

VGSTUDIO

System Requirements

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VGSTUDIO is a software package for the analysis and visualization of voxel data. It is used in a variety of application areas, such as industrial CT, medical research, life sciences, animation, and many others.

TABLE 1-1: PRODUCT DETAILS

FEATURE	DESCRIPTION
Product name	VGSTUDIO
Release	3.4
Optional modules ^a	<ul style="list-style-type: none">• CT Reconstruction (Cone Beam, Fan Beam, Parallel Beam)• IAR^{b,c} for CT Reconstruction• Special Algorithms (Helix, ART) for CT Reconstruction• CT Reconstruction (Planar)
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^a Available at surcharge. May not be part of your installation. Contact Volume Graphics for details.

^b Technology licensed from Fraunhofer EZRT 

^c Available for Windows operating systems only.

OPERATING SYSTEM

The software has been tested and approved for the following operating systems:

TABLE 2-1: SUPPORTED OPERATING SYSTEMS

PLATFORM	OPERATING SYSTEM
Windows ^a :	Windows 7 Professional SP1 64 bit
	Windows 8.1 Professional 64 bit
	Windows 10 Professional 64 bit

^a The support for Windows 7 and Windows 8.1 will be discontinued.

PROCESSOR

- Minimum:
Intel® Core™2 Penryn, Intel® Core™ i, or AMD Bulldozer.
- Recommended:
Latest Intel or AMD multi-core processors, e.g., Intel® Core™ i7 or Xeon® E5 processors with 2.4 GHz or higher.

RAM

- Minimum:
VGSTUDIO requires a minimum of 4 GB memory. However, the actual main memory needed for creating or loading a complete project will usually be significantly higher, since it depends on the size of the data set:
 - For visualization, the main memory should be twice the size of the data set. If a project contains more than one data set, double the sum of the data set sizes.
 - Performing CT reconstruction and other operations requires additional memory.
 - Please make use of our evaluation version of the software to test with your typical data sets. Contact our support team during the evaluation phase in case any questions arise.
- Recommended for professional use:
 - Data set with 1024 slice images. Slice image with 1024 x 1024 pixels. $1024^3 = 2$ GB of data
=> Minimum 4 GB memory
 - Data set with 2048 slice images. Slice image with 2048 x 2048 pixels. $2048^3 = 16$ GB of data
=> Minimum 32 GB memory

GRAPHICS CARD

- Minimum:

Dedicated NVIDIA or AMD graphics cards with at least 1 GB VRAM and OpenGL 3.3 support.



Importing FARO point clouds requires graphics cards that support at least OpenGL 4.1.

- Recommended:
 - NVIDIA® Quadro® K2000 or higher
 - NVIDIA® GeForce® GTX 770 or higher
 - AMD FirePro™ 3D V5900
 - AMD FirePro™ 3D V7900
 - AMD Radeon™ HD 7950
 - AMD Radeon™ HD 7970
 - AMD Radeon™ PRO WX 7100
 - AMD Radeon™ PRO WX 9100
- Drivers tested by Volume Graphics:
 - NVIDIA® Quadro® 2000: driver version 335.23 (for Windows 7)
 - NVIDIA® Quadro® K2100M: driver version 332.50 (for Windows 7)
 - NVIDIA® Quadro® K600: driver version 331.82 (for Windows 8.1)
 - NVIDIA® Quadro® K620: driver version 340.66 (for Windows 7)
 - NVIDIA® GeForce® GTX 680: driver version 340.52 (for Windows 7)
 - NVIDIA® GeForce® GTX 970: driver version 344.75 (for Windows 7)
 - NVIDIA® GeForce® GTX 980: driver version 347.52 (for Windows 8.1)
 - NVIDIA® GeForce® RTX 2080 Ti: driver version 419.35 (for Windows 7)
 - AMD FirePro™ D700: driver version 13.25 (for Windows 8.1)
 - AMD Radeon™ HD 7970: driver version 14.50 (for Windows 7)
 - AMD Radeon™ R9 290X: driver version 13.25 (for Windows 7)
 - AMD Radeon™ R9 M290X: driver version 14.20 (for Windows 7)

Onboard graphics chips are generally not recommended and should be thoroughly evaluated if no dedicated graphics card is available.

If your computer has more than one graphics card, make sure to switch off the SLI mode.

DISPLAY

The minimum resolution is 1400 x 1050 at 100% scale; the recommended resolution is 1920 x 1080 at 100% scale.

The actual display resolution results from the display scale multiplied by the minimum resolution. This means that for a display scale of 200%, you should use a display resolution of at least 2800 x 2100.

VGSTUDIO supports 4K monitors.

SWAP SPACE

The available swap space should have the same order of magnitude as the RAM. If available, we recommend that you place the swap partition on an SSD.

