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# What's new in Vicon Nexus 2.8

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## About Vicon Nexus 2.8

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Vicon Nexus 2.8 is a point release that provides features and enhancements in addition to those that were included in earlier releases of Nexus 2.

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## Nexus 2.8 new features and functions

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Nexus 2.8 provides the following new features and enhancements:

- [Visualize Plug-in Gait segment centers of mass on page 5](#)
- [Conventional Gait Model 2 on page 6](#)
- [Python scripts for easier modeling on page 7](#)
- [Improvements to working with IMUs on page 8](#)
- [Ability to calculate step width and limp index on page 12](#)
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- [Automatic notification of firmware updates on page 15](#)
- [Updates to Vicon software on page 18](#)

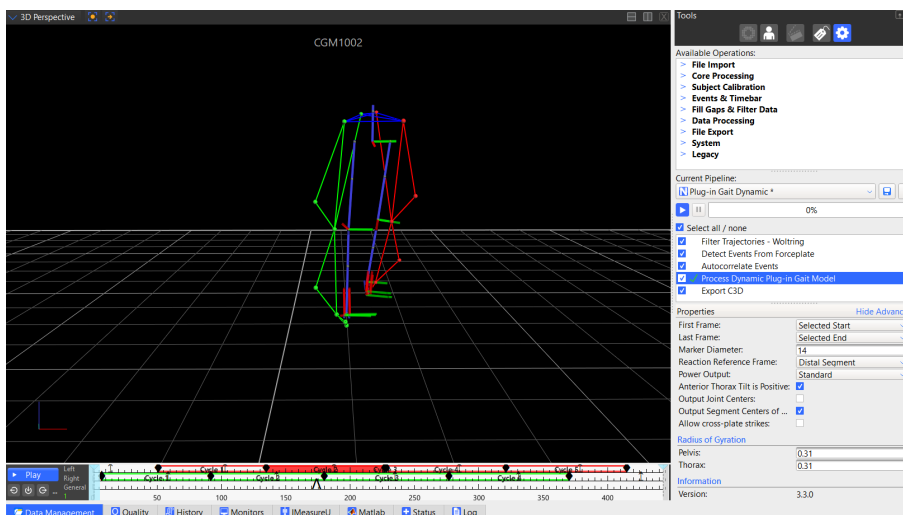
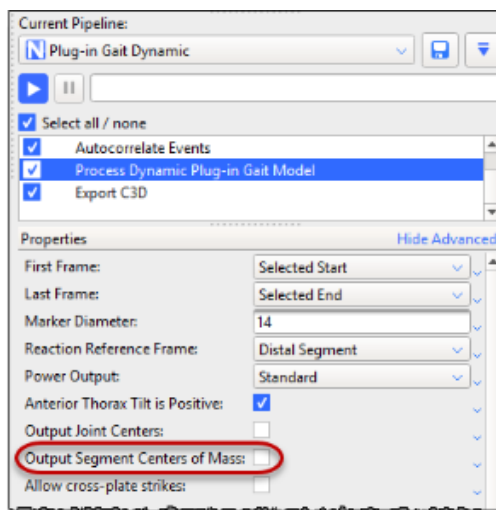
For a description of the other features and enhancements that have been released since Nexus 2.0, see the PDFs *What's New in Nexus 2.7*, *What's New in Vicon Nexus 2.6*, *What's New in Vicon Nexus 2.5* and *What's New in Nexus 2.4*.

To watch Nexus videos and tutorials, visit the [Nexus 2 playlist on YouTube](#).

## Visualize Plug-in Gait segment centers of mass

Location: Tools pane > Pipelines tab > Data Processing pipeline operations > Process Dynamic Plug-in Gait Model operation

A new option in the Properties for the Process Dynamic Plug-in Gait Model operation enables you to visualize the center of mass of each segment that is calculated by Plug-in Gait.



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## Conventional Gait Model 2

You can now use the Conventional Gait Model 2 (CGM2) from within Nexus so that you can execute the various CGM2 models on your data. It is available from the [Vicon website](#) as a separate download that is in addition to the Nexus 2.8 installer.

The Conventional Gait Model 2 (CGM2) has been developed by Dr Fabien Leboeuf (University of Salford), and partly funded by Vicon. It is an open-sourced biomechanical model developed in Python 2. By focusing on areas where it was known improvements could be made, the design of the CGM2 model enhances the Conventional Gait Model whilst maintaining its strengths.

pyCGM2 is compatible with versions of Nexus from 2.7 and later.

The installer provides CGM2 VSTs and CGM2 biomechanical models.

