

Video and Image Processing Blockset™ Release Notes

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Video and Image Processing Blockset™ Release Notes

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Summary by Version

This table provides quick access to what's new in each version. For clarification, see "Using Release Notes" on page 2.

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Latest Version V2.7 (R2009a)	Yes Details	No	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation
V2.6 (R2008b)	Yes Details	Yes Summary	Bug Reports Includes fixes	No
V2.5 (R2008a)	Yes Details	Yes Summary	Bug Reports Includes fixes	No
V2.4 (R2007b)	Yes Details	Yes Summary	Bug Reports Includes fixes	No
V2.3 (R2007a)	Yes Details	Yes Summary	Bug Reports Includes fixes	No
V2.2 (R2006b)	Yes Details	Yes Summary	Bug Reports Includes fixes	No
V2.1 (R2006a)	Yes Details	Yes Summary	Bug Reports at Web site	No
V2.0 (R14SP3+)	Yes Details	No	Bug Reports at Web site	No
V1.2 (R14SP3)	Yes Details	Yes Summary	Bug Reports at Web site	No

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
V1.1 (R14SP2)	Yes Details	Yes Summary	Bug Reports at Web site	No
V1.0.1 (R14SP1)	Yes Details	No	Fixed bugs	No
V1.0 (R14)	Yes Details	No	No bug fixes	No

Using Release Notes

Use release notes when upgrading to a newer version to learn about:

- New features
- Changes
- Potential impact on your existing files and practices

Review the release notes for other MathWorks™ products required for this product (for example, MATLAB® or Simulink®) for enhancements, bugs, and compatibility considerations that also might impact you.

If you are upgrading from a software version other than the most recent one, review the release notes for all interim versions, not just for the version you are installing. For example, when upgrading from V1.0 to V1.2, review the release notes for V1.1 and V1.2.

What's in the Release Notes

New Features and Changes

- New functionality
- Changes to existing functionality

Version Compatibility Considerations

When a new feature or change introduces a reported incompatibility between versions, the **Compatibility Considerations** subsection explains the impact.

Compatibility issues reported after the product is released appear under Bug Reports at The MathWorks™ Web site. Bug fixes can sometimes result in incompatibilities, so you should also review the fixed bugs in Bug Reports for any compatibility impact.

Fixed Bugs and Known Problems

The MathWorks offers a user-searchable Bug Reports database so you can view Bug Reports. The development team updates this database at release time and as more information becomes available. This includes provisions for any known workarounds or file replacements. Information is available for bugs existing in or fixed in Release 14SP2 or later. Information is not available for all bugs in earlier releases.

Access Bug Reports using your MathWorks Account.

Version 2.7 (R2009a) Video and Image Processing Blockset

This table summarizes what's new in Version 2.7 (R2009a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this version are:

- “Enhanced Draw Shapes and Draw Markers blocks” on page 4
- “Enhanced To Video Display Block” on page 4
- “Enhanced Video Viewer Block” on page 5
- “Improved Memory use in 2–D FIR Filter, 2–D Convolution, and 2–D Correlation Blocks” on page 5
- “Run-Time Library Removal” on page 5
- “New Rounding Modes” on page 5

Enhanced Draw Shapes and Draw Markers blocks

The Draw Shapes and Draw Markers blocks have the added feature to accept border and fill color values at the input port. A new anti-aliasing algorithm produces smoother edges. The block algorithms are enhanced to improve performance.

Enhanced To Video Display Block

The To Video Display block is modified to remain open after simulation stops. By default, the block does not use hardware acceleration thus reducing memory requirements, improving behavior on multi-headed displays and

external projectors. In addition, there is a new option to turn on hardware acceleration for improved performance.

Enhanced Video Viewer Block

The Video Viewer block has a new interface providing pixel region display and visualization controls.

Improved Memory use in 2-D FIR Filter, 2-D Convolution, and 2-D Correlation Blocks

The new algorithm used by 2-D FIR Filter, 2-D Convolution, and 2-D Correlation blocks reduces memory requirements by eliminating the need for the intermediate pad buffer.

