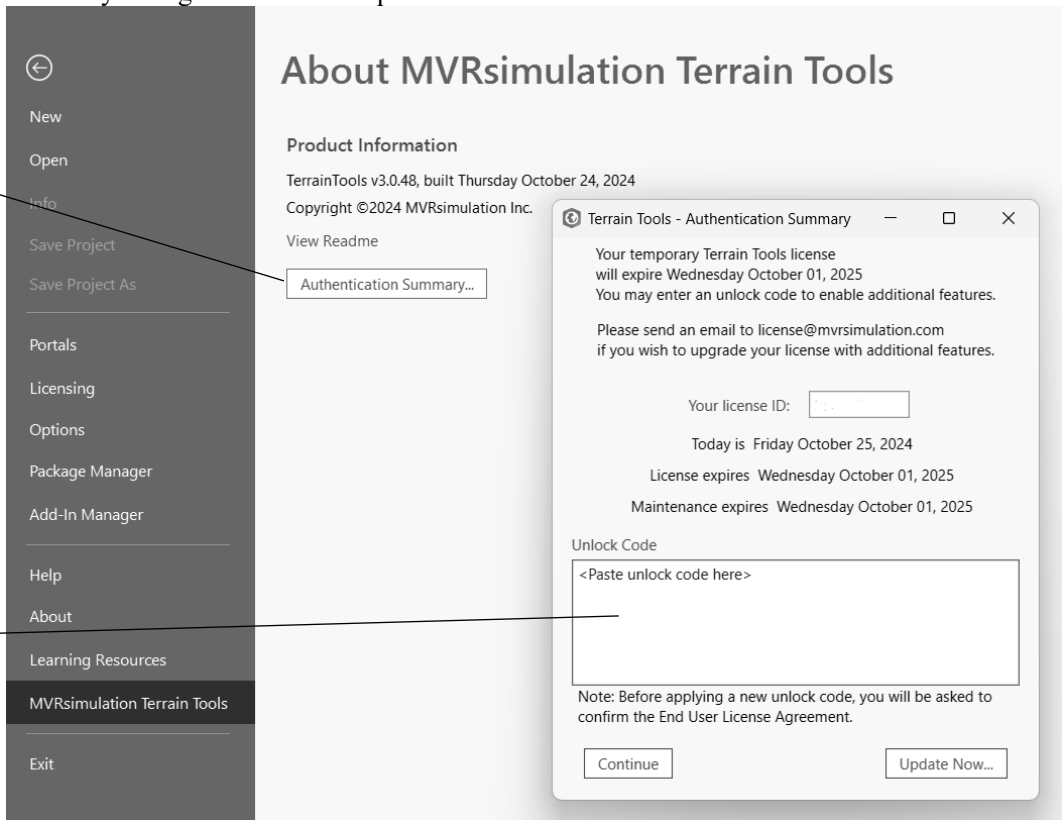
1. Start ArcGIS Pro. The first time you start ArcGIS Pro after installing Terrain Tools, MVRsimulation's Software License Agreement appears, which you must accept to use Terrain Tools.
2. When a message stating that the product is not licensed appears, click OK.
3. Next, when the Terrain Tools Authentication Summary dialog box appears, contact MVRsimulation by sending an email message to license@mvrsimulation.com (as described in the dialog box) to obtain an unlock code. To do this, click the linked email address "license@mvrsimulation.com" in the dialog box to automatically create an email message to MVRsimulation containing your product license ID.

   Note: The linked email address will not work if there is no email client configured on the system, or you have installed Terrain Tools on a system not connected to the Internet. If there is no email client configured on the system, the link will display a text file containing the license request email, but you will have to transfer that text file to another machine with email support in order to send it.
4. Close the Authentication Summary dialog box.

5. When you receive the unlock code in an email message from MVRsimulation, again start ArcGIS Pro. On the starup page, click the MVRsimulation Terrain Tools tab.
6. Click the Authentication Summary… button to open the Authentication dialog.
7. When the Authentication Summary dialog appears, copy and paste the unlock code you received from MVRsimulation into the Unlock Code field in the Authentication Summary dialog box and click Update Now.

Click this button to display MVRsimulation Terrain Tools Authentication dialog box.

Paste the unlock code you receive via email from MVRsimulation in this field and then click Update.



8. When the Software License Agreement appears, you must accept it in order to complete the licensing process. If this agreement is not accepted, the dongle will not be unlocked.

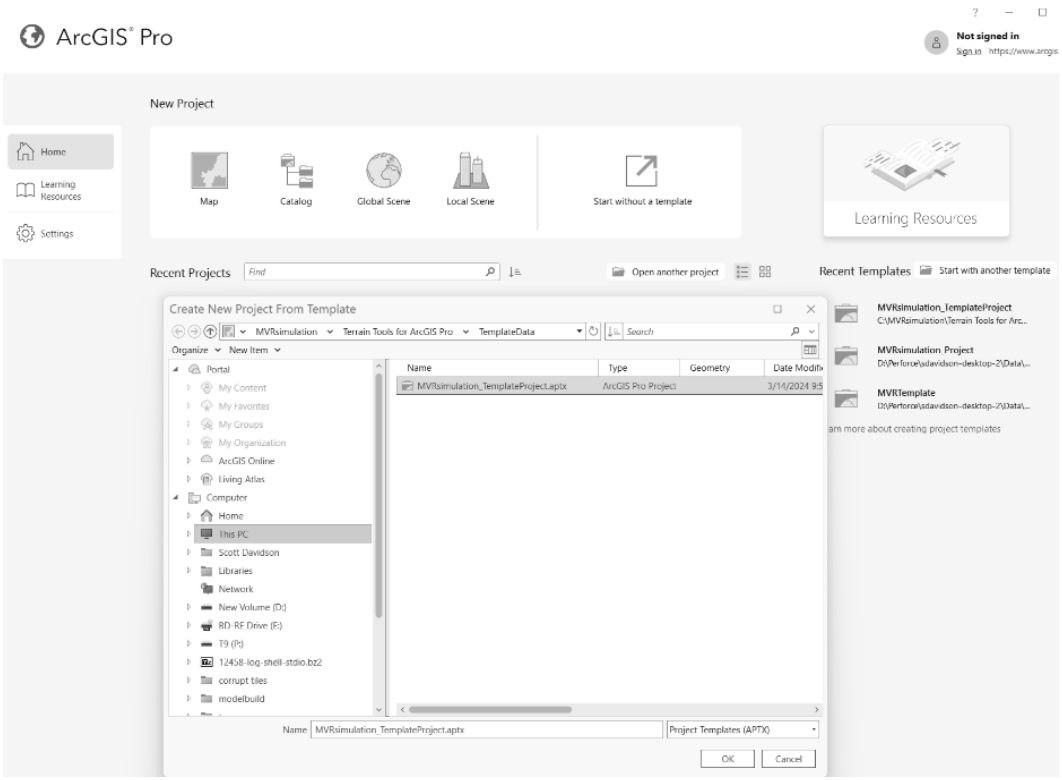
You are now ready to use Terrain Tools.

Starting Terrain Tools

MVRsimulation Terrain Tools for ArcGIS Pro software uses the Esri ArcGIS Pro application as the primary user interface for building terrain, so launching ArcGIS Pro is the first step in starting a new terrain map document.

To start a new terrain map document, using MVRsimulation's template:

1. Start ArcGIS Pro.
2. From the ArcGIS Pro start page, click the "Start with another template" button. Browse to the MVRsimulation Terrain Tools for ArcGIS Pro installation directory, C:\MVRsimulation\Terrain Tools for ArcGIS Pro\TemplateData. Select MVRsimulation_TemplateProject.aptx, then click OK.
3. After choosing the project name and output location, click 'OK' to proceed.



Before you go any further, take a moment to verify that the Terrain Tools hardware dongle is installed in your machine**.**

If you have Windows User Access Control (UAC) activated, files might not be saved or updated properly in the Terrain Tools installation directory if the MVRsimulation\ArcGIS Terrain Tools installation directory is located in the path C:\Program Files.

Note: Periodically, the MVRsimulation software installed on your system will issue an automatic message prompting you to agree to the Terms of Use of the software as specified in its Software License Agreement (SLA). You will receive the message for one of the following reasons:

- The first-time you launch the software after installation.
- Following an update of the application executable or dongle programming.
- When one-year period of time has elapsed since the SLA was last accepted.
- On the first day of software use since your software maintenance expired.

Renewing product maintenance and technical support

The maintenance expiration (and renewal) of an MVRsimulation software license is tracked through the product's dongle. The dongle is delivered with the purchase of a software license and can be updated through an unlock code provided by MVRsimulation.

To update the dongle upon the renewal of a license's maintenance and technical support plan, enter the unlock code provided by MVRsimulation upon maintenance renewal in the Authentication Summary dialog box as described earlier.

Removing Terrain Tools from your computer

To remove Terrain Tools for ArcGIS Pro software from your system, as you would need to do if you wanted to upgrade to a new version from an older version of Terrain Tools for ArcGIS Pro:

1. From the Start Menu, choose Settings > Control Panel, and then double-click Add or Remove Programs, to launch the Windows Add/Remove Programs utility.
2. From the Uninstall list of programs to remove, select MVRsimulation Terrain Tools for ArcGIS Pro and click Remove.
3. In the dialog box that appears, click Yes to remove Terrain Tools software from your system. If the Uninstall Program detects that the Terrain Tools Build Manager is running in the background, it will open a dialog box asking permission to close it.
4. After uninstalling the Terrain Tools for ArcGIS Pro program, optionally remove the Terrain Tools for ArcGIS Pro directory from your system or rename the directory to preserve any files you store there and want to retain. The process of uninstalling Terrain Tools removes all files that were originally installed, but does not remove any files that were generated after installation. For example, any build log files or MDS terrain tiles you created with the Terrain Tools will remain after the product is removed.