For more information, see the following links:

- For more details about the model: <https://pycgm2.github.io/>
- To set up the Python environment: <https://pycgm2.github.io/pages/pythonInstallation>
- To download the CGM2 installer and its documentation: <https://www.vicon.com/downloads/models-and-scripts/cgm2>

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## Python scripts for easier modeling

The following additional Python scripts are provided to make it simpler to develop Python models with Nexus.

- NexusAngles.py
- NexusObject.py
- NexusSegment.py
- NexusTrajectory.py

To use the scripts, add the following commands to the Python path:

- C:\Program Files (x86)\Vicon\Nexus2.8\SDK\Python

and, depending on your system:

- C:\Program Files (x86)\Vicon\Nexus2.8\SDK\Win64

or

- C:\Program Files (x86)\Vicon\Nexus2.8\SDK\Win32

## Improvements to working with IMUs

The following changes further integrate Vicon IMUs into the Nexus workflow.

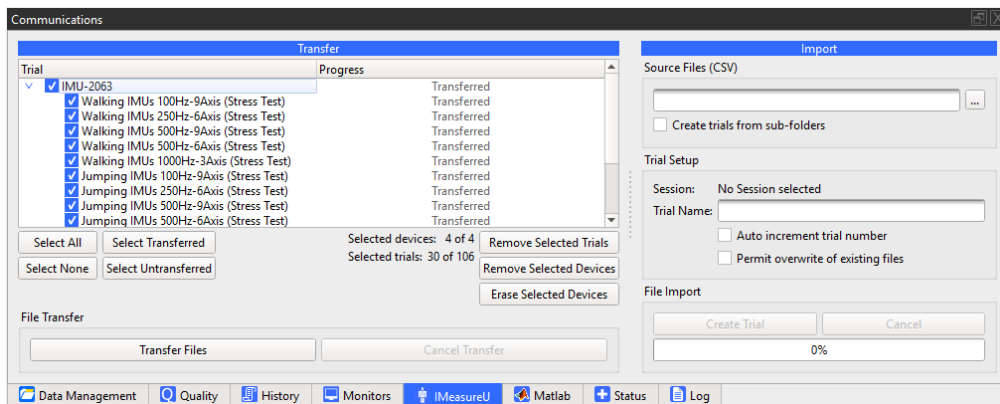
### Important

Vicon IMUs are supported for use with Nexus for research purposes only. For full sensor safety and regulatory details, see the [IMeasureU Sensor Safety and Regulatory Information](#), available from the Vicon website.

## New IMeasureU tab

Location: Communications pane

To make it easier to work with data from Vicon IMUs, the controls for working with IMU data can now be found on the new *IMeasureU* tab in the Communications pane.





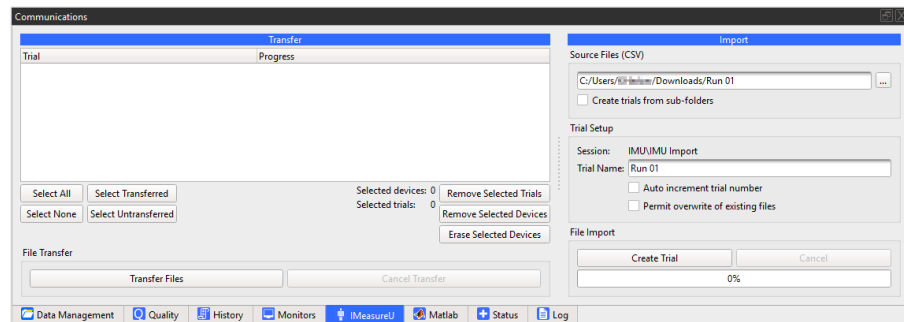
## Work with IMU Research input

Location: Communications pane > IMeasureU tab > Import section

You can capture data using IMeasureU Research app and then import the downloaded CSV files from Lightning into Nexus.

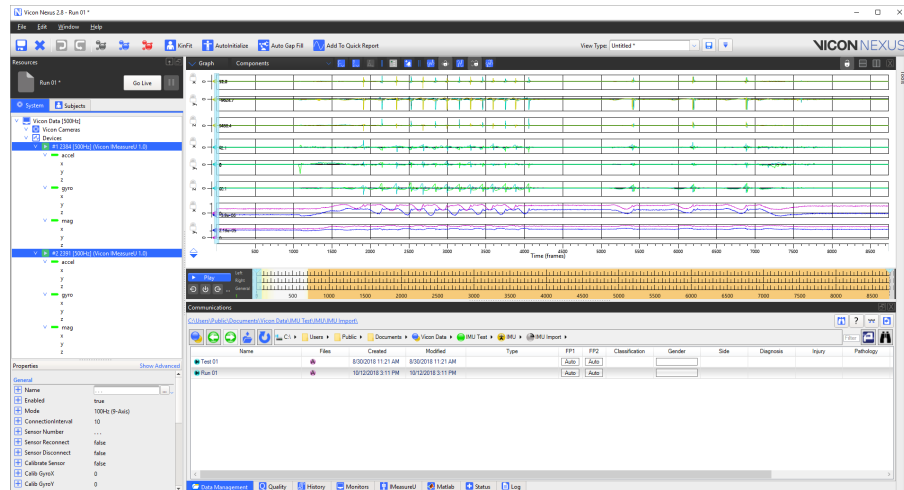
To work with IMU Research input:

1. On the **Data Management** tab, make sure you have selected the session into which you want to import your IMU Research files.
2. On the **IMeasureU** tab, in the **Import** section enter or browse to the relevant folder to import the CSV file(s) that you downloaded from Lightning.  
If you have downloaded multiple files to sub-folders, select **Create trials from sub-folders**.
3. In the **Trial Name** field, enter a name for the trial that will be imported. If required, select the options to automatically increment the trial numbers and/or overwrite existing trials with the same name.



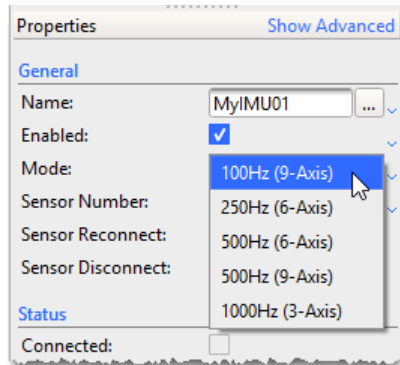
4. Click Create Trial.

Files with the extension *.x1d* are created in the location you selected in Step 1. You can view IMU Research data in the Graph pane in Nexus.



## Additional IMU collection modes

Location: System Resources pane > System tree > Devices node > Add Digital Device > IMeasureU sensor node > Properties pane > General section > Mode dropdown



When setting up IMUs to capture with Nexus (see Configure IMUs), you can now select from two additional collection modes (frequencies) at which the IMUs are to run:

- Capture IMU acceleration data (3-axis) at 1000 Hz

To enable the IMUs to run at 1000 Hz, your firmware must be at version 1.3 or later. If you are using earlier firmware, when you select 1000 Hz, you are prompted to upgrade to the required version.

Note that IMU firmware is upgraded via IMU Research only.
- Capture IMU acceleration data (9-axis) at 500 Hz.

Note that as the IMU magnetometer rate has a maximum frequency of 100 Hz, when the Mode is set to 500 Hz (9-axis), the firmware repeats the last reading to make up the difference between the output data rate of the magnetometer compared with that of the accelerometer/gyroscope.

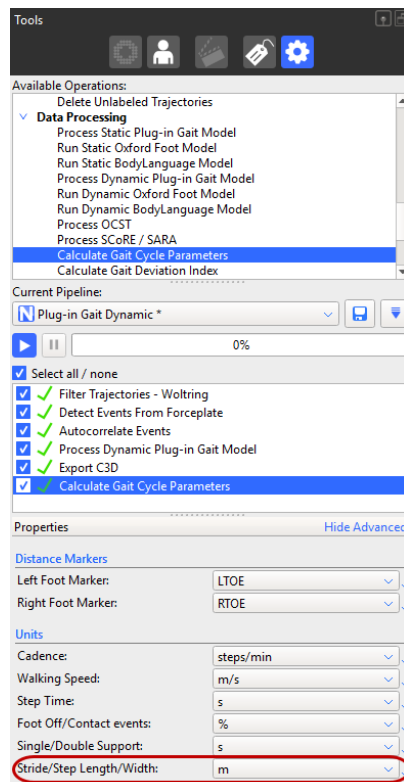
## Ability to calculate step width and limp index

Location: Tools pane > Pipeline tab > Data Processing operations > Calculate Gait Cycle Parameters operation

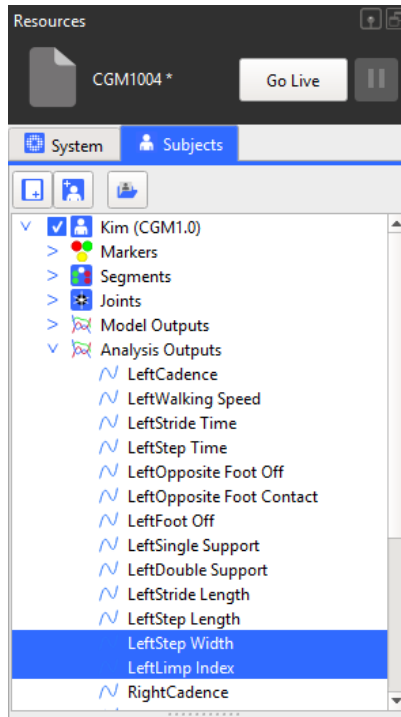
The Calculate Gait Cycle Parameters pipeline operation now includes the calculation of step width and limp index.

