

COGNEX®

VisionPro 9.10

About This Release

6/12/2023
Version 1.0

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VisionPro

5481712, 5495537, 5548326, 5583954, 5602937, 5640200, 5751853, 5768443, 5825913, 5850466, 5872870, 5901241, 5943441, 5978080, 5978521, 5987172, 6005978, 6039254, 6064388, 6075881, 6137893, 6141033, 6167150, 6215915, 6240208, 6324299, 6381366, 6381375, 6411734, 6421458, 6459820, 6490375, 6516092, 6563324, 6658145, 6687402, 6690842, 6697535, 6718074, 6748110, 6771808, 6804416, 6836567, 6850646, 6856698, 6920241, 6959112, 6963338, 6973207, 6975764, 6985625, 6993177, 6993192, 7006712, 7016539, 7043081, 7058225, 7065262, 7088862, 7164796, 7190834, 7242801, 7251366, 7313761, EP0713593, JP3522280, JP3927239

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About This Release

VisionPro 9.10 contains new or changed features since the previous release of VisionPro 9.9 SR1.

Important Changes in This Release

Be aware of the following two functionality changes from previous VisionPro releases:

- Changes to .NET Namespaces and Dependencies

This release introduces .NET assemblies that use the **Cognex.Vision** namespace in addition to supporting traditional assemblies with the **Cognex.VisionPro** namespace. Application developers must be aware of the dependencies and requirements for using the new software architecture introduced in this release. See the section Development and Deployment Requirements for Vision Interop Objects for more information.

In addition, be aware that this release requires .NET Framework 4.8.

- Change in 3D-L4000 Encoder Delay Relative to DS-1000

The 3D-L4000 Displacement Sensor behaves slightly differently than the DS-1000 Displacement Sensor when you enter a nonzero value for **Start on Encoder Count**. The 3D-L4000 delays the start of acquisition from the rising trigger signal by the specified encoder count and it extends acquisition from the falling trigger signal by the same encoder count. The DS-1000 delays the start but does not automatically extend the duration of the acquisition.

This change means that with the 3D-L4000 you do not need to increase the **CPEncoderEndOffset** value to maintain the same acquisition duration when specifying a nonzero value for **Start on Encoder Count**.

New Features in This Release

This release supports the following new features:

- This release adds two ViDi edge-learning vision tools to VisionPro:
 - The ViDiEL Classify tool distinguishes between different types of objects and can identify defect types from different categories. A Classify tool tolerates natural deviation within the same class and reliably determines acceptable variation from different classes.

A Classify tool does not require specific features to classify an object, and instead trains and analyzes whole images.

See the topic *Using a ViDiEL Classify Tool* in your installed VisionPro documentation for details.
 - The ViDiEL Segment tool separates images into object pixels and background pixels based on user-specified characteristics, where object pixels represent

features you want to further analyze with other vision tools in your application.

A Segment tool can identify potential defects that are challenging to define using rule-based parameters.

See the topic *Using a ViDiEL Segment Tool* in your installed VisionPro documentation for details.

Be aware that VisionPro implements the ViDi edge-learning tool edit controls as WPF components, so you cannot use them in your Visual Studio WinForms application without the **System.Windows.Forms.Integration.ElementHost** class in assembly *WindowsFormsIntegration.dll*, from Microsoft. See the following sample applications installed with VisionPro for examples:

- %VPRO_ROOT%\samples\Programming\ViDiEL\Classify\C#
- %VPRO_ROOT%\samples\Programming\ViDiEL\Segment\C#
- This release also includes the following updates:
 - This release upgrades to GenICam Standard Version 3.1.
 - All 3D-L4000 sensors support edge-level triggering.
 - Support for 3D-L4000 sensors include support for the 3D-L4033 model.

3D Operations Requirements

Your processor must support the AVX2 instruction set for any Cognex 3D operations.

VisionPro supports the **CPUCanExecute3D** method to return **True** if the processor in your computer is capable of executing Cognex 3D operations. Otherwise, the method returns **False**. Use the **CPUCanExecute3D** method to verify any computer you use to create or deploy your application can perform 3D operations.

Supported Operating Systems

VisionPro supports development and deployment on single or multiprocessor machines using native languages (English, Japanese, German, Korean, and Simplified Chinese) on a variety of Windows 64-bit operating systems.

VisionPro supports 2D vision tools and features on Windows 10 and Windows 10 IoT Enterprise.