Following these steps is crucial if you plan to install a new version of MVRsimulation's Terrain Tools for ArcGIS Pro.

CHAPTER 3

Installing and Updating the Dongle

To provide software authentication and mobility of a software license across multiple user systems, each MVRsimulation product is delivered with a Sentinel HASP USB security dongle. You insert the dongle into a USB port of the computer that is running the MVRsimulation product.

You can install the MVRsimulation product that you licensed on computer systems under your control in a manner described in the MVRsimulation Software License Agreement, thus ensuring software mobility. However, to run the product on any of these systems, the product's dongle must be physically attached to that system while the product is in use.

The security dongle uses encryption technology to authenticate whether a person or entity is authorized to use the MVRsimulation product. The software license, its maintenance expiration (and renewal), and enhanced product options are all tracked through the product's dongle. You update the dongle by applying an unlock code provided by MVRsimulation.

Ensuring software mobility

Each MVRsimulation product has its own dongle. You can install the software product that you licensed on computer systems under your control in a manner described in the MVRsimulation Software License Agreement. However, each instance of running that product requires the insertion of product's dongle at the end of the installation in order to start and operate the product.

About the dongle

The HASP security dongle is a hardware and software mechanism which ensures that only authorized users can use the MVRsimulation software product. The dongle itself is a thin device with a control processor and static memory attached to a USB adapter, as shown below. The dongle hardware device plugs into any USB port in your computer. The dongle is delivered with the purchase of each new licensed MVRsimulation software product. All MVRsimulation products automatically install the dongle device driver as part of the product installation process, and after that device driver installation you are prompted to plug in the dongle.

The dongle enables a single instance of an MVRsimulation product to work at one time on any computer on which the software has been installed.

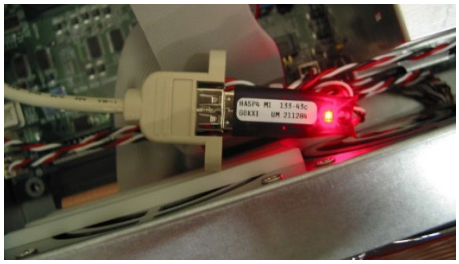
An MVRsimulation product will run *only* while you have its dongle plugged into your computer. Without the dongle, the product will not run. If you disconnect a dongle from the USB port of the system while running the product, the software will cease to operate; it will report the dongle failure in its error log.

The dongle is software version independent; it will function with future upgrades and subsequent versions of an MVRsimulation product. Each upgrade contains an executable that enables the dongle to activate the upgraded version of the software. The dongle is not dependent on a specific installation media; therefore subsequent upgrades of an MVRsimulation product can be installed from any installation media.

The dongle is independent of any computer hardware component, thus removing or replacing components (such as hard drive or video card) will not affect the use of the dongle.

The dongle may not be used in conjunction with a multi-port USB sharing device or extender. The dongle and its device driver is not compatible with Remote Desktop access and VRSG will not respond to remote access of a dongle in this manner.

Complete systems are shipped with appropriate MVRsimulation product dongles already in place. If you cannot locate dongles in an external USB connection, check your machine's internal USB connections as shown in the following image. MVRsimulation systems are shipped with the dongle installed inside the computer to help prevent damage.



Installing the security dongle

Installing the dongle is a simple process: first, the Sentinel HASP dongle device driver software is installed automatically as part of the MVRsimulation product installation. Then, after the product has been installed, you plug in the hardware dongle before starting up the product.

Note: Do *not* install the hardware dongle until after you have run the MVRsimulation product installation. If you install the dongle first, it will appear to Windows as an unknown device; you will then have to remove the dongle from the hardware configuration and restart the installation.

Whenever you install an MVRsimulation product, the installation will automatically check whether the current HASP dongle device driver has already been installed on your system. If a current device driver is not detected, the installation program will automatically install the device driver.

To install the hardware dongle after product installation:

Insert the dongle in a USB port in your computer. The dongle is thin enough that it will not interfere with any USB devices plugged into adjacent USB ports. The dongle is *not* a USB pass-through device; it fully occupies a USB port.

Once the system recognizes the new dongle hardware, a red LED light will illuminate within the dongle, indicating normal operation of the dongle.

Reboot your computer to complete installing the Hasp dongle.

Troubleshooting the dongle installation

A small set of users have encountered a problem with the dongle status after installing the HASP dongle driver on systems. The source of the problem is not known; it may include conflicts with other device drivers on the system, or the dongle was plugged in before the MVRsimulation product installation. The symptom of the conflict might be that upon starting the product, a warning box is displayed stating “Cannot validate license.”

If the product dongle is in place, its red light is illuminated, and the issue persists, contact support@mvrsimulation.com, for assistance in resolving the issue. MVRsimulation staff would be glad to guide you in completing the following steps:

1. Unplug the dongle from the computer.
2. Uninstall the HASP dongle driver.
3. Reinstall the HASP dongle driver manually at the command-line:
4. Locate the file \MVRsimulation\Common\Util\SafeNet\haspdinst.exe. (Optionally copy the file to temporary directory that can easily be accessed via a command-line prompt, such as c:\Temp.)
5. Open a command window and from the command prompt, type the following command:

```
haspdinst /r /kp
```

6. After this command finishes executing (this action should just take a few seconds), at the command prompt type:

   ```
   haspdinst /I
   ```

   (This action should also only take a few seconds to complete.)

7. Once these two steps are completed, insert the dongle into an active USB port in the computer. After the dongle is plugged in, its red indicator light should become illuminated.
8. Start the MVRsimulation software. The Authentication dialog box should appear, prompting you for an unlock code.

If the Authentication dialog box does not appear, or an error message appears:

1. Unplug the dongle and restart Windows.
2. Leaving the dongle unplugged, repeat the two command-line steps (steps 6 and 7) above after Windows restarts.
3. Plug the dongle into a USB port on your computer again.

Using the dongle

Each MVRsimulation product has its own dongle. If you run multiple MVRsimulation products on a single computer and need additional USB ports, consider obtaining a USB hub for the MVRsimulation product dongles.

You can secure a dongle to your system by threading a key chain or tie wrap through the hole at the plastic end, opposite the USB adapter.

About dongle replacement

Because you cannot run an MVRsimulation product without its dongle, take care not to damage or lose the dongle. Opening the dongle cover will likely damage it and disable it. A lost dongle cannot be replaced. Thus, to continue to use an MVRsimulation product, you would need to purchase a replacement software license, which would be distributed with a new dongle.

MVRsimulation will replace a damaged dongle upon request, as described in the Return Merchandise Authorization (RMA) instructions on its website at: www.mvrsimulation.com/aboutus/returns.html.

To report a damaged dongle:

1. Obtain the dongle ID number (license ID number). On newer dongles, the dongle ID number is printed directly on the dongle as shown. The dongle ID can be found on the VRSG Dashboard's About tab (and on the Blu-ray installation media).

   This dongle ID number contains information about what the dongle is licensed for (product and product maintenance). You must supply this dongle ID number in any

communication you have with MVRsimulation regarding your damaged dongle.

The dongle ID is the last line of text printed on MVRsimulation's newer dongles.

2. Email rma@mvrsimulation.com with a request to obtain an RMA number for the damaged dongle you intend to return.
3. Send MVRsimulation the damaged dongle, or at a minimum, the metallic unit (which houses the electronic circuit board and memory chips) along with the RMA number. MVRsimulation will *not* replace a dongle for which you only return the purple plastic holder without the corresponding metallic unit.

For more information about HASP dongles, see the Sentinel website at www.safenet-inc.com/products/software-rights-management/sentinel-hasp-hl/.

Managing a software license by its dongle

The status of a software license, its maintenance plan renewal, and access to certain product options are all managed by the authentication software in conjunction with the product's dongle. You update the dongle by using an unlock code you obtain from MVRsimulation.

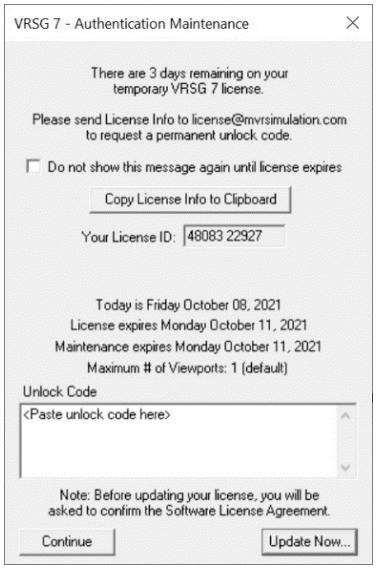
An *unlock code* is an alphanumeric string. When you receive an unlock code from MVRsimulation, you cut-and-paste that code into the application's authentication dialog box to update the dongle. Situations in which you would need to enter an unlock code include:

- Making a temporary license permanent.
- Accessing additional product options or new MVRsimulation 3D terrain.
- Renewing the maintenance support for a license.

The remainder of this chapter describes how to enter an unlock code for each of these situations. The steps depict the updating of a VRSG dongle, but similar steps apply to any MVRsimulation software product.

