

# **VisionPro**

## **Quick Reference**

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# VisionPro Hardware Requirements

Your computer must meet minimum requirements.

## Minimum Computer Requirements

- IBM or compatible Pentium computer with MMX/SSE2 instruction set
- One open PCI slot if you are using a PCI-bus Cognex frame grabber or a GigE camera adapter
- One open PCI Express slot if you are using a PCI Express-bus frame grabber, Cognex Communication Card or GigE Vision network adapter
- One open USB port for the Cognex Security Key
- One USB3 port if you are using GenTL acquisition
- 4 GB memory, 2 GB free disk space prior to installation
- 1024 x 768 display with a display setting of 96 DPI
- PCI, PCI Express (recommended), or AGP video adapter
- Microsoft .NET Framework version 4.7.2

## Microsoft Visual Studio

VisionPro supports development and deploying using the following compilers that target the .NET Framework version 4.7.2:

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

## 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 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 64-Bit OS
VisionPro with any of the following sensor series: <ul style="list-style-type: none"> <li>• DS1000</li> <li>• DS900</li> <li>• 3D-L4000</li> </ul>	Windows 10 Pro and Windows 10 IoT Enterprise
VisionPro with the DSMax series sensors	Windows 10 Pro
3D-A5000 sensor with A5000 Viewer and 3D HandEye Field Calibrator	Windows 10 Pro
CAD Import Tool	Windows 10 Pro
Cognex 3DExpress	Windows 10 Pro

# Installing VisionPro

1. Uninstall any existing VisionPro software.

Use the **Add or Remove Programs** feature of the Windows Control Panel to remove any of the following programs if they are present:

**Cognex VisionPro**

**Cognex Drivers**

**Cognex Japanese Documentation**

**Cognex Software Licensing Center**

Restart your computer if prompted.

2. Turn off the computer and install the vision hardware necessary for your vision application.

For non-Cognex hardware, follow the manufacturer's installation instructions.

3. Attach the necessary cameras, I/O devices and Cognex Security Key and turn on the computer.

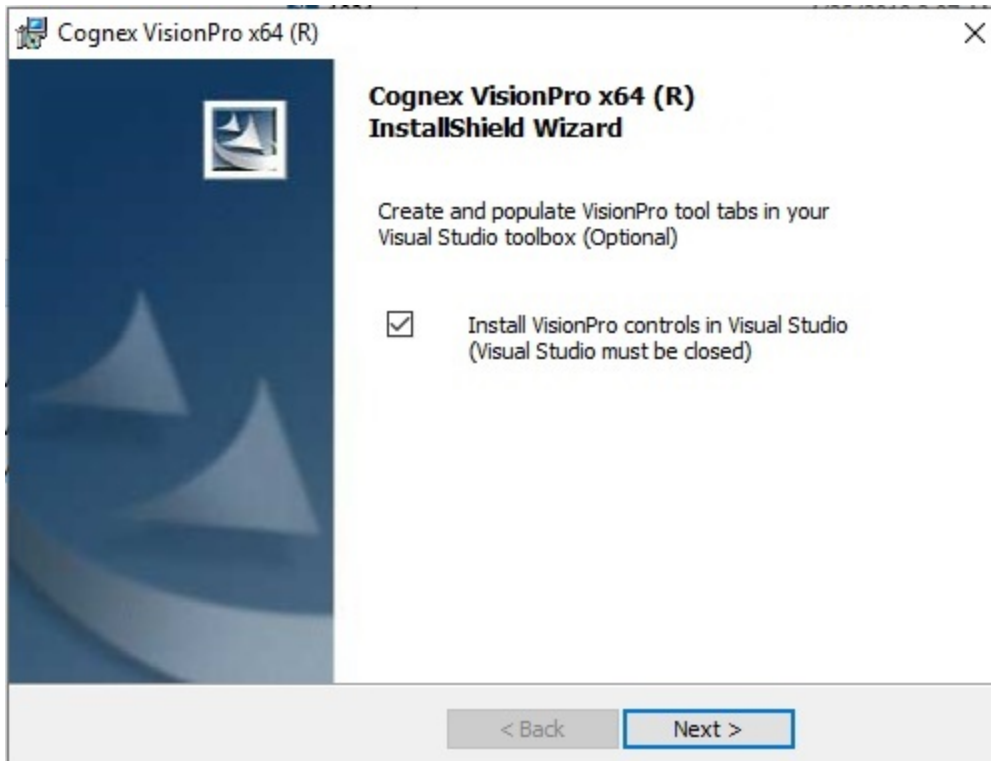
Microsoft might display the **Found New Hardware Wizard**. Select **Cancel**.