To calculate step width and limp index:

1. Ensure your trial data includes both Foot Strike and Foot Off events. If it doesn't, either recapture the data or add the missing events.
2. Add the Calculate Gate Cycle Parameters operation to your current pipeline in the usual way.
3. In the Properties pane, ensure that the units for the Stride/Step Length/Width setting are as required.



- Run the Calculate Gate Cycle Parameters operation on your data. In the Subjects Resources pane, notice that both step width and limp index are included in the Analysis Outputs.



On the Log tab, notice that step width and limp index data is displayed.

Time	Category	Text
13:10:26.893	Calculate Gait Cycle Parameters	Kim: Left Opposite Foot Contact 43 %
13:10:26.893	Calculate Gait Cycle Parameters	Kim: Left Foot Off 68 %
13:10:26.893	Calculate Gait Cycle Parameters	Kim: Left Single Support 0.28 s
13:10:26.893	Calculate Gait Cycle Parameters	Kim: Left Double Support 0.27 s
13:10:26.893	Calculate Gait Cycle Parameters	Kim: Left Stride Length 1.1 m
13:10:26.893	Calculate Gait Cycle Parameters	Kim: Left Step Length 0.64 m
13:10:26.893	Calculate Gait Cycle Parameters	Kim: Left Step Width 0.14 m
13:10:26.893	Calculate Gait Cycle Parameters	Kim: Left Limp Index 1.1
13:10:26.893	Calculate Gait Cycle Parameters	Kim: Right Cadence 150 steps/min
13:10:26.893	Calculate Gait Cycle Parameters	Kim: Right Walking Speed 1.7 m/s
13:10:26.893	Calculate Gait Cycle Parameters	Kim: Right Stride Time 0.798 s

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## Close trials using the SDK

You can now use the SDK to close the current trial without saving. This functionality is available for both MATLAB and Python.

The function requires the following call:

```
vicon.CloseTrial(timeout)
```

`timeout` is in milliseconds and specifies the length of time during which the function tries to run.

Note that the command can only be used from an external application such as MATLAB or Python, and cannot be used in a script that is executed from within Nexus.

The following example uses Python:

```
import ViconNexus

vicon = ViconNexus.ViconNexus()
subject = vicon.GetSubjectNames()
vicon.CloseTrial(200)
```

Note that this call function is not listed by using `DisplayCommandList`. To display details about the call, use `vicon.DisplayCommandHelp('CloseDontSave')`.

## Automatic notification of firmware updates

You are now automatically notified when any component of your Vicon system is running out-of-date firmware, and given the opportunity to update to the latest version.

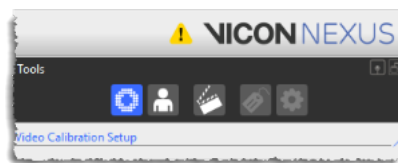
### Important

To ensure optimum performance and access to all the latest functionality, Vicon recommends that you upgrade to the latest firmware whenever it becomes available.

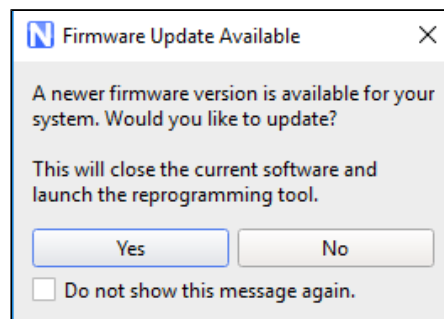
To monitor and/or upgrade system firmware:

1. When you start Nexus or connect any Vicon devices into your system, Nexus checks to see whether the firmware for all your devices is up-to-date.