VisionPro supports various 3D sensors and 3D vision tools based on your 64-bit operating system:

3D Hardware/Feature	Required OS
VisionPro with the 3D-L4000, DS1000 and DS900 series sensors	Windows 10 Pro and Windows 10 IoT Enterprise, Windows 11 Pro
VisionPro with the DSMax series sensors	Windows 10 Pro, Windows 11 Pro
3D-A5000 sensor with A5000 Viewer and 3D HandEye Field Calibrator	Windows 10 Pro, Windows 11 Pro
CAD Import Tool	Windows 10 Pro, Windows 11 Pro
Cognex 3DExpress	Windows 10 Pro, Windows 11 Pro

Supported Visual Studio Development Environments

VisionPro 9.10 supports development and deploying using the following compilers that target the .NET Framework version 4.8.1:

- Microsoft Visual Studio 2015 (v. 14.0), Update 3
- Microsoft Visual Studio 2017 (v. 15.0)

Acquisition Platforms

Refer to the VisionPro Camera Support website

(<https://www.cognex.com/products/machine-vision/vision-software/visionpro-software/visionpro-camera-support>) for a complete list of cameras VisionPro supports. Be aware that not all acquisition platforms are supported on all operating systems.

- GigE Vision and related performance drivers
- 3D-A5000 3D Sensor
- DS1000 Series 3D Sensors
- 3D-L4000 Series 3D Sensors (3D-L4050, 3D-L4100, 3D-L4300, 3D-L4033)
- DS900 Series 3D Sensors
- DSMax Series 3D Sensors
- MVS-851x series (Only MVS-8511, MVS-8511e, MVS-8514, MVS-8514e)
- CFG-8700 series
- USB 3.0 cameras by means of a GenTL consumer

Support for Cognex Designer and VisionPro Deep Learning

Refer to the following for information on using Cognex Designer and VisionPro Deep Learning with VisionPro 9.10:

Designer	VisionPro 9.10 supports Designer 4.4.3 and cannot be used with earlier versions of Designer.
VisionPro Deep Learning (VPDL)	Using VisionPro 9.10 and VisionPro Deep Learning on the same system requires you install both: <ul style="list-style-type: none">• VPDL 3.1.1 (earlier versions of VPDL are not compatible)• The VisionPro 9.10 supplemental GPU installer, which you can find in the same location on MyCognex as the VisionPro 9.10 installer.

Security Key Firmware

VisionPro uses a USB security key attached to your computer to ensure the software is properly authorized for use. This release supports firmware version 4.12 for VisionPro security keys. See the topic *Security Key Updates* in your installed VisionPro documentation for how to check the firmware version on your security key.

If you are using a security key with a previous version of firmware, contact Cognex Support for assistance in upgrading to the latest version. Keep your security key firmware up to

date to take advantage of the latest features and improvements to Cognex software security.

Find Additional VisionPro Documentation Online

The [VisionPro Support website](#) contains additional VisionPro documentation not included with your VisionPro installation.

Needed Instruction Sets

The following table lists the specific instruction set your processor must support for various vision tools:

Tool	Instruction Set	Notes
PMAlign	SSE4.1	Instruction set needed for 16-bit image analysis only
PMRedLine	SSE4.1	
<ul style="list-style-type: none">Any 3D operationsViDiEL tools	AVX2	Any AVX instruction sets prior to AVX2 are not sufficient for 3D operations.

Development and Deployment Requirements for Vision Interop Objects

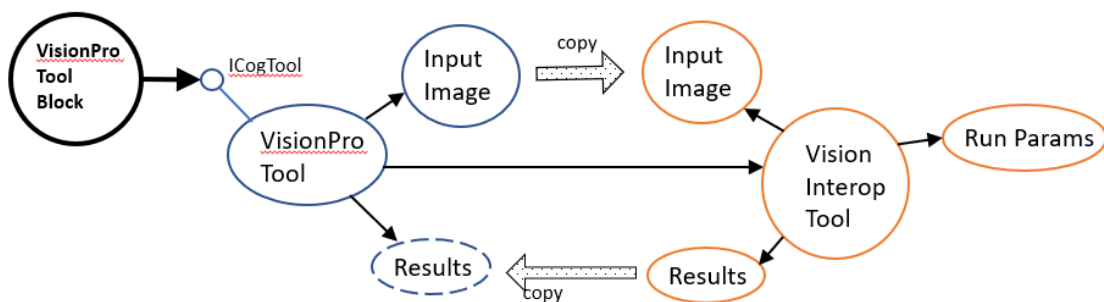
Starting with Version 9.9, VisionPro adds advanced tools based on a new Cognex software architecture. The new architecture introduces .NET assemblies that use the **Cognex.Vision** namespace. In addition, VisionPro 9.x continues to use traditional assemblies with the **Cognex.VisionPro** namespace. For ease of reference, software objects that live in the **Cognex.Vision** namespace will be referred to as *Vision Interop* objects, or simply **VI** objects.