4. Install the VisionPro software from the Windows Desktop:

Launch the *setup.exe* application from the installation media.

- You must have Administrator privileges to install VisionPro.
- If your computer does not already have Microsoft Visual Studio Redistributables installed, they will automatically be installed.
- If your computer requires an update to the Windows Installer, it will automatically be updated. Depending on how your system is configured, you might see a message about this update taking place.

- (Optional) By default the installer launches a VisionPro Edit Control extension to populate the tool palette in Visual Studio with the latest VisionPro edit controls. The extension detects which versions of Visual Studio you have installed and will populate the tool palette for all installed versions by default:

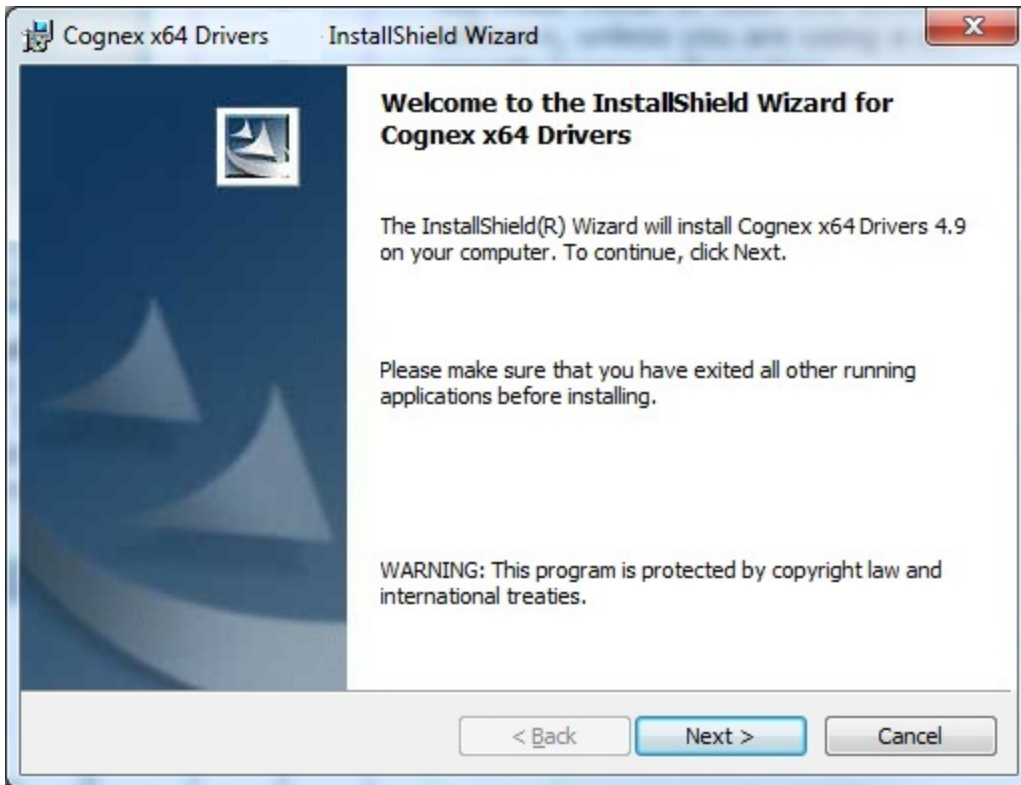


Be aware the extension does not support automated population of VisionPro edit controls with Visual Studio Express.