If your devices aren't using the latest firmware, Nexus displays an icon in the toolbar to let you know that a more up-to-date version of the firmware is available:



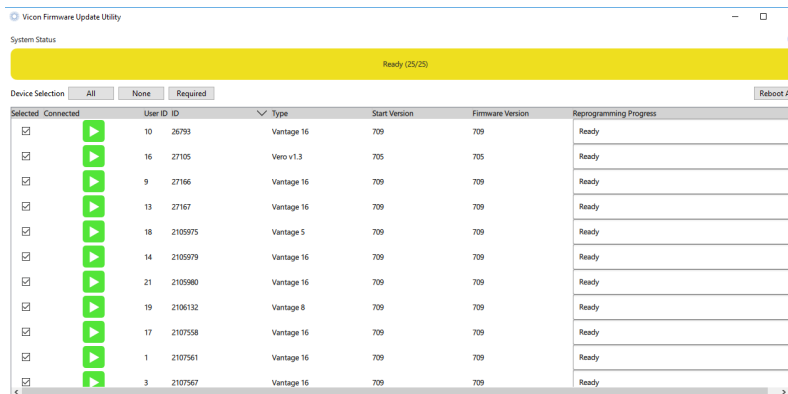
2. Click on the icon to display more information.  
Nexus displays a prompt that enables you to open the Vicon Firmware Update Utility (reprogramming tool).



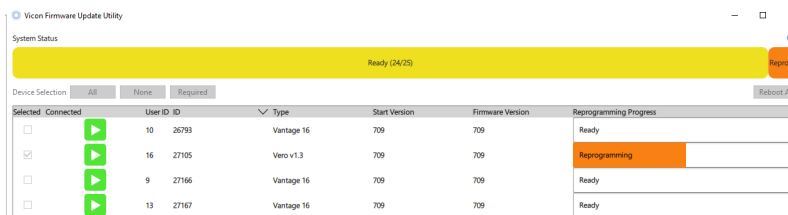
- Click Yes to open the Vicon Firmware Update Utility. Note that you can also open the Vicon Firmware Update Utility from the Start menu (select Vicon > Vicon Firmware Update Utility).

Nexus closes and the Vicon Firmware Update Utility is displayed, showing all the connected devices and their current firmware version.

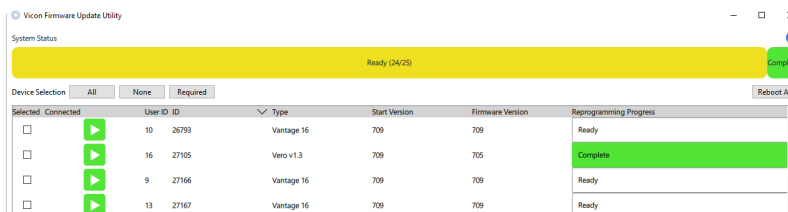
By default, all devices are selected.



- If you don't want to update any of the devices, clear the relevant check box(es). Note that if required, you can select devices to be updated that are already using the latest version.
- At the bottom of the Vicon Firmware Update Utility window, in the Choose Firmware version list, select or browse to the required firmware version.
- Click Reprogram to update the firmware for the selected device(s).



When updating is complete, the Firmware Version column displays the updated firmware version and the System Status line and the Reprogramming Status column display Complete on a green background.





**Note**

If you do not have continual internet access, Nexus is unable to notify you when a new version of the system firmware is available. In this case, install the Vicon Firmware Update Utility on an internet-connected machine to detect and download the latest version of the firmware. You can then transfer this download to the local machine and use the Vicon Firmware Update Utility to update to the latest version of the firmware.

**To downgrade to an earlier firmware version**

To downgrade to a firmware version that was previously downloaded, open the Vicon Firmware Update Utility (from the Start menu click **Vicon > Vicon Firmware Update Utility**) and select the required firmware version.

## Updates to Vicon software

- Updated Vicon Video Viewer (1.5)
- New Vicon ProEclipse (1.2)
- Patch release of Vicon ProCalc (1.2.1)

See also [Requirements for Nexus 2.8 on page 20](#).

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## Requirements and upgrading

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For information about requirements and systems supported for this version of Nexus, see:

- [Requirements for Nexus 2.8 on page 20](#)
- [Systems supported for Nexus 2 on page 22](#)
- [Upgrading Nexus on page 23](#)

### Note

The Vicon motion capture system and the Nexus software, manufactured by Vicon Motion Systems Limited, have been tested prior to shipment and meet the metrological requirements as detailed in the Medical devices directive. (See *Regulatory information* in the Nexus documentation area of the Vicon website, [docs.vicon.com/](https://docs.vicon.com/).)

## Requirements for Nexus 2.8

Note the following requirements for Nexus 2.8.

- [Operating systems for Nexus 2.8 on page 20](#)
- [Basler video cameras and Nexus 2.8 on page 20](#)
- [MATLAB and Nexus 2.8 on page 21](#)
- [ProCalc and Nexus 2.8 on page 21](#)
- [Vicon IMUs and Nexus 2.8 on page 21](#)

### Operating systems for Nexus 2.8

Nexus 2.8 is supported under the following operating systems:

- **Microsoft Windows 10, 64-bit** (this is the Vicon-recommended OS): Compatible with and fully supported. Installation, software operation and required third-party drivers tested.
- **Microsoft Windows 7**: Supported and has undergone limited testing.