Making a temporary license permanent

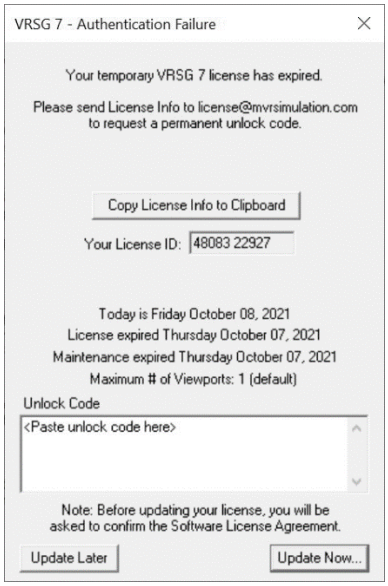
An MVRsimulation product is initially delivered with a temporary license, in the form of a dongle that has an expiration date. This date is based on the payment terms of the purchase and an additional grace period. A few days before the temporary license is due to expire, a message similar to the following appears when you start the product:



Do one of the following:

- Click Continue and proceed with using the product. Optionally you can also select the "Do not show this message again until license expires" checkbox to suppress the message from displaying at the start of subsequent product sessions before the license has expired.
- Click Copy License to Clipboard and then then paste the License ID into an email message addressed to license@mvrsimulation.com (as described in the message) to request an unlock code.

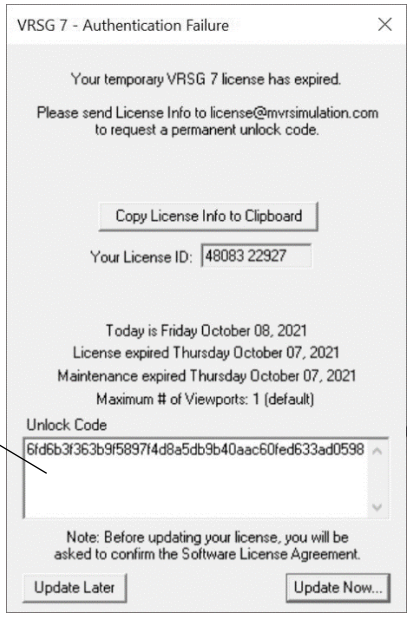
When the expiration date for the temporary license is reached, the following message appears:



When this message appears, you will not be able to run the product until you enter an unlock code. To update this license with an unlock code for a permanent license:

1. Click Copy License to Clipboard and then then paste the License ID into an email message addressed to license@mvrsimulation.com as described in the above message, and then send the email to obtain an unlock code.
2. When you receive an email reply from MVRsimulation with the unlock code, restart the MVRsimulation software product. Again, the product will start by displaying the Authentication Failure dialog box as shown above.
3. In the Unlock Code text field, enter (by pasting or typing exactly) the unlock code provided by MVRsimulation, and then click Update Now.

Paste or type the unlock code provided by MVRsimulation in this text field.



If the unlock code is accepted, the message “Authentication confirmed” appears.

4. Click OK in the message box. At this point the product will start up as it normally would. The dongle is now permanently operational.

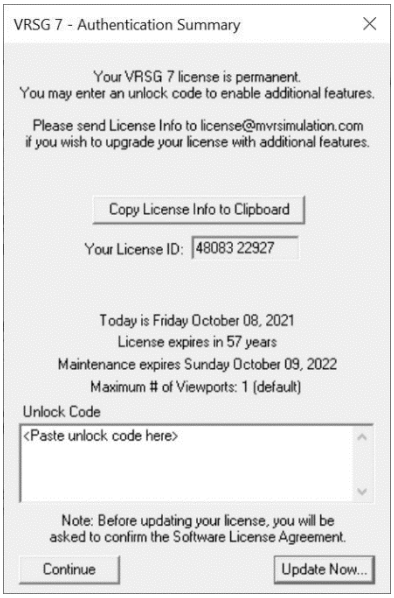
Adding options to a license

Some MVRsimulation product options or databases are not available in a core product, but instead require an MVRsimulation-supplied unlock code to gain access to them. At the time of publication of this manual, a unique unlock code is required to enable the VRSG physics-based IR features for U.S. domestic customers. International (non-U.S.) customers must first obtain ITAR approval to use VRSG’s physics-based capability. The physics-based IR option contains enhanced features not available in the core product. Access to new MVRsimulation terrain databases might also require an unlock code.

To use VRSG’s physics-based IR option, you must first obtain and enter an MVRsimulation-supplied unlock code to enable that option for your VRSG license.

To add the option to your VRSG license:

1. Click the Authentication Summary button on the VRSG Dashboard's About tab. On the Authentication Summary dialog box, obtain your license ID and copy that ID to an email message addressed to license@mvrsimulation.com with your request for an unlock code for the feature (such as the physics-based IR option), and then send the email message.
2. When you receive an email reply from MVRsimulation with the unlock code, start VRSG and click the Authentication Summary button on the VRSG Dashboard's About tab.
3. The Authentication Summary dialog box appears, as shown:



4. Enter the unlock code provided by MVRsimulation (by pasting or typing it exactly) into the Unlock Code text field, and then click Update Now.

Paste or type the unlock code provided by MVRsimulation in this text field.

5. When the confirmation message appears, click OK. Next, the VRSG Dashboard appears.
6. Click the About tab on the VRSG Dashboard to confirm that the component has been enabled. The tab should contain text stating that the option is enabled.

Renewing product maintenance and technical support

The license maintenance expiration (and renewal) of an MVRsimulation software license is tracked through the product's dongle. The dongle is delivered with the purchase of a software license and can be updated using an unlock code provided by MVRsimulation.

When annual maintenance support for a product nears its expiration date, the following warning message appears when you start the product:

When you see this message, do one of the following:

- Click Update Later and proceed with using the product. You can arrange for payment of maintenance support renewal for your license and then update the dongle. Optionally you can also select the "Do not show this message again" check box to suppress the message from displaying at the start of subsequent product sessions.
- If the license's maintenance and support plan has been renewed, send an email message to license@mvrsimulation.com (as described in the message) to obtain an unlock code to update the license maintenance.

When the expiration date for maintenance support is reached, the Authentication Maintenance dialog box appears stating that after the software maintenance term expires, you can continue to run the existing version of the product, but you cannot receive any future product updates or technical support.

If you attempt to participate in further product updates by downloading an updated executable, the product will fail to launch, and will display the following dialog box:

At this point, you would need to renew the software maintenance support to use this executable.

1. Upon payment of your maintenance support renewal, contact MVRsimulation by sending an email message to license@mvrsimulation.com (as described in the above message) to obtain the unlock code.
2. After you receive the unlock code via an email reply, restart the MVRsimulation software product. Again, the product launches by displaying the Authentication Failure dialog box as shown above.
3. Enter the unlock code provided by MVRsimulation (by pasting or typing it exactly) in the Unlock Code field, and then click Update Now.

Paste or type the unlock code provided by MVRsimulation in this text field.

A confirmation message appears followed by normal start-up of the product.

Note: If your site runs VRSG on multiple channels on a network, you can update multiple unlock codes at once. Contact MVRsimulation for more information.

Troubleshooting license authentication

In the event that you enter an unlock code that does not appear to work, that is, it does not resolve the condition for which you are using it, notify MVRsimulation at license@mvrsimulation.com of the problem. Be sure to provide your license number so that a member of MVRsimulation's support staff can issue a replacement unlock code. This information can be very helpful in troubleshooting and resolving your support request.

CHAPTER 4

Installing Multi-Axis User Input Devices

The VRSG interface and keyboard provide full user control for navigating through the virtual world. Installing a game controller to use with VRSG is optional, but for unconstrained database navigation, a six-degree-of-freedom (6DOF) device is preferred. Most users use a game controller with VRSG because it provides optimal 360° navigation in any direction for a more intuitive virtual world experience. For this reason, most VRSG complete systems are sold with a game controller.

Gamepads or joysticks are generally used in VRSG only in these specific cases:

- Flying a terrain database in fixed-wing mode.
- Controlling a simulated UAV camera in UAV View mode, which enables you to attach to a DIS entity that supplies the UAV airframe telemetry.
- Creating and manipulating a dismounted First Person Simulator (FPS) character on the database.

VRSG works with many gamepads and joysticks. The Logitech F310 gamepad is MVRsimulation's device of choice for manipulating characters in FPS mode and controlling a UAV camera in simulated UAV mode. Windows 10 has built-in drivers for most of these devices and usually recognizes your gamepad/joystick when you first plug it in. This means you can immediately start using your device with VRSG. (You can also configure the gamepad/joystick in the Gaming Options Control Panel using vendor-supplied software.)

Installing a 6DOF game controller

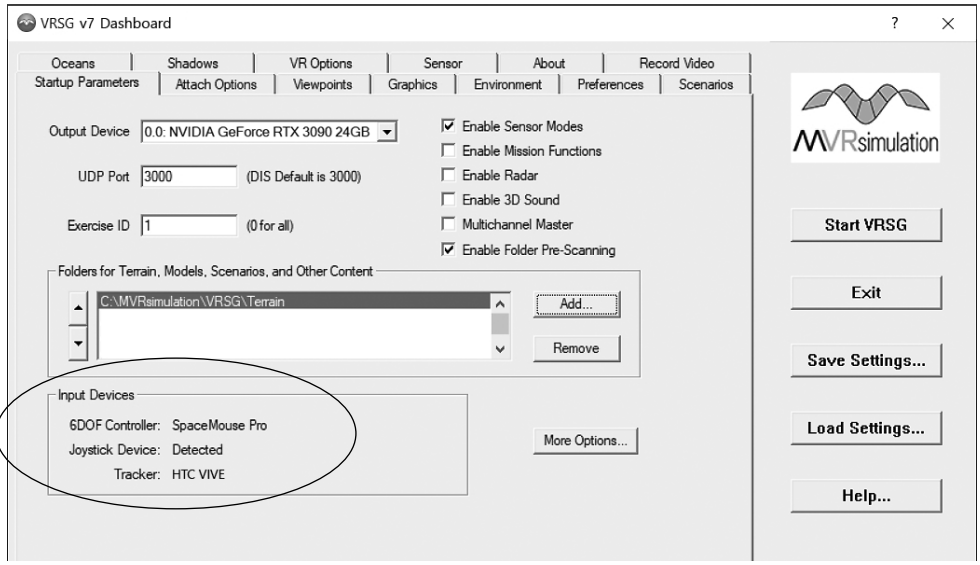
VRSG supports the Logitech 3Dconnexion SpaceMouse Pro and SpaceMouse Compact 6DOF controllers.