DISK SPACE

Make sure to have sufficient free disk space in the directory for temporary files (see **Preferences > General > Expert** in the **Edit** (for Windows/Linux) or **VGSTUDIO** menu (for Mac)). If there is less than 1 GB available in this directory, a warning message will be issued. This message is also issued if this directory has been deleted.

USER RIGHTS

Make sure every user either has user or administrator rights. The license might not work on guest accounts.

RECOMMENDED SETUP

Optimal for industrial usage is a PC with

- two current Intel® Xeon® processors and 32 GB RAM,
- 64-bit hardware,
- 64-bit operating system, and
- 64-bit version of VGSTUDIO.



Virtual machines are not supported. VGSTUDIO should be executed on your local machine.

THIRD PARTY SOFTWARE

The optional reporting functions using an Excel Add-In support the following Microsoft® Excel versions:

- Microsoft® Excel 15 (part of Microsoft® Office 2013), 32 bit
- Microsoft® Excel 16 (part of Microsoft® Office 2016), 32 bit
- Microsoft® Excel 365 (part of Microsoft® Office 365 Business), 32 bit



64-bit versions of Microsoft® Excel are not supported.



Using the Excel Add-In for reporting is currently only supported for Windows.

The optional CT Reconstruction module places some specific requirements on the graphics card and RAM. For other system hardware, please refer to the general system requirements listed above. Make sure to turn off the Aero theme when performing a CT reconstruction under Windows 7/8.1 to achieve optimal system performance.

RAM

- Minimum:
 - 2 GB to run the reconstruction for very small data sets.
- Recommended:
 - At least 4 GB.

Calculate the optimal size of memory based on the size of the volume ($x * y * z$), the size of one projection ($x * y$), and the number of projections:

size of memory = (volume size * 4) + (projection size * number of projections * 4)

The result is the optimal size of memory in bytes. To convert to MB, divide by 1,000,000.

Example:

volume: $1024 * 1024 * 1024$

size of one projection: $1024 * 1024$

number of projections: 720

size of memory = $(1024 * 1024 * 1024 * 4) + (1024 * 1024 * 720 * 4) = 7,314,866,176$

This equates to 7,315 MB or 7.315 GB.

GRAPHICS CARD

- Minimum:
 - NVIDIA® GeForce® GTX 650 Ti or higher
 - NVIDIA® Quadro® K620 or higher
 - AMD FirePro™ V5900 or higher
 - AMD R7 360 or higher
- Recommended:
 - NVIDIA® Quadro® K5000M
 - NVIDIA® GeForce® GTX 780
 - NVIDIA® GeForce® GTX 980 Ti
 - NVIDIA® GeForce® GTX Titan X
 - AMD Radeon™ R9 390 X
 - AMD Radeon™ PRO WX 9100
- Drivers tested by Volume Graphics:
 - NVIDIA® Quadro® 6000: driver version 275.33 (for Windows 7)
 - NVIDIA® GeForce® GTX 780: driver version 355.82 (for Windows 7)
 - NVIDIA® GeForce® GTX Titan: driver version 313.93 (for Windows 7)
 - NVIDIA® GeForce® GTX 980: driver version 355.98 (for Windows 7)
 - NVIDIA® GeForce® GTX 1080: up to driver version 368.81 (for Windows 7)

- NVIDIA® GeForce® RTX 2080 Ti: driver version 419.35 (for Windows 7)
- AMD FirePro™ W9000: driver version 13.25 (for Windows 7)
- AMD FirePro™ W9100 32 GB: driver version 16.12.1 (for Windows 7)
- AMD FirePro™ W9100 32 GB: driver version 17.Q4/17.10.1730.1012-170804a-317 (for Windows 7)
- AMD Radeon™ HD 7970: driver version 14.50 (for Windows 7)
- AMD Radeon™ PRO WX 7100: driver version 17.Q4/17.10.1730.1012-170804a-317 (for Windows 7)
- AMD Radeon™ PRO WX 9100: driver version 19.Q4/19.30.28-191002a-347677C-RadeonProEnterprise2019 (for Windows 10)

It is not recommended that you use different types of graphics cards in a system.

DISPLAY

If the performance of a CT reconstruction performed on the graphics card in a dual monitor setup seems to be slow, remove the second monitor and reboot the computer.

GENERAL

- When the application is started, system resources, such as main memory and number of processors, will be checked since these may be insufficient, especially if several applications are running at the same time. If your system resources are not sufficient, a warning message will be displayed. Under certain conditions, starting the application may be prevented.
- You need a 3-button mouse with a scroll wheel to use the software. 3D mouse functionality is supported for the 3D window for 3DConnexion mouse devices.
- Problems may arise when you run more than one instance of the application. Typical problems involve the user interface, such as incomplete or misplaced interface elements or errors in the display of images. User settings like presets or workspace layout may inadvertently be overwritten. Processor capacity and main memory will be shared between instances of the application and may prove insufficient. This may result in dramatically low system performance or even application crashes, especially if parts of the information need to be swapped to disk due to high memory consumption.