- (Optional) Install the Asian language versions of the documentation.  
By default the VisionPro installation utility will not install Asian language versions of VisionPro documentation.

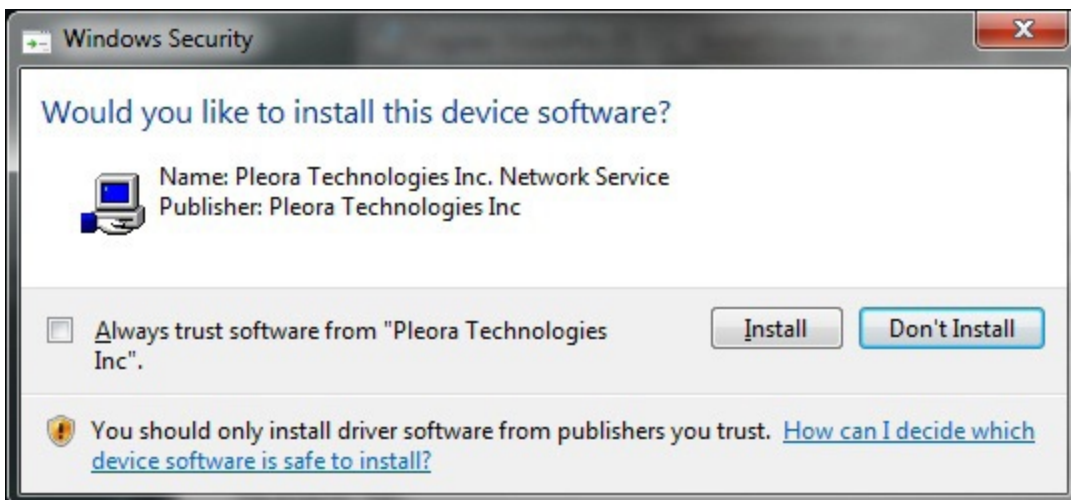
## 7. Install the VisionPro Hardware Drivers

The **Cognex Drivers** utility will launch once the VisionPro software is installed:



The **Cognex Drivers** utility will install the GigE Vision drivers and all the frame grabber drivers. You can, as an option, select **Custom** in the **Setup Type** dialog and pick the specific drivers you want installed. The drivers are Authenticode signed with a Cognex certificate.

The installer might display a Windows Security warning for the Gige Vision driver from Pleora Technologies:



You must click **Install** to use the correct GigE Vision drivers for best performance.

If you do not install any drivers during the initial software installation and want to install one or more drivers later, re-insert the installation media and double-click on *setup.exe* in the *ldrivers* directory to launch the **Cognex Drivers** utility.

Reboot the computer if prompted. If you install additional image acquisition hardware later, use the Windows Control Panel to select the **Cognex Drivers** software for repair and modifications.

## Configure the Gigabit Ethernet Network

If you installed one or more GigE Vision network adapters, you must use the GigE Vision Configuration Tool to assign an IP address to each adapter port and each camera connected to it. Each port of a network adapter must have its own IP address on its own subnet. Each camera must have its own IP address on the same subnet as its network adapter, otherwise the camera and the adapter will not be able to communicate.

See the **GigE Vision Cameras User's Guide**, available from the **Start** menu, for more information about configuring your computer to use GigE Vision cameras.

## Configure Your Cognex Communication Card

If you installed a Cognex Communication Card for use in network communication for your production environment, launch the **Cognex Comm Card Configurator** by choosing **Start->Cognex->VisionPro->Utilities->Cognex Comm Card Configurator** and provide the Ethernet settings the hardware will need.

See your VisionPro documentation for more information on how to use a Cognex Communication Card.