SpaceMouse Pro and SpaceMouse Compact 6DOF controllers.

To install one of these controllers, simply plug the device into a USB port and allow the installation of the device drivers. If you plan to use a gamepad or other joystick with VRSG (in addition to a 6DOF controller), see the section “Installing and calibrating Windows joystick devices.”

Using the 6DOF controller device with VRSG

When you launch VRSG, it scans the USB and serial ports for a 6DOF controller device. On the VRSG Dashboard’s Startup Parameters tab, a status message will appear, indicating whether VRSG has detected the 6DOF controller:



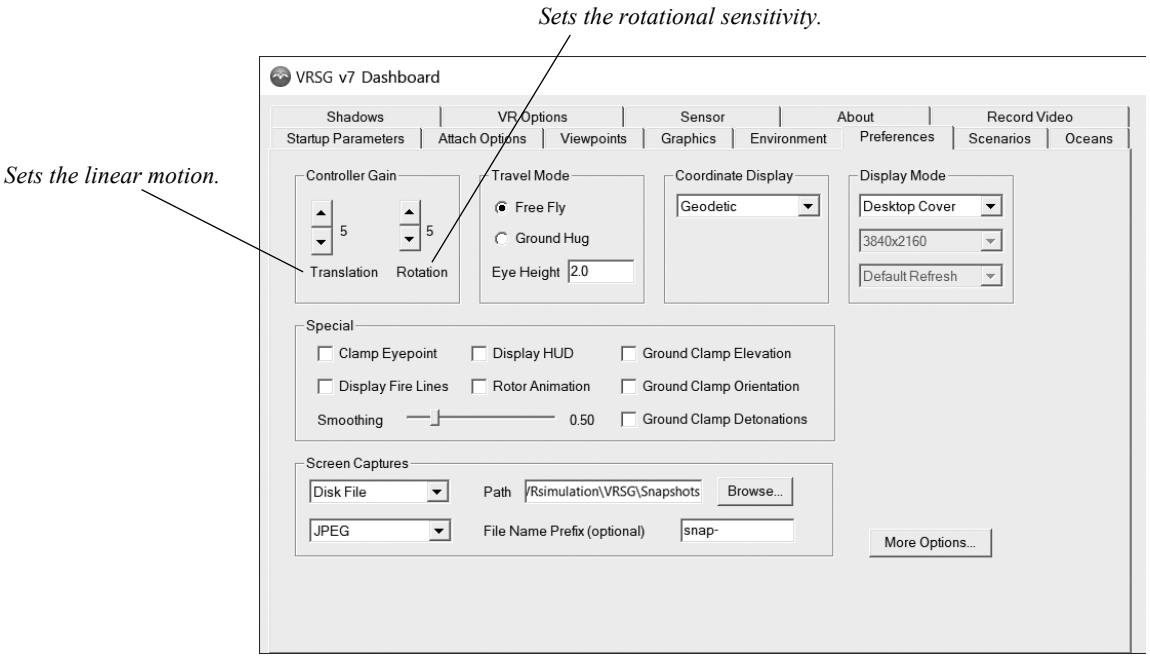
Indicates that VRSG has detected the SpaceMouse Pro 6DOF controller (and a joystick or gamepad, and a tracking device).

The Logitech 3Dconnexion's 6DOF controllers use a knob called a *controller cap* which provides the 3D navigation by flexing in all directions. When you use the device with VRSG, moving the cap left or right pans in those directions, pulling and pushing pans up and down, moving toward or away from you zooms in and out, and rotating or tilting the cap spins about its various axes.

3Dconnexion controller cap: push, pull, twist or tilt the cap to pan, zoom and rotate.

With six degrees of freedom, you can flex the cap in all directions. Six buttons on the controllers correspond to VRSG functions in the virtual world. For example, by pressing the R button on the SpaceMouse Pro you can cycle through the attachment options, which correspond to the Mode options listed in the Attach tab of the VRSG Dashboard. Press the F button on the SpaceMouse Pro to display online help of the VRSG functions available in the visualization window and the buttons they correspond to on the controller.

You can adjust the motion sensitivity of the controller on the Preference tab of the Dashboard, as shown:



If you are short on work space, you can use the SpaceMouse Compact, which is a small 6 DOF controller without buttons or a wrist rest. You access VRSG functions (which are mapped to buttons on the other two controllers) with keyboard shortcuts and on the Dashboard.

For information about how to use the 6DOF game controller button functions with VRSG, see the chapter "Exploring the VRSG System" in the *MVRsimulation VRSG User's Guide*. You can also learn how to use the controller with VRSG on MVRsimulation's website at www.mvrsimulation.com.

Installing and calibrating Windows gamepad and joystick devices

Gamepads and joysticks are used in VRSG in the following cases:

- Flying around the terrain database in fixed-wing mode.
- Controlling a simulated UAV camera in UAV View mode, which enables you to attach to a DIS entity that supplies the UAV airframe telemetry.
- Creating a dismounted character to perform activities on the database in VRSG First Person Simulator (FPS) mode.

VRSG works with any 8-button 4-axis input device that complies with the USB Human Interface Device (HID) standard. However, for ease of use in the modes listed above, MVRsimulation recommends the Logitech F310 gamepad. This USB device is supported by Windows and VRSG without the need to install any additional software.

With two analog sticks, digital buttons, and precise D-pad, and smooth, precise action, the gamepad is the ideal input device particularly for manipulating a character in the virtual world. Using the gamepad for FPS entails making use of the two thumbsticks, the D-pad, and buttons for directly manipulating the character's movements and for accessing functions such as firing weapons, laser designating in JTAC mode, and so on. In UAV simulated camera mode, functions on the gamepad include zooming, tracking an entity or a location on the ground, and taking a screen capture.

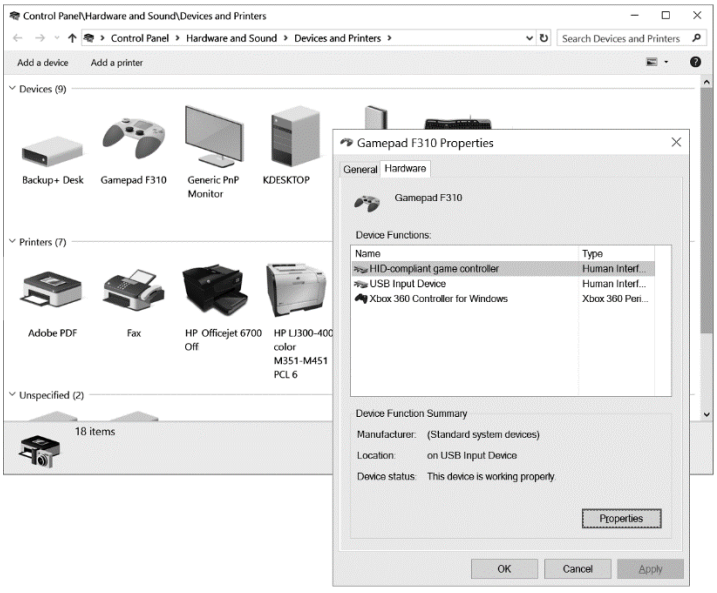
Shown below is the Logitech F310 gamepad, which has sufficient axes and buttons for accessing all FPS, UAV, or fixed-wing mode features.

Logitech F310 gamepad.

After you install the game controller, you should verify that the installation is successful.

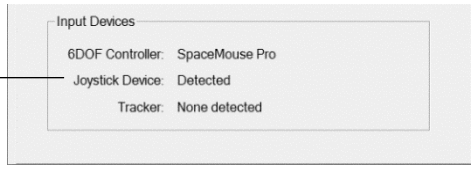
To verify that the controller is working properly, examine the controller’s properties:

1. In the Windows Control Panel, choose Devices and Printers and then right-click on the icon of the Logitech F310 device. The Gamepad F310 Properties dialog box appears, where you can see the status of the device:



2. Click the Properties button. The Properties dialog box appears, with further information about the gamepad. (No driver is needed to use this device with VRSG.)
3. If you need to calibrate the gamepad, install the Logitech Gaming Software on the DVD that was packaged with the gamepad. Then, from the Start menu choose Start > Logitech > Logitech Gaming Software.
4. When you launch VRSG, the Startup Parameters tab on the Dashboard indicates whether it has detected a joystick device (including a gamepad):

Indicates that VRSG has detected the gamepad or other joystick device.