Breaking Changes

- Starting with VisionPro 9.9, VisionPro 9.x targets .NET Framework 4.8.
- If your application uses **CogToolBlock** or **CogToolGroup**, you have new run time dependencies. This is because the data binding mechanism used to link tool terminals has been enhanced to support **VI** data types. See the following section on *Applications that Use VI Objects* for specific steps that you must take.

New Tools That Use Vision Interop

VisionPro now incorporates advanced Edge Learning tools from the **VI** architecture by wrapping them with a traditional VisionPro tool layer. For example, the new **CogClassifyTool** and **CogSegmentTool** are front-ends for the **VI** tools named **Cognex.Vision.ViDiEL.ClassifyTool** and **Cognex.Vision.ViDiEL.SegmentTool**. The **CogClassifyTool** and **CogSegmentTool** behave like traditional VisionPro tools, but are powered by the corresponding **VI** tool. They can be used in QuickBuild, inside a tool block or tool group, just like any other VisionPro tool. The VisionPro tool forwards its input image to the **VI** tool and (sometimes) returns results after the **VI** tool is run, as shown in the following simplified block diagram. The **VI** results will not be copied back to the VisionPro tool if they consist of standard .NET types (like, Integer, String, Double, etc.), but they will be copied back if they represent a **Cognex.VisionPro** type (e.g. a **CogImage8Grey**).



You will typically create a new-style VisionPro tool using QuickBuild, and configure that tool using its GUI edit control. The tool will be run as part of the tool block that contains it. You can, however, access the **VI** objects directly from C# code. This will be discussed in greater detail below.

Accessing VI Objects with C#

You can access **VI** objects programmatically using C#. You can do this through Visual Studio, or through VisionPro scripting.

References

In either environment you will need to reference the appropriate assemblies. To work with the **VI** component wrapped by a VisionPro ViDiEL tool, you will need to reference:

- **Cognex.VisionPro.ViDiEL.dll**
c:\Program Files\Cognex\VisionPro\ReferencedAssemblies
Comment: Contains **CogClassifyTool**, **CogSegmentTool**, and related classes.
- **Cognex.VisionPro.VisionInterop.dll**
c:\Program Files\Cognex\VisionPro\ReferencedAssemblies
Comment: Used by all **VI** tools. Provides utility methods for converting between VisionPro class objects and their equivalent **VI** class objects, such as a **CogImage8Grey** to **Image8Grey**.
- **Cognex.Vision.ViDiEL.Classify.Net.dll**
c:\Program Files\Cognex\VisionPro\bin\Dependencies
Comment: Required to use the **CogClassifyTool**
- **Cognex.Vision.ViDiEL.Segment.Net.dll**
c:\Program Files\Cognex\VisionPro\bin\Dependencies
Comment: Required to use the **CogSegmentTool**
- **Cognex.Vision.Core.Net.dll**
c:\Program Files\Cognex\VisionPro\bin\Dependencies
Comment: Used by all **VI** tools
- **Cognex.Rbbt.Net.dll**
c:\Program Files\Cognex\VisionPro\bin\Dependencies
Comment: Used by all **VI** tools
- **netstandard.dll**
Comment: Provided by Microsoft to facilitate interaction with *mscorlib.dll*
- **Cognex.Vision.Startup.Net.dll**
c:\Program Files\Cognex\VisionPro\bin\Dependencies
Comment: Only required if you are working with Visual Studio. Not required for scripts.

Working With Visual Studio

- The following steps are needed to resolve dll dependencies that are not in the GAC. The steps will (a) create a symbolic link to the location of the dll dependencies, and (b) update the *app.config* file to use this location. Note that the *mklink* command requires Admin rights, thus you will need to launch Visual Studio as an Administrator.

1. Add the following *postBuildEvent* step to the applications Visual Studio project file:

```
cd $(TargetDir)
if exist VisionProDependencies\ (rmdir VisionProDependencies)
mklink /D VisionProDependencies "$(VPRO_ROOT)\bin"
```

2. Add the following to the application's App.config file:

```
<configuration>
  <runtime>
    <assemblyBinding xmlns="urn:schemas-microsoft-com:asm.v1">
      <probing privatePath="VisionProDependencies"/>
    </assemblyBinding>
  </runtime>
</configuration>
```

- if you are using any **VI** tool you need to call the *Initialize* and *Shutdown* methods as described below:
 - At the start of your application call the **VI** function **Cognex.Vision.Startup.Initialize(Cognex.Vision.Startup.VProX)**.
 - At the end of your application call the **VI** function **Cognex.Vision.Startup.Shutdown()**.
 - Note that even if *Initialize* is called again after *Shutdown* has been called, tools will no longer work properly. Thus make sure *Shutdown* is only ever called at the end of the application.
- When working with **VI** tools in a .NET application you should work with those tools in the **Cognex.Vision** namespace. This will give direct access to the **VI** tool without using the **Cognex.VisionPro** wrapper class which is designed primarily for QuickBuild integration.