## Working with Third-Party Imaging Devices

Manufacturers of cameras, frame grabbers, and other devices that generate digital images can make these images available to the VisionPro Imaging Device interface. Refer to the manufacturer's web site for specific support information.

## Configure Your Camera Link Cameras

If your cameras use the Camera Link communication protocol, use the **Cognex Camera Link Serial Comm Utility** to program the Camera Link cameras over the Camera Link serial port.

Launch the CogCLSerial utility by choosing **Start->Cognex->VisionPro->Utilities->CameraLink->CogCLSerial**.

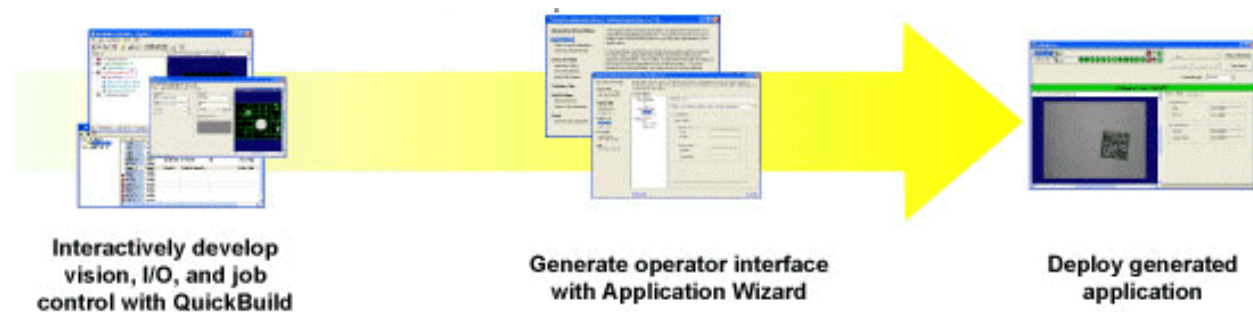
# VisionPro Overview

VisionPro provides an interactive development environment that you can use to assemble tools, configure acquisition and I/O, and deploy robust, high-performance applications with full-featured operator interfaces. VisionPro also provides a full-featured toolkit that you can program in .NET using C#, VB.NET or managed C++.

VisionPro consists of a set of development tools:

- **QuickBuild** is an interactive application builder that lets you define an application containing multiple Jobs. For each Job, you define and configure the image source (a Cognex frame grabber, GigE Vision camera, imaging device for a 3rd party acquisition adapter, or an image file), then add the vision tools and the results analysis logic. You can run the Jobs interactively, using either manual, triggered, or automatic operation.
- Within QuickBuild, the **Communications Explorer** provides an interface to Cognex I/O hardware. You can link specific data items and results from an application to output lines or a TCP/IP connection to network hardware. You can configure system-level output such as a job-ready signal or a system heartbeat, and input signals to control when your vision application executes.
- Using the **Application Wizard** you can generate a complete operator interface that encapsulates the application you created using QuickBuild and the Communications Explorer. The Wizard-generated application includes an executable Windows program, fully commented source code, as well as the job and I/O configuration data. Depending on the options you specify, the application can also provide full configuration control over the job internals at run time.

The following figure provides an overview of a basic VisionPro development process:



# Advanced Development Capabilities

In addition to using the Application Wizard to package your VisionPro application for deployment, you can also write a custom application around the configured Jobs, or you can create your entire application using C#, managed C++ or VB.NET directly with the underlying VisionPro components. The following are the three most common advanced development paths towards a customized, deployable application:

- Interactive development with QuickBuild plus a customized Application Wizard-Generated Operator Interface  
Because the Application Wizard generates a VB.NET or C# application, including source code, you can use Microsoft Visual Studio to view and modify the generated operator interface. This makes it easy to customize the look and feel of the application by adding controls and display values from other system components.
- Interactive Development plus a Custom-Written Operator Interface  
The VisionPro .NET programming interface includes functions to load and operate a saved QuickBuild application (in fact, the Wizard-generated application uses these functions). Instead of using the Wizard-generated code, you can simply write your own Visual Studio application to load and control the saved QuickBuild application.
- Custom application using the VisionPro programming interface  
The .NET programming interface lets you create entire applications using C#, managed C++ or VB.NET, providing low-level control of image acquisition, and analysis.