Run-Time Library Removal

The Real-Time Workshop® software pack-and-go utility enables code portability. In previous releases, the Video and Image Processing Blockset™ software pack-and-go .zip file included more files than necessary due to a dependence on a run-time library that shipped with the product. In addition, you could not examine the contents of Video and Image Processing Blockset run-time functions from the Real-Time Workshop HTML report, because the code was accessed through the prebuilt library. In R2009a, this dependence on the run-time library for code generation is removed. The pack-and-go .zip file is now smaller than in previous releases, and the Real-Time Workshop HTML report provides links to the source code of the run-time functions.

New Rounding Modes

The following rounding modes have been added to blocks that support fixed-point signals:

- **Convergent** — Rounds the result of a calculation to the closest representable number. In the case of a tie, **Convergent** rounds to the nearest even number. This is the least biased rounding method provided by the blockset.
- **Round** — Rounds the result of a calculation to the closest representable number. In the case of a tie, it rounds positive numbers to the closest

representable number in the direction of positive infinity, and it rounds negative numbers to the closest representable number in the direction of negative infinity.

- **Simplest**— Rounds the result of a calculation using the rounding mode that adds the least amount of extra rounding code to your generated code. For more information, see “Rounding Mode: Simplest” in the Simulink® Fixed Point™ documentation.

Version 2.6 (R2008b) Video and Image Processing Blockset

This table summarizes what's new in Version 2.6 (R2008b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes Summary	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this version are:

- “New Apply Geometric Transformation block” on page 7
- “C code generation and the Accelerator modes are now supported for fixed-point and integer word lengths up to 128 bits” on page 8
- “ROI support for Minimum and Maximum blocks” on page 8
- “New and Enhanced Demos” on page 8
- “New Data Type Support Table” on page 9
- “2D-FFT Block Correctly Applies Divide-By-Two on Butterfly Outputs” on page 9
- “Refined Pad Input Handling of 2D-FIR Block” on page 10

New Apply Geometric Transformation block

The Apply Geometric Transformation block can be used to transform an image using a projective, affine or non-reflective similarity transformation matrix. The block provides Polygon ROI support supplied manually or calculated using segmentation and trace boundary techniques. This block used together with the Estimate Geometric Transformation block provides a flexible, robust model to transform images.

C code generation and the Accelerator modes are now supported for fixed-point and integer word lengths up to 128 bits

C code generation and the Simulink Accelerator and Rapid Accelerator modes are now supported for fixed-point and integer word lengths up to 128 bits. The few exceptions where Real-Time Workshop® Embedded Coder™ will not generate code for fixed-point and integer word lengths beyond 32 bits are for the Autothreshold, Histogram Equalization, Hough Lines, Projective Transformation, and Shear blocks.

ROI support for Minimum and Maximum blocks

Full Region of Interest (ROI) support is available for the Minimum and Maximum blocks. Use the ROI type parameter to specify whether the ROI is a rectangle, line, label matrix, or binary mask. Full ROI processing is available to users who have a Video and Image Processing Blockset™ license. If you only have a Signal Processing Blockset™ license, you can still use ROI processing, but are limited to the ROI type Rectangles.

New and Enhanced Demos

The Video and Image Processing Blockset contain new and enhanced demos.

New Bar Code Recognition Demos

Two new demos using the Video and Image Processing Blockset to create an image processing system which can recognize and interpret a GTIN-13 barcode. The GTIN-13 barcode, formally known as EAN-13, is an international barcode standard. It is a superset of the widely used UPC standard.

The live video demo uses the From Video Device block provided by Image Acquisition Toolbox™ to acquire live image data from a Unibrain Fire-i digital camera into Simulink.