Troubleshooting the gamepad or joystick installation

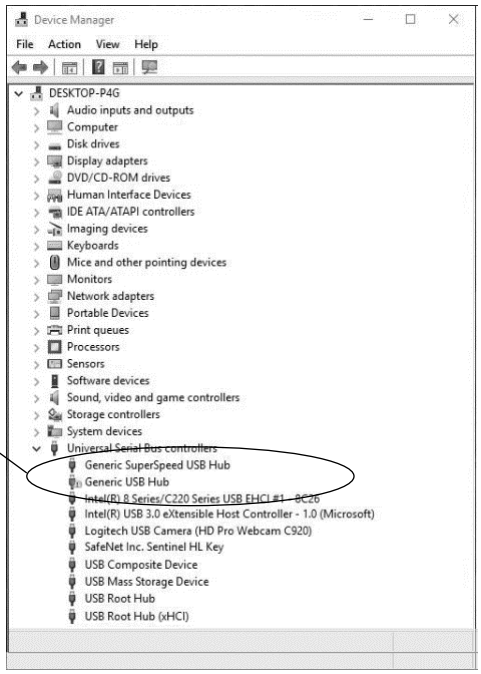
Current gamepads and other joysticks are compliant with the USB Human Interface Device (HID) specification, which means they are automatically recognized by Windows in a "plug-and-play" manner, and in turn, are detected by VRSG upon startup.

If VRSG does not detect the presence of the gamepad or other joystick, first ensure the USB connection is working properly. If the connection is functioning properly, examine the Device Manager to see whether Windows has detected a problem.

To access the Device Manager:

1. Open the Control Panel and choose System.
2. From the System page, open the Device Manager.

Warning icon indicates that Windows has detected a device that is not working properly.



Any device that is not installed properly will be shown in the list of devices marked in some way, as shown in the above example. The example above shows an entry with a question mark beside it, indicating that the device is improperly installed. You should resolve hardware problems listed here before you operate the VRSG system. (Hardware conflicts are typically caused by IRQ conflicts or from purchasing improperly configured systems.)

If the joystick icon does not appear in the list at all, as in the case of legacy model joysticks you will need to install your joystick manually, as described next.

Note: If you experience drifting in the VRSG scene when you use the gamepad, you might need to recalibrate the gamepad. You can recalibrate the gamepad through the gamepad's Properties dialog box, as described on the previous page.

Installing a joystick manually

Complete the following steps to install the joystick manually:

1. Open the Control Panel.
2. Click Hardware and Sound, and then click Add a Device.
3. When the Add a Device screen appears, click the Next button, select the device you want Windows to add from the listed devices, and click Next.

After you install the device, you should make sure that your system's Device Manager shows that this device is functioning properly, as described earlier.

APPENDIX A

License and Warranty

MVRsimulation Inc. Software License Agreement

Version 45990 (1 January 2026)

DO NOT INSTALL THIS SOFTWARE UNLESS YOU HAVE READ, UNDERSTOOD AND AGREE TO THESE TERMS

MVRsimulation Inc. ("**MVR**"), a Massachusetts corporation, is supplying a copy of its VRSG®, Scenario Editor or Terrain Tools software to You (as that term is defined below) on the terms set forth herein and in the Purchase Order (as defined below). This License Agreement is entered into as of the date first written above between MVRsimulation and the undersigned licensee ("**you**"), with an address indicated below your signature line. Now, therefore, you and MVRsimulation agree as follows:

Article 1 **DEFINITIONS:** As used herein:

"**Additional Materials**" means software not constituting Software (as defined below), Data Files not specified in a Purchase Order or created as part of the License Authentication process, and libraries (including Model libraries) not specified in a Purchase Order.

"**Authentication Files**" means the files in .C2V, .V2C or .A2C format that are exchanged in the course of a License Authentication or the reinstallation of the Software onto another computer.

"**Data Files**" means data files supplied by MVR under a Purchase Order or as Additional Materials or created by you or MVR as part of the License Authentication process.

"**Demonstration Video**" includes any visual display involving VRSG, Scenario Editor or Terrain Tools or the Data Files that can be viewed by a third party, whether hosted on a public server, circulated in a format that permits individual viewing, or demonstrated at your facility or that of a third party.

"**Documentation**" means documentation published by MVR describing the functions and operation of the Software.

"**Dongle ID**" means a unique digital identifier of a physical dongle transmitted as part of the authentication process described in Section 2.02.

"**Initial Maintenance Term**" is a one year term beginning on the date on which you first receive a long-term License Authentication or, if different, the maintenance term is specified in the Purchase Order.

"**License Authentication**" means the authentication described in section 2.02 below.

"**Licensed Materials**" means the Materials and Additional Materials.

"**License ID**" means a unique digital identifier of a physical computer installation transmitted as part of the authentication process described in Section 2.02.

"**Maintenance Term**" means the Initial Maintenance Term as it may be extended from time to time pursuant to Section 3.04.

"**Materials**" means the Software, related Documentation, and any Data Files, Models or libraries supplied by MVR under a Purchase Order.

"**Models"** means the three-dimensional representations of vehicles, weapons, characters, and cultural features such as buildings, foliage, signage and street elements made available by MVR.

"**Proprietary Files**" means Models or Data Files provided in any proprietary file format of MVR, including without limitation files provided in the .VIR, .MDY, .MDX, .MDS, .HPZ, .HPY, .HPX, .TEX, .C2V, .V2C and/or .A2C format.

"**Purchase Order**" means the purchase order, quotation or online order form, including the Standard Terms, pursuant to which you have agreed to purchase and MVR has agreed to sell licenses of Software.

"**Refresh**": A License Authentication may be "**Refreshed"** if you transfer your Software to a new computer or request the right to use additional Software features beyond those in your original Purchase Order. This refreshing may take the form of reprogramming of a dongle or the exchange of new Authentication Files.

"**Scenario Editor**" means MVR's VRSG Scenario Editor software product.

"**Software**" means the MVR software (which may include VRSG) identified in the Purchase Order and any upgrades, updates, new releases, versions, corrections or revisions thereto which MVR makes or has previously made available to you.

"**Standard Terms**" means MVR's standard terms and conditions available at www.mvrsimulation.com/howtobuy/standard_terms_and_conditions.html or, if attached as an exhibit to the Purchase Order or this license agreement, in the form so attached.

"**Terrain Tools**" means MVR's Terrain Tools for Esri ArcGIS software product.

"**Updates**" means updates, upgrades and new releases and subreleases of VRSG, Scenario Editor or Terrain Tools software product.

"**VRSG**" means MVR's Virtual Reality Scene Generator software product.

"**You**" means the legal entity or governmental agency on behalf of which the user of this copy of VRSG, Scenario Editor or Terrain Tools is acting in installing and using this copy of VRSG, Scenario Editor or Terrain Tools. This definition applies even when "you" appears with a lower case 'y'.

Article 2 LICENSE

Section 2.01 **Grant.** MVR grants you a non-exclusive license (i) to install the Licensed Materials onto a computer under your control, whether the computer is accessed directly or over a private network and when installed over a private network, and (ii) for you or your employee (and, if you are an accredited college or university, your students) to use the Licensed Materials and Software so installed for your own internal business, operational or

educational purposes, and, if you are acquiring this license in connection with a United States government contract identified in the Purchase Order, for the purpose of fulfilling your obligations under that contract, provided, however that the Licensed Materials may only be run or otherwise used on a computer that has been authenticated, as described in Section 2.02.

Section 2.02 **Authentication.** Authentication of a computer may occur either as a result of an exchange of Authentication Files or by your use of a dongle obtained from MVR. If your Purchase Order refers to authentication by means of Authentication Files, the exchange of Authentication Files will occur when you install the Software on a computer. As part of the installation process, the Software will collect and compile unique identity information of the physical computer either (i) into a .C2V file, or (ii) into a License ID output to the computer's video display, to be transmitted via email to MVR. Upon receipt of the .C2V file or the License ID code, MVR will create and send by reply e-mail either a .V2C or .A2C Authentication File which you will be able to use to complete the authentication process. MVR's transmission to you of the Authentication File will trigger the commencement of the Initial Maintenance Term for the copy of VRSG, Scenario Editor or Terrain Tools to which it is related.

For users whose authentication is to be done by means of dongle(s), MVR will provide the number of dongles stated on the Purchase Order. An individual dongle may not be used by more than a single user or on more than a single computer simultaneously. As part of the installation process, you will be prompted to send the applicable Dongle ID(s) via email to MVR. Upon receipt of these Dongle ID(s), MVR will send by reply emailan unlock code for each dongle for which a Dongle ID has been received. You will be able to use these unlock code(s) to complete the authentication process. MVR's transmission to you of the unlock code for a dongle will trigger the commencement of the Initial Maintenance Term for the copy of VRSG, Scenario Editor or Terrain Tools to which it is related.

Although MVR may provide you with temporary License Authentication (which may involve a temporary unlock code for a dongle or a .A2C or .V2C authentication file with a temporary duration), MVR shall have no obligation to extend any such temporary License Authentication, provide additional temporary License Authentication or provide you with a permanent License Authentication unless and until you have paid in full for the Software and any other services or materials identified in the Purchase Order. Accordingly, your use of the Software may be interrupted until such payment has actually been received and processed by MVR.