The VisionPro online documentation provides an example of creating a deployable VB.NET application by loading a QuickBuild application and adding a custom graphical user interface.


# Getting Started

Your VisionPro installation includes several features to help you develop your vision application.

## Develop Your Application with QuickBuild

QuickBuild is a rich interactive development environment that lets you create and manage multiple Jobs, each of which contains multiple tools and has the ability to run automatically whenever an image is available:

**Double-click job in Job Manager to edit job**


**Click  to configure image acquisition**


**Link ImageSource's OutputImage terminal to other tools to supply image**


**Click and drag tool properties to link**


**Double click tools to edit properties**

**Drag vision tools from Toolbox to Job Editor**

**In Job Editor, click  to run the job once**


** to run the job continuously**

**In QuickBuild, click  to run all jobs once**

** to run all jobs continuously**

## Configure the Communications Explorer

Once your job is working properly, use the Communications Explorer to configure the signals carried by your discrete I/O hardware and establish any TCP/IP links you need to exchange data with other network hardware:

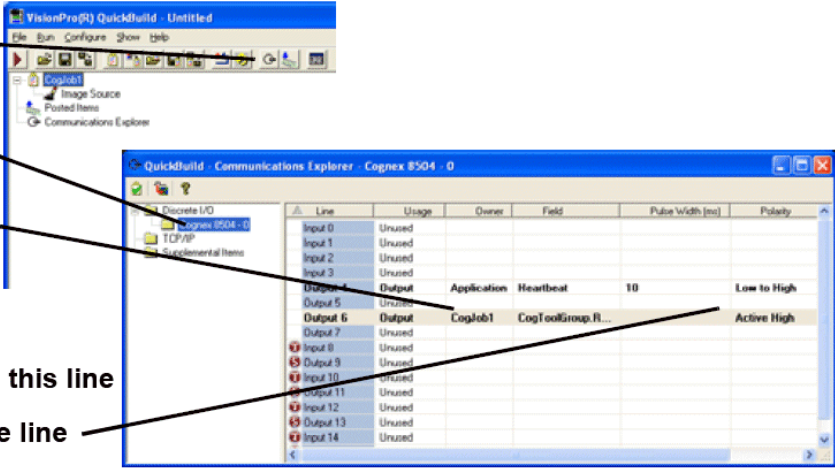
Click Communications Explorer icon 

Select the I/O device to configure

To link an output pin to job data, click in the Owner column and select the job

Click in the Field column to select the data item to drive this line

Use other fields to configure line properties



Line	Usage	Owner	Field	Pulse Width (ms)	Polarity
Input 0	Unused				
Input 1	Unused				
Input 2	Unused				
Input 3	Unused				
Output 4	Output	Application	Heartbeat	10	Low to High
Output 5	Unused				
Output 6	Output	CogJob1	CogToolGroup.R...		Active High
Output 7	Unused				
Input 8	Unused				
Output 9	Unused				
Input 10	Unused				
Output 11	Unused				
Input 12	Unused				
Output 13	Unused				
Input 14	Unused				