GRAPHICS CARD

- Make sure to have the latest driver version for your graphics card installed.
- Graphics card drivers for laptops available from the laptop manufacturer may be out of date. Check the graphics card manufacturer's website for the latest graphics card drivers.
- Onboard graphics chips are not recommended.
- Volume Graphics uses platform-independent, industry-standard APIs like OpenGL or OpenCL for GPU programming. Vendor-specific APIs like CUDA or DirectX are currently not supported.

RAM

- For the calculation of the required RAM, only the size of the data set when it was loaded into the RAM is relevant. If the data is saved in compressed files, e.g., the JPEG 2000 format (.jp2), the size of the data set on the hard disk may be significantly smaller than the size of the data set when it was loaded into the RAM.
- Do not deactivate the swap space. If more RAM is needed and there is no swap space, this may cause the system to crash.

REMOTE ACCESS

Remote access to VGSTUDIO is not supported. You should run the software locally on your own computer. If you use remote access to run VGSTUDIO, you may encounter problems, such as a corrupt display of the user interface, low performance, application crashes, and more.

The table below lists some common problems and their solutions.

TABLE 5-1: TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTIONS
Rendering problems occur, e.g., the 3D window is not (correctly) displayed, saved images are faulty.	<ul style="list-style-type: none"> An outdated graphics card driver is installed. 	Download and install the latest driver for your graphics card.
	<ul style="list-style-type: none"> An onboard graphics card is installed. 	An onboard graphics card might be insufficient to run your VG product.
	<ul style="list-style-type: none"> The installed graphics card is not recognized correctly. 	In Preferences > General > Expert > Hardware renderer in the Edit (for Windows/Linux) or VGSTUDIO menu (for Mac), check the Memory override option and manually set the correct memory of your graphics card.
Only part of the 3D window is updated when an object is moved.	No Aero theme is selected in Windows.	In the Personalization window of the Windows Control Panel , switch to an Aero theme.
The performance is low.	There is not enough RAM available due to other applications running at the same time.	Close all other applications when running VGSTUDIO.
The performance is extremely low with large data sets.	The size of the data sets exceeds the installed RAM, data is swapped on hard disk.	<ul style="list-style-type: none"> If possible, install more RAM. Reduce the size of the data set (for example, by using suitable import settings).
The application crashes when working with large data sets.	The size of the data sets exceeds the installed RAM, the swap space is not activated or too small.	<ul style="list-style-type: none"> Activate the swap space. Enlarge the size of the swap space to about the order of magnitude of the RAM. Install more RAM. Reduce the size of the data set (for example, by using suitable import settings).
The application crashes when you save large image stacks (NVIDIA graphics card).	There is an incorrect implementation of OpenGL in the graphics card driver.	Download and install a more recent driver for your graphics card.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTIONS
On a notebook with two graphics cards: The application crashes before or while showing the splash screen.	Automatic switching between the graphics cards does not work properly.	Deactivate the onboard graphics card in the BIOS in order to use the dedicated graphics card of the notebook.
An installed codec is not visible in the codec selection when saving a .avi file.	<ul style="list-style-type: none"> The codec is not compatible with the selected settings of the avi. 	<ul style="list-style-type: none"> Change the settings for the .avi file, e.g., frame size, frame rate (fps). In many codecs, the width and height of the image must be a multiple of 2. Select a different codec.
	<ul style="list-style-type: none"> A 32-bit version instead of a 64-bit version of the codec is installed. 	<ul style="list-style-type: none"> Install the 64-bit version of this codec. Select a different codec.
The application crashes when you try to save an animation to a .avi file using a third-party codec package.	Most codecs are continuously being developed and are not always free of bugs.	<ul style="list-style-type: none"> Select a different codec of this codec package to save the animation to a .avi file. Use a different codec package. Render the animation as an uncompressed .avi file or an image stack and convert it to a compressed .avi file using a third-party software (e.g., VirtualDub).
The dongle manager does not resume working after the operating system returns from sleep mode.	Known problem of the dongle manager.	Remove the dongle and reboot the computer.
A .vgl file is not opened by VGSTUDIO when a .vgl file is double-clicked in the Windows Explorer.	.vgl files are not linked to the executable of VGSTUDIO.	Re-install the software.
VGSTUDIO does not start for a user with administrator rights.	The message "Do you really want to run the program as administrator or elevated process?" was answered with No and the Never show this dialog again checkbox was checked.	Delete the <i>settings_vgstudio3.4.ini</i> file in the <i>C:\Users\ <user name>\AppData\Roaming\ Volume Graphics\</i> directory.

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TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTIONS
Performance drops considerably or the application freezes during CT reconstruction of large data sets on a system equipped with an NVIDIA GeForce GTX 1080 graphics card.	The installed driver for the NVIDIA GeForce GTX 1080 graphics card is newer than 368.81.	Install an older graphics card driver.