Section 2.03 **Restrictions**. You may not do or permit any other party to do any of the following:

a) Use the Licensed Materials other than as specifically permitted in this Agreement or permit any other person to do so;

b) Make the Licensed Materials available to, persons other than those described in clause (ii) of Section 2.01 or more concurrent users than the number of licenses that you have purchased;

c) Make the Licensed Materials available for use on a non-Authenticated computer;

d) Permit simultaneous use of the Licensed Materials by more users than are authorized by the License Authentication, whether over a computer network, or on a virtual or emulated computer or otherwise;

e) Attempt to (a) alter, merge, modify, adapt, or translate any Licensed Materials (excluding only Data Files that are not Proprietary Files), (b) decompile, reverse engineer, disassemble, derive, or otherwise reduce the Software to a human-perceivable form, or (c) develop any software that would permit an end user to read or access any Proprietary Files. The parties understand that, as used herein, the term "reverse engineer" shall include, without limitation, any use of benchmarking information or incremental output from the Software to determine MVR source code, algorithms or data format, or for the purpose of recreating the Software (including without limitation any MVR Files) or creating software or files substantially similar thereto;

f) Use any Licensed Materials for the purpose of training, developing or operating any form of artificial intelligence, whether artificial narrow intelligence (or "weak AI), artificial general intelligence (or "strong" AI), including without limitation using Licensed Materials to train large language models, without a specific, separate license from MVR authorizing such use;

g) Bypass the copy protection code or any other technological measure that controls access to the Licensed Materials;

h) Make copies of any of the Licensed Materials other than one copy for back-up or archival purposes or use a back-up copy other than as a replacement for the original copy. You must include on any back-up copy all copyright and other notices included on the Materials or Additional Materials;

i) Export, re-export or use the Licensed Materials or any copy thereof in violation of the export control laws of the United States of America or any other country;

j) Use any dongle or Authentication File supplied to you by MVR in connection with the license of the Software in any manner other than in connection with the use of the Materials as permitted hereunder;

k) Use the Software to test or analyze the performance or user interface of the Software in order to develop or improve a product which competes with the Software;

l) Publish or provide to third parties performance characteristics relating to the Licensed Materials without the express written consent of MVR;

m) Demonstrate the Licensed Materials in public or private forums without using (i) a platform that provides the Software sufficient performance capacity to operate at peak capacity, and (ii) the most recent versions of any Software and Data Files;

n) Use or circulate any Demonstration Video without first obtaining the approval of MVR, which approval MVR may withhold if it reasonably determines that the Demonstration Video will not correctly reflect the peak performance of the Software and Data Files;

o) Publish or provide this document to third parties in electronic or printed form;

p) Create or distribute derivative works based upon the Licensed Materials (including without limitation databases derived from files provided to you by MVR).

Section 2.04 **Updates to License Agreement.** If you renew, revive or extend the Maintenance Term, Refresh your License Authentication, or request and receive any Updates or Additional Materials, you may be prompted to accept the then-current version of

this Agreement, which if accepted shall apply to all Licensed Material. You will not be able to use Updates or Additional Materials or extend or revive the Maintenance Term without accepting the then-current version of this Agreement unless MVR then expressly permits it (which it may refuse in its absolute discretion), but any extension of the Maintenance Term previously paid for will continue in effect under the existing Agreement until it expires.

Section 2.05 **Ownership and Copyright.** Title and copyright to the Licensed Materials (including, without limitation, any databases, libraries, images, "applets", photographs, animations, video, audio or music and text incorporated therein and any hardware keys provided in connection therewith) and all copies thereof remain with MVR and/or its licensors. The Licensed Materials are copyrighted and are protected by United States copyright laws and international treaty provisions. You may not remove the copyright and other proprietary rights notices from any the Licensed Materials. You agree to prevent any unauthorized copying of the Licensed Materials. Except as expressly provided herein, MVR does not grant any express or implied right to you in the Licensed Materials or under the patents, copyrights, trademarks, or trade secret information of MVR or its licensors.

Article 3 MAINTENANCE AND SUPPORT

Section 3.01 **Initial Support.** Except as you and MVR may otherwise have mutually agreed in writing, MVR will provide technical support and maintenance in connection with your use of the Materials during the Initial Maintenance Term. If MVR later provides you with any subsequent License Authentication (as may arise if the Software is transferred to a replacement computer, or MVR provides you with a replacement dongle or any new unlock code for a dongle), your subsequent License Authentication shall not restart or extend the Maintenance Term. If you have purchased multiple seats of the Software and have therefore received multiple License Authentications, the Materials accessed with each License Authentication will have a separate Maintenance Term, based on the date on which MVR first provides you with a long-term License Authentication for the applicable copy of the Software. Upon the expiration or termination of the Maintenance Term, MVR will have no obligation to provide maintenance or support for the Materials. MVR may temporarily suspend its support in the event of interruptions beyond its reasonable control, such as may arise in the event of flood, earthquake, terrorist attack, failure of third party communications systems and the like.

Section 3.02 **Nature of Support.** All maintenance and support will be provided remotely during MVR's normal business hours. The maintenance and support provided by MVR hereunder will consist of:

(a) responding promptly via e-mail during the Maintenance Term to any questions regarding reports of errors or defects in the Software;

(b) providing assistance via e-mail and telephonically during the Maintenance Term relating to the installation and use of the Software;

(c) if you first received the Materials electronically, permitting you to re-install the Materials electronically on the same or a different computer until the end of the Maintenance Term or, if longer, until the fifth anniversary of the end of the Initial Maintenance Term. However, if you extend the Maintenance Term beyond six years, MVR reserves the right to provide you with a later version of the Materials than the version that was specified in your Purchase Order; and

(d) providing access during the Maintenance Term to (1) any "Additional Materials"

generally released to MVR's customers, (2) error corrections (i.e. patches) and updates intended to fix reported errors, and (3) all product updates, upgrades and enhancements to the Software that MVR generally releases to its customers during the Maintenance Term. If you request that MVR perform maintenance or support on site at your premises or outside normal business hours, you will be responsible for all reasonable expenses incurred by MVR in connection with performance thereof and MVR reserves the right to charge its then prevailing rates per hour of service provided, or to refuse to provide such service.

Section 3.03 **Exclusions and Limitations.** MVR's maintenance and support obligations do not include: custom programming, training, implementation, database changes or support, product upgrades for which MVR generally imposes a separate price or fee, any requests for content revisions or changes of any kind, or any other matters not specifically covered hereunder. In addition, the provision of maintenance or support hereunder is subject to commercial availability and technological compatibility and the absence of any actual or threatened litigation between you and MVR. MVR provides no guarantee that the Software or any upgrades or updates to the Software provided pursuant to this Maintenance Agreement will function or perform when used on equipment that does not conform to the specifications indicated in the documentation relating thereto. MVR shall have no obligation to provide maintenance or support if you use or attempt to use the Software with hardware that fails to meet the minimum requirements indicated in the Documentation or otherwise modify, revise or transfer the software other than as permitted herein or without MVR's prior written permission.

Section 3.04 **Extension of Maintenance Term.** At any time before the expiration of the Maintenance Term associated with a particular copy of the Software, you may extend such Maintenance Term for successive one (1) year terms, provided, however, that such extensions shall no longer be available or applicable if MVR has generally discontinued maintenance of the licensed version of the Software (in which case MVR shall refund any amounts that you have already paid for extensions that have not yet commenced). For each annual extension of the Maintenance Term associated with a copy of the Software, you shall pay MVR the applicable maintenance fee set forth in the Purchase Order for extension of the Maintenance Term or, if an applicable maintenance fee is not specified, the price then generally charged by MVR for the maintenance and support services described herein. All payments for extensions purchased hereunder must be received by MVR before the expiration of the then current Maintenance Term.

Section 3.05 **Termination of Maintenance Term.** Except when the software is transferred to U.S. Government Customer, the Maintenance Term will terminate automatically in the event that you (a) materially breach any term of this Agreement (including without limitation any payment obligation contained herein), or (b) violate or infringe any of MVR's intellectual property in any manner unless such proposed termination is governed by the Contract Disputes Act of 1978, in which case MVR may pursue its rights in the manner prescribed in that Act and the regulations promulgated thereunder.

Section 3.06 **Effect of Termination or Expiration.** The Software and any updates, upgrades and enhancements thereto that are installed during the Maintenance Term will continue to be accessible after the expiration or termination of the Maintenance Term. However, even though you may be able to download and install product updates, upgrades and enhancements to the Software after the expiration or termination of the Maintenance

Term, these updates, upgrades and enhancements will not function on your computer unless and until you have revived and reinstated the Maintenance Term as described below.

Section 3.07 **Revival.** In the event that you wish to receive maintenance and support after the expiration or termination of the Maintenance Term, you may request that the Maintenance Term be revived and reinstated for a new one (1) year term. MVR may, accept or refuse such a request in its sole and absolute discretion. Upon notice that MVR has agreed to revive the Maintenance Term, you shall pay to MVR a maintenance fee at its then-applicable rates for (a) the one (1) year term commencing as of the date when MVR receives the payment and (b) any gap period (measured in months) between the end of the expired or terminated Maintenance Term and the commencement of the newly revived one-year term described in clause (a).

Article 4 SAFEKEEPING OF DONGLES AND AUTHENTICATION FILES

If you have been provided a dongle or an Authentication File format in connection with your license of Software, the safekeeping and preservation of the dongle or Authentication File is your responsibility. If you need a replacement dongle or Authentication File, MVR will provide one at its then-current rates for such replacement but only if MVR is satisfied that there has been no attempt to use it in a manner not permitted under this Agreement**. For that reason, MVR strongly recommends that you back up your .A2C or .V2C files to a separate storage device and retain that backup file for archival purposes.** To obtain a replacement dongle, you must physically return it (including the casing with identifiable labeling and all mechanical and electrical parts) to MVR so that MVR can troubleshoot any damage to it.If your Authentication File has become unusable, you will likewise have to return it to MVR and certify that you have not kept any copies of it. MVR may in its discretion provide you with a dongle or Authentication File that can only be used for a short period of time when it sends you the invoice for the replacement. Your ability to receive a permanent License Authentication is subject to MVR's receipt of payment in full of the invoice; per Section 2.02, paragraph 3. If you wish to transfer Software to a new computer or change the operating system of your existing computer, see Section 7.02 for instructions as to that process.