Working with VisionPro Scripting

- When writing script you can access **VI** properties directly. For example, you can set the "Enabled" property of the **VI** ClassifyTool using C# script code like this:

```
((CogClassifyTool)toolGroup.Tools["CogClassifyTool1"]).VisionInteropTool.Enabled = true;
```

- There is no need to call either **Cognex.Vision.Startup.Initialize(Cognex.Vision.Startup.VProX)** or **Cognex.Vision.Startup.Shutdown()** in your VisionPro script code. This is done automatically within QuickBuild.

VisionPro – VI Data Conversion

To make programmatic use of **VI** classes with VisionPro easier, a set of conversion functions is provided. In the new **Cognex.VisionPro.VisionInterop** assembly is a new class, **CogCoreConverters**. This class provides numerous static methods for converting between **VI** classes and their VisionPro counterparts. See, for example:

- Image8Grey CogCoreConverters.**MakeImage8Grey**(CogImage8Grey image) // convert from VisionPro to **VI**
- CogImage8Grey CogCoreConverters.**MakeCogImage8Grey**(Image8Grey image) // convert from **VI** to VisionPro

Using VI Edit Controls in a WinForms Application

VisionPro generally provides a WinForms edit control for each of its tools, and users are free to reuse those controls. The **VI**-based tools work differently. Their edit controls are WPF-based rather than WinForms-based. There are no edit controls for the VisionPro wrapper tools.

- All VI Tools
Assembly Reference: Cognex\VisionPro\bin\Cognex.VisionProUI.Controls.dll
Comment: Support for WPF tool edit controls. Not GACed
- ClassifyTool
VI WPF Control: **Cognex.VisionProUI.ViDiEL.Classify.Controls.ClassifyEdit**
Assembly Reference:
Cognex\VisionPro\bin\Cognex.VisionProUI.ViDiELClassify.Controls.dll
Comment: Not GACed
- SegmentTool
VI WPF Control: **Cognex.VisionProUI.ViDiEL.Segment.Controls.SegmentEdit**
Assembly Reference:
Cognex\VisionPro\bin\Cognex.VisionProUI.ViDiELSegment.Controls.dll
Comment: Not GACed

You can incorporate these WPF controls in your WinForms application with the help of Microsoft's **System.Windows.Forms.Integration.ElementHost** class in assembly WindowsFormsIntegration.dll. See the Microsoft documentation for details on this class.

An important characteristic of the **VI** WPF controls is that they act upon the **VI**-based tool rather than upon the containing VISIONPRO tool. In particular, these controls have several built-in buttons that will interact with the **VI**-based tool in ways that may not be desired for your VisionPro application:

- The **Run** button calls the Run method on the **VI**-based tool, *not* on the containing VisionPro tool.
- The **Reset** button will replace the current **VI**-based tool with a default constructed instance. It will *not* replace the current containing VisionPro tool with a default constructed instance.
- The **Open** button will expect to load a **VI**-based tool from a .VPP file. It will *not* successfully load a VisionPro tool from a .VPP file.
- The **Save** and **SaveAs** buttons will write out **VI**-based .VPP files, *not* VisionPro .VPP files.

See the installed sample application

%VPRO_ROOT%\samples\Programming\ViDiEL\Classify\C# for examples of this technique.

Deploying VisionPro Applications

See the following sections for information on creating deployable applications.

Applications That Use VI Objects

Because of the new run-time dependencies for **VI**-based classes (e.g. CogClassifyTool or CogSegmentTool) or classes that potentially could load/use **VI**-based classes (e.g.

CogToolBlock, CogToolGroup) you will at a minimum need the DLL dependency steps listed in the topic *Using VisionPro with Microsoft Visual Studio* for details. This requires:

- An edit to the application's *app.config* file,
- A new postBuildEvent command, and
- Calls to the Initialize and Shutdown methods.

See the topic *Deploying Your VisionPro Application* in your installed VisionPro documentation for details on deploying your finished vision application to other systems.

Note that an *<applicationName>.exe.config* file will be generated by Visual Studio and this needs to be deployed along with your built executable. This tells the application where to look for the non GAC'd DLL dependencies, but it also needs the symlink to exist. A batch file called *VisionProDependencyHelper.bat* can be found in the VisionPro bin folder to create the links for you. The bat file needs to be executed in the folder where your application executable resides and needs to be run as Administrator due to the mklink command.

Notes

ViDiEL wrapper classes (i.e. **Cognex.VisionPro.ViDiEL.CogClassifyTool**) are not guaranteed to reflect every change to an attached **VI** tool (i.e. **CogClassifyTool** or **CogSegmentTool**). This is another reason to use the **VI** tool directly where possible in .NET applications.