Although Nexus may install and function under other Microsoft Windows operating systems, this is not officially supported or recommended by Vicon.

### Basler video cameras and Nexus 2.8

If Basler digital cameras will be connected to Nexus 2.8, ensure you have updated to the Basler Pylon5 SDK and drivers (v5.0.0), which are available from the Vicon website.

If you are using an Intel i340, i350 or i210 network card, when you install the drivers, select the option for **Filter drivers**, not **Performance drivers**.

#### Important

The Pylon5 driver supports:

- Basler GigE cameras under both Windows 10 and Windows 7.
- Basler FireWire cameras (A600 series) under Windows 7 only.

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## MATLAB and Nexus 2.8

If you are planning to use MATLAB with Nexus 2.8, ensure that, in addition to installing MATLAB, you install the [.Net Framework version 4.5](#).

## ProCalc and Nexus 2.8

To run ProCalc with Vicon Nexus 2.8, you must install ProCalc 1.2.1.

## Vicon IMUs and Nexus 2.8

To connect IMUs in Nexus 2.8, you must update them via the IMeasureU Research app to 1.3 firmware or later.

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## Systems supported for Nexus 2

Before you install Vicon Nexus 2.8, note the following limitations on supported systems:

- Nexus captures data only from Vicon systems (including Vicon Vero and Vicon Vue, Vicon Vantage, Vicon Bonita, Vicon T-Series, and MX+ and MX cameras and units).
- Nexus 2.8 does not support connection to the Reference Video System (Nexus Slave application).

## Upgrading Nexus

This section describes functionality that is dependent upon the version of Vicon Nexus that is being upgraded:

- [Upgrading from Nexus 2.7 and earlier on page 23](#)
- [Upgrading from earlier versions of Nexus 2 on page 24](#)
- [Upgrading from Nexus 1.x on page 24](#)

### Note

Although data collected in Nexus 2.8 (ie, *.c3d* files) can be viewed in earlier releases of Nexus, you cannot reprocess this data (ie, *.x2d* with *.xcp* files) in releases earlier than 2.7.

## Upgrading from Nexus 2.7 and earlier

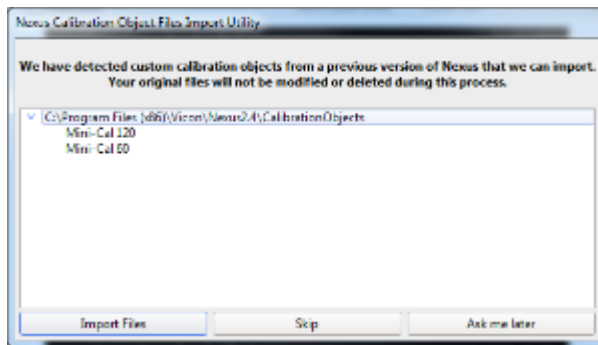
Improvements to camera calibration that were provided by Nexus 2.7 have the following effects on compatibility of data between releases:

- Data collected in earlier releases of Nexus can be reprocessed in Nexus 2.8 because calibration (*.xcp*) files that were created in earlier releases are fully compatible with Nexus 2.8. Note that if you load a calibration (*.xcp*) file that was created in an earlier release of Nexus into Nexus 2.8 and save it, Nexus maintains its compatibility with earlier releases.
- You can use earlier releases of Nexus to view data that was collected in Nexus 2.8 (that is, you can open Nexus 2.8 *.c3d* files in Nexus 2.7 and earlier).
- However, calibration (*.xcp*) files that are created in Nexus 2.8 are not backward-compatible, that is, they cannot be read by releases of Nexus earlier than 2.7, and loading will fail if attempted.

## Upgrading from earlier versions of Nexus 2

If you are upgrading from a previous version of Nexus 2, during installation a dialog box gives you the option of adding the **Auto Intelligent Gap Fill** button and/or the **Add to Quick Report** button to your Nexus toolbar. For more information on these features, see *Automatically fill gaps in trial data*, in the *Vicon Nexus User Guide* and *Quick Reports*, in the *Vicon Nexus Reference Guide*. To add the additional button(s) to your toolbar, click **Upgrade Files**.

On first launch, Nexus 2.8 scans the installation directories of earlier versions of Nexus 2 and offers to automatically transfer custom objects that it finds.