Article 5 LIMITED WARRANTIES; DISCLAIMERS; REMEDIES; INDEMNITY

Section 5.01 **Limited Warranties.** MVR warrants that:

(a) The Software will perform substantially in accordance with the technical functionality set forth in the Documentation during the Maintenance Term; and
(b) Any physical media on which the Materials are delivered will be free from defects in material and workmanship that will prevent you from loading the Software on your computer for a period of sixty (60) days from the date of shipment to you.

These warranties shall be null and void in the case of any defect caused by any of the following: (i) modification of the Materials by any party other than MVR; (ii) use of the Materials with hardware or software other than that supplied or recommended by MVR; (iii) other improper or unauthorized use of the Materials by you; (iv) failures or defects in third party software or hardware; or (v) external factors such as, but not limited to, power failures or electrical surges.

Section 5.02 **Remedies.** If the Software fails to perform substantially in accordance with the Documentation, your sole remedy is to initiate a technical support ticket by contacting MVR at support@mvrsimulation.com; and MVR's sole obligation will be to provide

reasonable commercial efforts to resolve the issue to your satisfaction in accordance with Section 3.02. Your sole and exclusive remedy with respect to any defective media shall be the right to return such media to MVR, and MVR's sole liability to you shall be the replacement of any defective media.

Section 5.03 **DISCLAIMERS.** EXCEPT AS SET FORTH ABOVE, THE MATERIALS ARE PROVIDED "AS IS" WITHOUT ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND INCLUDING WARRANTIES OF SATISFACTORY QUALITY, MERCHANTABILITY, NONINFRINGEMENT OF THIRD-PARTY INTELLECTUAL PROPERTY, OR FITNESS FOR ANY PARTICULAR PURPOSE. WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, NO WARRANTY IS MADE THAT THE ENCLOSED SOFTWARE WILL GENERATE COMPUTER PROGRAMS WITH THE CHARACTERISTICS OR SPECIFICATIONS DESIRED BY YOU OR THAT THE MATERIALS WILL BE ERROR-FREE. THE WARRANTY PROVIDED HEREIN DOES NOT EXTEND TO ANY HARDWARE PURCHASED FROM MVR. ANY SUCH WARRANTY MUST BE PROVIDED IN A SEPARATE WRITING. THESE DISCLAIMERS OF WARRANTY CONSTITUTE AN ESSENTIAL PART OF THIS AGREEMENT.

Without limiting the foregoing, MVR provides no guarantees that the Software or any upgrades or updates to the Software provided as part of the maintenance and support described below will function or perform when used on equipment that does not conform to the specifications indicated in the Documentation relating thereto.

Because certain jurisdictions prohibit the waiver of certain warranties, the above disclaimer may not apply to you and you may have additional legal rights that vary by jurisdiction.

Section 5.04 **LIMITATION ON LIABILITY.** TO THE MAXIMUM EXTENT PERMITTED BY LAW, IN NO EVENT SHALL MVR OR ANYONE ELSE WHO HAS BEEN INVOLVED IN THE CREATION OF THE MATERIALS BE LIABLE FOR ANY DAMAGES OR LOSSES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, DIRECT OR INDIRECT DAMAGES, INCIDENTAL OR CONSEQUENTIAL DAMAGES, DAMAGES FOR LOSS OF PROFITS, BUSINESS INTERRUPTION, LOSS OF INFORMATION AND/OR LOSS OF DATA), WHETHER ARISING IN TORT, CONTRACT OR OTHERWISE, ARISING OUT OF THE USE OF OR INABILITY TO USE THE MATERIALS, EVEN IF MVR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN ANY CASE, MVR'S ENTIRE LIABILITY HEREUNDER SHALL BE LIMITED TO THE AMOUNT ACTUALLY PAID FOR THE MATERIALS.

Because some jurisdictions prohibit the exclusion or limitation of liability for damages, the above limitation may not apply to you and you may have other legal rights that vary by jurisdiction.

Section 5.05 **Indemnity.**

(a) MVR shall defend, indemnify, and hold harmless you and your permitted assignees (under Article 7), customers (collectively the **"Indemnitees**") from and against any claims, damages, losses, costs, and expenses, including reasonable attorneys' fees, arising out of any action by a third party that is based upon a claim that any work performed or Software provided infringes or otherwise violates the intellectual property rights of any person or entity.

(b) If an Indemnitee's use of the Software is held to constitute infringement or is enjoined, MVR shall at its option and expense (i) procure for Indemnitee the right to continue using the Software, or (ii) replace or modify the same with Software that is non-infringing and provides equivalent functionality acceptable to the Indemnitee.

(c) MVR's obligation to indemnify Indemnitees under this Article shall not apply if the alleged infringement is based upon you or any Indemnitee's unauthorized modification of the Software or the use of the Software in combination with other Software or devices, where such combination caused the infringement and where infringement would not have occurred from your or an Indemnitee's use of the Software alone.

(d) Commercial Customers. If you are not an agency of the United States government, you agree to indemnify MVR and its affiliates against any loss, liability or expense (including reasonable legal fees) it incurs arising out of or in connection with any breach or violation of the terms of this Agreement by you or your use of the Materials.

(e) Purchases By U.S. Government. If you are the United States government or an agency thereof, then you authorize and consent to all use and manufacture, in performing this license, of any invention described in and covered by a United States patent,

(1) Embodied in the structure or composition of any article the delivery of which is accepted by the United States government under this contract; or,

(2) Used in machinery, tools, or methods whose use necessarily results from compliance by MVR with (i) specifications or written provisions forming a part of this contract or (ii) specific written instructions given by the Contracting Officer directing the manner of performance. The entire liability to the Government for infringement of a United States patent shall be determined solely by the provisions of the indemnity clause, if any, included in this license, and you assume liability for all other infringement to the extent of the authorization and consent hereinabove granted.

Article 6 CONFIDENTIALITY

You agree that the Materials, the object and source code of the Software, the algorithms used by the Software, the performance characteristics of the Software, and the algorithms and functioning of any dongles or Authentication Files provided to you in connection therewith (collectively, the "**Confidential Information**") are or contain the confidential and proprietary information and trade secrets of MVR and that MVR is providing the Materials to you in confidence. You shall not and you shall not permit others to reverse engineer the Software (including by analysis of benchmarking or output information) or to access the source code, algorithms or performance characteristics of the Software, the dongles or the Authentication Files. In addition, you agree (i) to preserve in strictest confidence all Confidential Information, (ii) not to disclose the Confidential Information to any third party except as expressly permitted herein, (iii) only to disclose the Confidential Information within your business organization to those employees (and, if you are an accredited college or university, your students) who have first agreed to be bound by the terms and conditions substantially similar to those contained herein, (iv) not to disclose any Confidential Information to any agents, contractors or consultants except if such disclosure is related to the authorized use of the Materials hereunder and after having received a commitment from such agents, contractors or consultants to be bound by substantially similar obligations with

respect to such information as you are hereunder, and (v) not to use the Confidential Information for any reason except in connection with the authorized use of the Materials. You shall be responsible and liable for any unauthorized disclosure, publication or dissemination by any of your employees, students, agents or contractors of any Confidential Information. Confidential Information shall not include any information which: (a) you possess prior to the receipt hereof without obligation of confidentiality; (b) you rightfully receive from a third party without any obligation of confidentiality to such third party, and which such third party received without any obligation of confidentiality, direct or indirect, to MVR; or (c) is or becomes publicly available lawfully and without breach of any obligation to MVR by you. You may disclose Confidential Information if such disclosure is required under the terms of any statute, regulation, order, subpoena or document discovery request, provided that prior written notice of such disclosure is furnished to MVR as soon as practicable in order to afford MVR an opportunity to seek a protective order or otherwise contest or restrict such required disclosure. The parties agree to cooperate fully to limit disclosure in the event of any apparent legal requirement that Confidential Information be disclosed.

Article 7 TRANSFER AND ASSIGNMENT

Section 7.01 **Transfer or Assignment by Licensee.** Except as otherwise permitted by law or expressly permitted herein, you may not transfer or assign this Agreement or the Licensed Materials to another person without the prior written permission of MVR, except:

(i) if the Purchase Order identifies a U.S. Department of Defense ("DOD") contract in furtherance of which you have ordered the Materials, this license may be transferred to any other DOD contractor who needs the Materials in furtherance of a DOD contract or to the United States government agency for which the contract is being performed,

(ii) in connection with the sale of all or substantially all of your assets, this license may be transferred to the purchaser, and

(iii) if you are acting as a systems integrator for an end user identified in the Purchase Order, this license may be transferred to the end user;

provided, however, that (x) you are then in compliance with your payment obligations under any related Maintenance Agreement then in effect with respect to the Materials, and (y) the transferee provides MVR with:

(A) an unqualified, written acceptance of the terms of this License and any related maintenance agreement fifteen (15) days after the transfer (and, for transfers pursuant to clause (i), identifying the DOD contract for which the Materials are required), and

(B) the name, address, telephone number and e-mail address of an employee of the transferee authorized to communicate with MVR in connection with this License and any related maintenance agreement.

In no case shall any of the Licensed Materials or any related dongle be knowingly or intentionally licensed, transferred or assigned to terrorist sponsored organizations or to organizations which primarily reside within terrorist countries as defined by the United States of America Department of State.

Any transfer made pursuant to this Section must include all of the Licensed Materials and any related dongle and Authentication Files. You shall be solely responsible for any transfer being in compliance with United States export laws and regulations. Upon a transfer in compliance with this Section, the transferee shall thereafter be solely responsible for compliance with the terms of this license agreement (except for any breach or violation which predates the transfer, for which you shall remain responsible) and you will have no further obligation to indemnify MVR hereunder except with respect to your use of the Licensed Materials prior to the transfer. If you are acting as a systems integrator for an end user, you may only use the Licensed Materials to develop, install and support the systems for the end user and not for any other purpose.