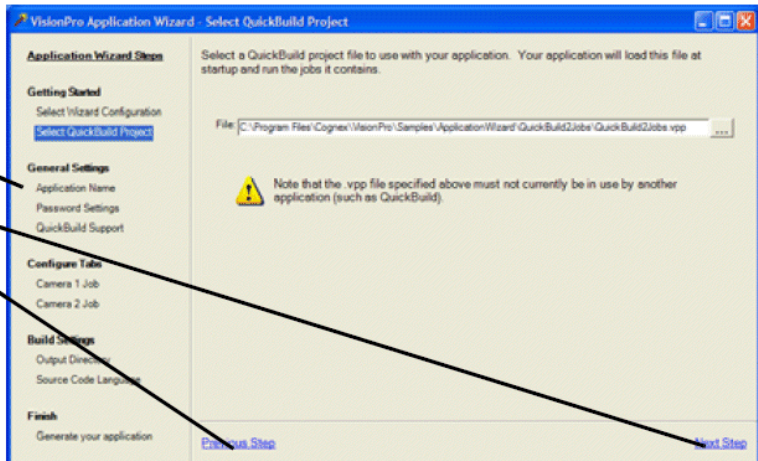
## Use the Application Wizard to Build a Deployable System

After saving your complete QuickBuild application, including all Jobs and communications information, launch the VisionPro Application Wizard and create a deployable operator interface:

Click on the Application Wizard icon  or select Cognex->VisionPro->Application Wizard from the Start menu

Follow the step by step instructions

Use the Previous and Next Step links to navigate through the Wizard



# Sample Jobs and Programs

VisionPro installs a large set of Visual Studio programming samples for a variety of tools. Each sample solves a specific vision task, and were created using C# or VB.NET.

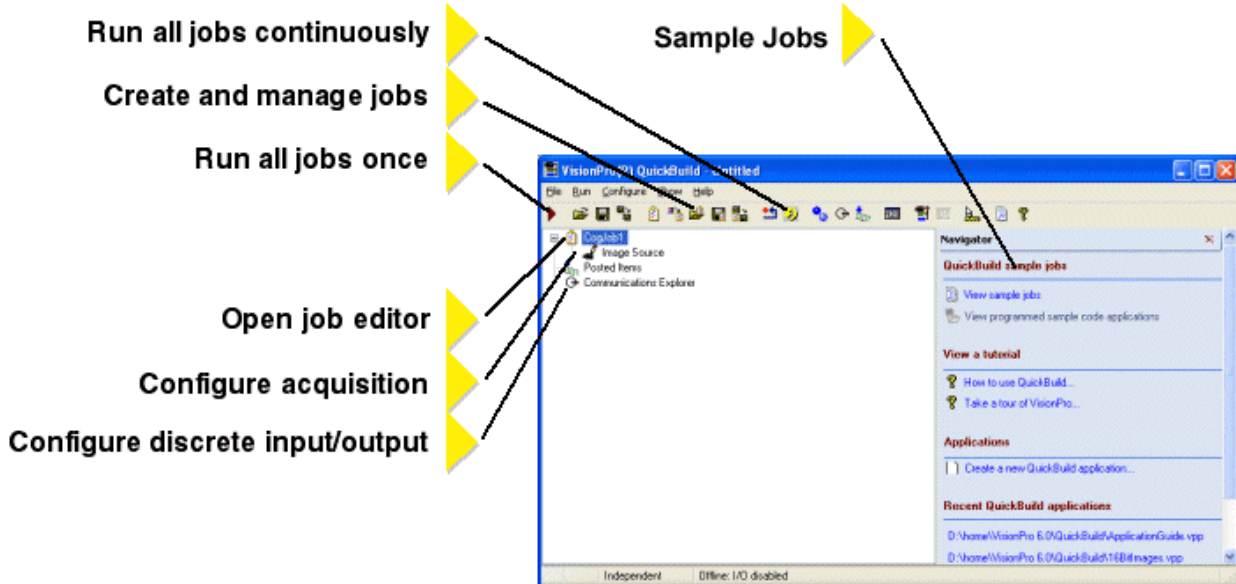
The installation utility installs a set of programming samples, which are located by default in *\Program Files\VisionPro\Samples\Programming*.

Likewise, QuickBuild includes a set of sample Jobs that demonstrate a variety of vision tasks, and can be accessed through the Navigation pane.