If you click **Import Files**, Nexus 2.8 copies custom calibration objects from earlier versions of Nexus (2.0 and later) to the **Public Documents** folder (eg *C:\Users\Public\Documents\Vicon\Nexus2.x\CalibrationObjects*).

### Important

When you create new custom calibration objects, ensure you save them into this folder (not to the Nexus installation folder), so that they are available to future versions of Nexus.

## Upgrading from Nexus 1.x

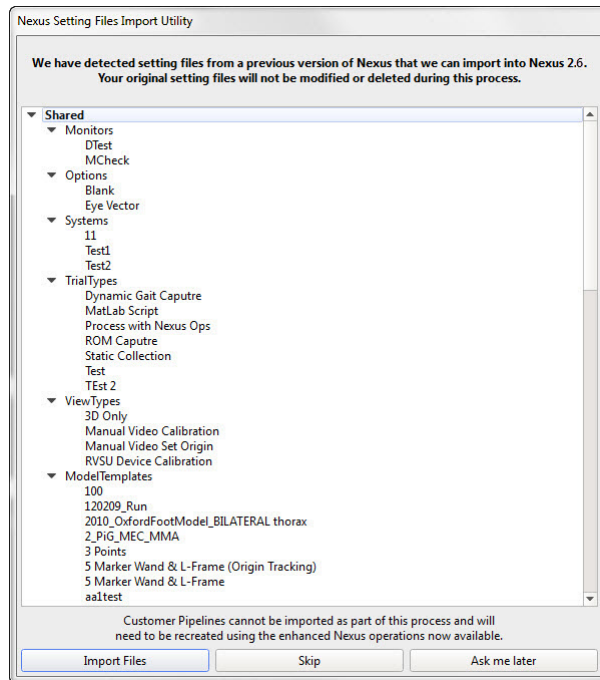
### Note

This section applies only to versions of Nexus that are earlier than 2.0.

Nexus 2.8 installs into its own folder, called *Nexus2.8*. If you already have Nexus 1.x installed, it will remain installed alongside the new Nexus installation.



On installation, Nexus 2.8 automatically scans for Nexus 1.x files, displays a list of any older files that it finds, and provides an automated system for importing these into Nexus 2.8.



This process copies all the old files and converts the copies, ensuring that original files are not moved, altered, or destroyed.

**Important**

Custom pipelines are not copied from earlier versions of Nexus, so if you want to use your old pipelines, copy them from the following Vicon product installation folder (by default in *C:\Program Files (x86)\Vicon* or *C:\Program Files\Vicon*):

`\Nexus\WorkstationPlugins`

and paste them to the following location in the Vicon production installation folder (by default in *C:\Program Files (x86)\Vicon* or *C:\Program Files\Vicon*):

`\Nexus2.#\LegacyPlugins`

They will then be available in the **Legacy** pipeline operations in Nexus 2.8.

For more information on the installation and licensing process, see *Installing and licensing Vicon Nexus*.

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## Regulatory information

For Vicon Nexus regulatory details, see Vicon Nexus regulatory information in the Nexus documentation area of the Vicon website ([docs.vicon.com](https://docs.vicon.com)).

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## Addressed issues

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The following issues are among the total that have been addressed in Vicon Nexus 2.8:

- Device data is no longer cleared when you run a post-capture pipeline.
- An error in selecting the ProCalc Operation Scheme parameters has been resolved.
- Inconsistent BodyBuilder kinetic results between raw data and C3D data has been resolved.
- Corrected sign on the normalized ground reaction force components when walking along the Y-axis.
- Generic analog data devices are now permitted to contain multiple outputs of the same type.
- NexusSegment objects for MATLAB have been improved to match the definitions used by BodyLanguage.
- Improved over-rotation correction for joint and segment outputs.
- Force plate footstrike indicators are now displayed in the order of the force plate IDs.
- Dynamic Plug-in Gait no longer creates joint angle data for missing segments.
- Exporting an *.mot* file now generates free moments.
- Improvements to AMTI digital forces plates when butterflies are enabled within Nexus.
- Improvements to hotkeys Ctrl+[ and Ctrl+] when clicking Go Live.
- Offline playback via the DSSDK has been resolved.
- Auto-correlated time bar events are now retained for long treadmill trials containing more than 255 events.
- Kin Fit Kinematics Euler\_XYZ and SegmentGlobal Euler\_XYZ angles now match.
- Improvements to third-party video transfer.
- You can now create a model output with both Velocity and Angular Velocity component types.