Section 7.02 **Transfer to Another Computer or Computer Operating System.** If you wish to transfer the Licensed Materials from one of your computers to another or install a new operating system on your existing computer, the process of re-installing the Licensed Materials will depend upon your method of authentication. If you have a hardware dongle, you may install that dongle in the new computer (or on the existing computer with its new operating system) and install (or re-install) the Licensed Materials on it. If you authenticated by means of Authentication Files, you may (i) transfer the hard drive containing the Licensed Materials from your old computer to your new one, or (ii) reinstall the Software on a new hard drive by requesting permission to effectuate such a transfer in an e-mail to MVR, which may impose a fee for permitting such a transfer. If MVR permits such a transfer, it will instruct you as to how to generate a License ID or .C2V file that will de- install the Licensed Materials from the original computer. You must then send a License ID or .C2V cancellation receipt that will be generated as part of the de-installation process to MVR by e-mail, and MVR shall (upon your payment of any fee required as part of the transfer process) generate a new .A2C or .V2C Authentication File for your use in installing the Licensed Materials on the replacement computer or on the existing computer with the new operating system. **If you do not have a backup copy of your Authentication File and are unable to generate a new License ID or .C2V file (which may happen if, for example, your original computer has become lost, stolen or inoperable) then you may need a replacement Authentication File. See Article 4 for terms applicable for obtaining one.**

Section 7.03 **Transfer by MVR.** MVR may not assign its rights and delegate its duties hereunder without your prior consent, which you may not unreasonably withhold, condition or delay, except that MVR may freely assign its rights and delegate its duties hereunder to a purchase of substantially all of its assets or to a merger partner in a merger in which MVR is not the surviving entity. After such an event, MVR shall have no further obligation to you hereunder except to provide you, or to cause its successor to provide you, with notice of the transaction within 30 days of its occurrence.

Article 8 SUPPLEMENTAL LICENSE TERMS

Section 8.01 **Additional Materials.** In certain cases MVR may from time to time provide Additional Materials at no extra charge to customers with whom MVR has an active maintenance relationship. The license of the Additional Materials granted herein is limited to integration with systems that use the Software and is revocable by MVR without cause in its sole and absolute discretion. Upon request by MVR, you must, within five (5) days of receiving such request, return to MVR all of your physical copies of the Additional Materials, destroy all electronic copies of the Additional Materials in your possession or control, and take such additional actions as MVR may reasonably request to ensure that no copies of the Additional Materials remain in your possession and control. MVR makes no

representation or warranty regarding Additional Materials. You are responsible for compliance with any export laws and regulations applicable to any export or deemed export of them.

Section 8.02 **Third Party Materials.** MVR may include among the Licensed Materials software, libraries or databases provided by third parties ("**Third Party Materials**"). Although MVR makes these Third Party Materials available for your convenience, in certain cases you will not be able to use or access specific Third Party Materials with, or as part of, the Software until you have first accepted specific terms and conditions provided by the owner of such Third Party Materials (e.g., by executing a clickwrap or license agreement). Your use of any Third Party Materials provided by MVR will be subject to both the terms of this Agreement and any terms and conditions provided by the owner of such Third Party Materials.

Section 8.03 **U.S. Government Restricted And Limited Rights.** The Materials have been developed entirely at private expense and have been sold and offered for sale to non-governmental customers. The Software is "commercial computer software" as defined in DFARS 252.227-7014 (Feb. 2012) and in FAR 2.101(a), and "restricted computer software" as defined in FAR 27-401 (Oct. 2014) (or any equivalent agency regulation or contract clause). The Materials comprising computer software are provided with the rights set forth in FAR 52.227-19 (November 2007). The Materials comprising technical data are pre-existing technical data developed entirely at private expense and, are provided with the rights described in DFARS 252.227-7015(b) (Feb. 2014). The foregoing grants of Restricted and Limited Rights are only for the benefit of the United States government and its contractors and, in their hands, override any inconsistent restrictions set forth elsewhere in this License Agreement. The Materials may only be sold or transferred to an agency or instrumentality of the United States Government under prime contracts that effectively incorporate restrictions on government use, reproduction, or disclosure no less protective of MVR than the foregoing and any other attempted sale is null and void. Use, reproduction, or disclosure of the Materials by the government or its agents or contractors is subject to the restrictions set forth herein and/or therein, as applicable. Contractor and manufacturer are MVRsimulation Inc., 57 Union Avenue, Sudbury, MA 01776. Use of the Materials by the United States government constitutes acknowledgment of MVR's proprietary rights and of the limited data rights granted in them.

Article 9 TERMINATION

Upon any material violation of any of the provisions of this Agreement, your right to use the Licensed Materials shall automatically terminate without reimbursement and you shall be obligated, within thirty (30) days of receiving a notice of termination of this license from MVR, to return to MVR all of your copies of the Licensed Materials and any hardware keys provided to you in connection therewith, destroy all electronic copies of the Licensed Materials and Authentication Files in your possession or control, and take such additional actions as MVR may reasonably request to ensure that no copies of the Licensed Materials or Authentication Files remain in your possession and control. However, the foregoing shall not apply if the matter constitutes a dispute governed by the Contract Disputes Act of 1978, in which case MVR may pursue its rights in the manner prescribed in that Act and the regulations promulgated thereunder.

Article 10 GENERAL

Section 10.01 **Complete Agreement.** This Agreement and the Purchase Order constitute the entire agreement between you and MVR and supersedes all representations, understandings and other agreements between the parties with respect to the subject matter described herein or therein. In the event of an express inconsistency between this Agreement and the Purchase Order, the inconsistency shall be resolved by giving precedence to the inconsistent terms as follows:

(a) first, to any negotiated rider or addendum to a manually signed version of this Agreement (or any proper termination thereof), regardless of whether it is signed before or after the electronic acceptance of this Agreement (with such documents taking precedence with respect to each other in reverse chronological order of their effective dates);

(b) second, to terms specifically added to the Purchase Order as a result of negotiations between the parties;

(c) third, to the terms of this Agreement; and

(d) fourth to preprinted or standard terms of the Purchase Order that were not modified or included as a result of negotiations between the parties.

To establish that Purchase Order terms were negotiated, a party must produce e-mail or other written correspondence pre-dating the execution of the Purchase Order constituting or acknowledging such negotiations. If this agreement is presented in connection with your installation of an Update of VRSG, Scenario Editor or Terrain Tools, it shall supersede any prior electronic version of the license agreement that You accepted upon an earlier installation of this copy of VRSG, Scenario Editor or Terrain Tools or an Update to it but shall remain subject to the documents identified in clauses (a) and (b) above.

Section 10.02 **Amendment and Waiver.** Failure of a party to enforce any provision of this Agreement does not constitute and should not be construed as a waiver of such provision or the right to enforce such provision. This Agreement may be amended only by a writing executed by both parties or by your electronic acceptance of a more recent version of this license agreement provided to you by MVR.

Section 10.03 **Trademarks.** Nothing contained herein shall give you the right to use any of MVR's trademarks or trade names and you agree not to remove or alter any trademark, trade name, copyright or other proprietary notices, legends, symbols or labels appearing on or in any copies of the Materials.

Section 10.04 **Governing Law; Venue.** This Agreement is governed by the laws of the United States of America and the Commonwealth of Massachusetts, without giving effect to conflict of laws provisions thereof. Any action or proceeding brought by either party against the other arising out of or related to this Agreement shall be brought only (i) in a Massachusetts state court or federal district court for the District of Massachusetts, or, (ii) in the case of a proceeding brought by or against the United States government, the Court of Federal Claims (CoFC) in accordance with the Contract Dispute Act (41 U.S.C. § 7101-7109) or any successor thereto, and each of MVR and you hereby consent to the personal jurisdiction of such courts. The application of the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded. If any provision of this Agreement is held to be unenforceable, such provision shall be reformed only to the extent necessary to make it enforceable.

Section 10.05 **Customer Suggestions.** MVR considers developing product features requested by customers at no additional cost. MVR retains all rights to these features and may incorporate them in its commercial off-the-shelf products. For further information about MVR's practices in this regard, go to www.mvrsimulation.com/howtobuy/customerfeatures.html.

Section 10.06 **No Corrupt Practices.** You warrant that, in the course of obtaining this license of the Materials, or of selling any products (the "Purchaser Products") into which the Materials are to be integrated, (a) neither you nor your employees or agents have made, offered or promised to make or offer, any payment or any proffer of anything of value, including bribes, either directly or indirectly to any public official, regulatory authority or anyone else for the purpose of influencing, inducing or rewarding any act, omission or decision involving sales of the Materials or the Purchaser Products in order to gain an improper advantage, nor have you authorized or encouraged any other party to do so, and (b) you shall comply, and shall cause your employees and agents to comply, with all applicable anti-corruption and anti-bribery laws and regulations in the course of obtaining purchase orders, requisitions or other authorizations to purchase the Materials and the Purchaser Products. You shall notify MVR immediately upon becoming aware of any breach of your obligations under this Section.

To initiate a support ticket, please contact MVR at support@mvrsimulation.com.

MVRsimulation and the MVRsimulation logo and VRSG (Virtual Reality Scene Generator) are registered trademarks. "Globaldesic" and the phrase "geospecific simulation with game quality graphics" are trademarks of MVRsimulation Inc.

MVRsimulation's round-earth VRSG terrain architecture ("Globaldesic") is protected by U.S. Patent 7,425,952.

All other brands and names are property of their respective owners.

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