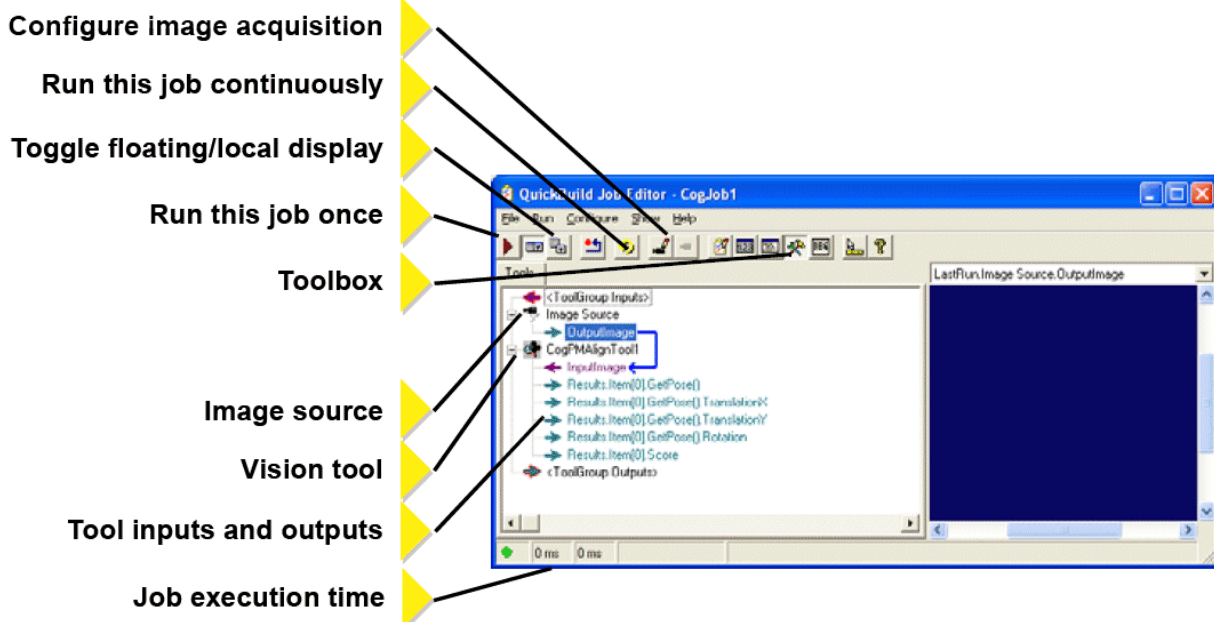
# Reference

VisionPro offers a set of standard user interfaces for most functionality

## QuickBuild Window



## Job Editor



## Tool Edit Control

Reset tool

Toggle floating/local display

Run this tool once

Tool parameters

Image selector

Local display

Tool execution time

The screenshot shows the 'CogWeb Tool1' window. On the left, there are several callout boxes with yellow arrowheads pointing to specific UI elements: 'Reset tool' points to a circular arrow icon in the toolbar; 'Toggle floating/local display' points to a window icon; 'Run this tool once' points to a play button icon; 'Tool parameters' points to the 'Segmentation' settings panel; 'Image selector' points to the 'LastRun Input Image' dropdown; 'Local display' points to the image preview window; and 'Tool execution time' points to the status bar at the bottom left showing '44.425ms'.