- 
- When exporting IMUs via ASCII export, if no unique name is provided, the device user ID is added to the column headers.
  - Export motion file (*.mot*) no longer creates multiple files for trials with multiple force plates.
  - Third-party force plates settings are retained when switching between system files.
  - The Export TRC pipeline operation now enables you to exclude the subject name in the header if required.

## Known issues

The following legacy issues are known to exist in this release.

Description	Workaround
A crash can occur if any Noraxon EMG error messages are not dismissed before shutting down Nexus.	Dismiss all Noraxon EMG error messages before exiting Nexus.
When run via the Run Python operation, the Load Trial command in the Python SDK is not able to load a trial.	Run the Python script from IDE or command line.
Some of the latest versions of the FFDSHOW video encoder fail to work properly.	Vicon recommends the use of <code>ffdshow_rev3562_20100907</code> .
Running a legacy VPI operation removes non-standard model outputs.	Use the equivalent native operations.
AMTI digital device plugins missing required dependencies.	<p>For AMTI Digital Device V1_00.vdd, download Microsoft Visual C++ 2008 SP1 Redistributable Package (x86) from <a href="https://www.microsoft.com/en-gb/download/details.aspx?id=5582">https://www.microsoft.com/en-gb/download/details.aspx?id=5582</a></p> <p>For AMTI Digital Device V1_10.vdd, download Microsoft Visual C++ 2010 Redistributable Package (x86) from <a href="https://www.microsoft.com/en-gb/download/details.aspx?id=5555">https://www.microsoft.com/en-gb/download/details.aspx?id=5555</a></p>

Description	Workaround
<p>Basler cameras do not work under Windows 10 with Pylon drivers earlier than Pylon5.</p>	<p>If Basler cameras will be connected to Nexus 2.5 or later, update to the Basler Pylon5 SDK and drivers (v5.0.0), which are available from the Vicon website.</p>
<p>Device drivers for Cometa/Wave depend on your Windows version.</p>	<p>For Windows 10 device drivers, contact Cometa. For Windows 7 device drivers, contact Vicon Support.</p>
<p>When the system frame rate is set above 80Hz, if you enable Preview mode, no preview is displayed for Vicon Vantage cameras (the Camera view is blank).</p>	<p>To use Preview mode with Vantage cameras, select a system frame rate below 80Hz.</p>
<p>When you right-click the <b>Devices</b> node on the <b>System Resources</b> pane, Noraxon is not available in the <b>Add Digital Device</b> menu.</p>	<p>When you install the Noraxon plug-in (ViconInterfaceForNoraxon - v1.0.2.1.msi), change the installation path to C:\Users\Public\Documents\Vicon\Nexus2.x\DigitalDevices\</p>
<p>Noraxon Telymyo DTS device halts camera and analog data delivery when Noraxon devices are housed/not charged.</p>	<p>Digital devices now have an <b>Enabled</b> parameter in their <b>Properties</b> pane. To prevent a given manufacturer's plugin from holding up the rest of Nexus, clear <b>Enabled</b> for ALL devices from that manufacturer.</p>
<p>Unable to run legacy Static Gait Model under Japanese Windows. Log entry reads: No parameter file found</p>	<p>The legacy Plug in Gait model does not support international character sets. Instead of using the legacy Plug-in Gait model, use the native Nexus 2 replacement gait model (found under <b>Data Processing</b> pipeline operations: <b>Process Static Plug-in Gait Model</b> and <b>Process Dynamic Plug-in Gait Model</b>).</p>

Description	Workaround
Export c3d at the end of a pipeline does not clear the trial and leaves the trial with a dirty flag (*).	The <b>Export C3D</b> operation does not write out the subjects associated with the trial. To remove the dirty flag on a trial, save the entire trial, which saves all associated files (x2d, xcp, etc), using the <b>Save Trial - C3D + VSK</b> operation.
Video capture duration can be limited directly after deletion from SSD storage.	After deleting your video files, wait a few seconds before starting your next capture. This is because some Solid State Drives require a few seconds to recover full Write speed after file deletion.
Spaces in variable names can cause BodyLanguage to fail.	When creating subject parameters for use in BodyLanguage modeling, use underscores instead of spaces.
Nexus can suffer many problems if Eclipse databases are created in locations that are Read-only. These problems range from data silently failing to save to crashes.	NEVER create Eclipse databases in locations that require administrator privileges to read or write.
Starting a capture very soon after a change to the system frame rate, or a resynchronization, can result in erratic capture behavior (failure or dropped frames).	Avoid starting captures soon after changing the hardware setup.
PAL or NTSC camcorders are included in Active Wand camera calibration if the MX system is set to run at the same standard (i.e. PAL or NTSC).	Before performing active wand camera calibration, disable the camcorders.