## Communications Explorer

Validate current config

I/O devices

Individual output line

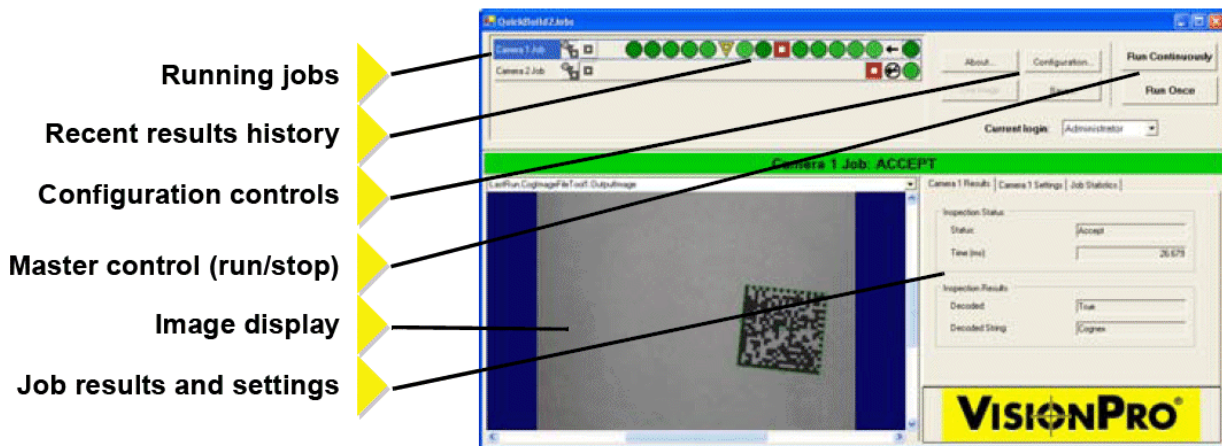
Associated job

Linked data field

The screenshot shows the 'QuickBuild - Communications Explorer - Cognex 8504 - 0' window. On the left, there are callout boxes with yellow arrowheads pointing to: 'Validate current config' (a checkmark icon), 'I/O devices' (a tree view showing 'Discrete I/O', 'Cognex 8504 - 0', 'TCP/IP', and 'Supplemental Items'), 'Individual output line' (a row in the table), 'Associated job' (a cell in the 'Owner' column), and 'Linked data field' (a cell in the 'Field' column).

Line	Usage	Owner	Field	Pulse Width (ms)	Polarity
Input 0	Unused				
Input 1	Unused				
Input 2	Unused				
Input 3	Unused				
Output 4	Output	Application	Heartbeat	10	Low to High
Output 5	Unused				
Output 6	Output	CogJob1	CogToolGroup.R...		Active High
Output 7	Unused				
Input 8	Unused				
Output 9	Unused				
Input 10	Unused				
Output 11	Unused				
Input 12	Unused				
Output 13	Unused				
Input 14	Unused				

## Generated Operator Interface



## For More Information

### In QuickBuild

Click the question mark in any window to display a pop-up menu of options for displaying information related to the current vision tool or QuickBuild component.

### From Microsoft Windows

From the **Start** menu, select **Cognex->VisionPro->Documentation** for a list of available titles.

# VisionPro Utilities

VisionPro includes the following utilities that are available through the **Start** menu:

- **3D HandEye Field Calibrator**  
Create a rigid transformation that maps points from a Cognex sensor to the 3D space defined by a robot-coordinate system.
- **A5000 Viewer**  
Set acquisition parameters for a 3D-A5000 sensor that can be saved for your QuickBuild or Visual Studio application.
- **CAD Import Tool**  
Convert a CAD file into a 3D range image file.
- **Cognex Comm Card Configurator**  
Configure the Ethernet settings of your Cognex Communication Card.
- **Cognex GigE Vision Configurator**  
Set the IP addresses for your GigE network adapters and GigE Vision cameras.
- **DS Field Calibrator**  
Calibrate one or more 3D sensors to create a unified 3D coordinate space.
- **IDB Editor**  
Create and modify images in an image database file.
- **Image & Mask Editor**  
Add a masking pattern to the training image of a CNLSearch or PMAlign tool.
- **Image Font Extractor**  
Create an image font file from an existing image.
- **Image Grading Utility**  
Create a library of records for a set of existing images, assigning them grades of Accept, Reject or Unknown based on the features they exhibit.
- **VisionPro 3D Viewer**  
View 3D range images in three dimensions.
- **VisionPro Controls Wizard**  
Populates the tool palette in Visual Studio with the latest set of VisionPro edit controls.