Enhanced Lane Departure Warning System Demo

This demo detects and tracks road lane markers in a video sequence and notifies the driver if they are moving across a lane. The demo illustrates how to use the Hough Transform, Hough Lines and Kalman Filter blocks from

the Video and Image Processing Blockset blocks to create a line detection and tracking algorithm.

Enhanced Disparity Estimation for Stereo Vision Demo

The enhanced version of the demo uses a virtual reality scene as the input. The demo provides the user with an example of using the Virtual Reality Toolbox™.

New Data Type Support Table

The Video and Image Processing Blockset Data Type Support Table is now available through the Simulink model Help menu. The table provides information about data type support and code generation coverage for all Video and Image Processing Blockset blocks. Select **Help > Block Support Table > Video and Image Processing Blockset** or **Help > Block Support Table > All Tables**. You can also type `showvipblockdatatype` at the MATLAB command line to bring up the table.

2D-FFT Block Correctly Applies Divide-By-Two on Butterfly Outputs

The **Skip divide-by-two on butterfly outputs** for fixed-point signals check box on the Fixed-point pane of the 2D-FFT block dialog has been moved to the Main pane and renamed **Divide butterfly outputs by two**. This check box now correctly applies to both fixed-point and floating-point inputs. In releases prior to R2008b, the block always ignored this check box for floating-point inputs.

Compatibility Considerations

The 2D-FFT block can give results in R2008b and later releases that are scaled differently than in previous releases when all the following conditions are met:

- 1** The block input is floating point.
- 2** The **Divide butterfly outputs by two** check box is selected (or the **Skip divide-by-two on butterfly outputs** for fixed-point signals check box on the 'Fixed-point' pane was NOT selected, for releases prior to R2008b)

3 The **Logging mode** parameter on the Fixed-Point Tool for the model is not set to Minimums, maximums and overflows

Make sure that this check box is set correctly for your needs. Refer to the block reference page for more information.

Refined Pad Input Handling of 2D-FIR Block

When using Constant padding, the block now ensures that the pad value is real when the input image is real.

Compatibility Considerations

You will get an error message if pad value is complex when the input is real.

To build a model that pads a real input with a complex value, you can use the Bias block to add a complex zero value.

Version 2.5 (R2008a) Video and Image Processing Blockset

This table summarizes what's new in Version 2.5 (R2008a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes Summary	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this version are:

- “New Estimate Geometric Transformation block with RANSAC and Least Median of Squares Algorithms” on page 11
- “Increased N-Dimensional Support” on page 12
- “New and Enhanced Demos” on page 12
- “Tunability Status Modified for Several Block Parameters” on page 13
- “Enhanced From Multimedia File Block” on page 14
- “Enhanced Blob Analysis Block” on page 14
- “Blocks Obsoleted” on page 15
- “Hough Transform” on page 15

New Estimate Geometric Transformation block with RANSAC and Least Median of Squares Algorithms

The Estimate Geometric Transformation block can be used to find the transformation matrix which maps the greatest number of point pairs between two images. The user can select to use the RANdom SAMple Consensus (RANSAC) or the Least Median of Squares algorithms to calculate the distance metric for finding the transformation matrix. For more information see the Estimate Geometric Transformation block reference page.

Increased N-Dimensional Support

The following blocks now have support for N-D signals:

- Variance
- Standard Deviation
- Mean
- Histogram
- Median

New and Enhanced Demos

The Video and Image Processing Blockset contain new and enhanced demos.

New Chroma-Based Road Tracking Demo

This demo uses chroma information to detect and track road edges set in primarily residential settings where lane markings may not be present. The Chroma-based Tracking demo illustrates how to use the Color Space Conversion block, the Hough Transform block, and the Kalman Filter block to detect and track information using hue and saturation. For more information see the Chroma-based Road Tracking Demo.

Video Mosaicking Enhanced

The enhanced Video Mosaicking demo incorporates the new Estimate Geometric Transformation block, along with the Corner Detection block, the Projective Transformation block, and the Compositing block to create a mosaic image from a video sequence. The demo accumulates transformation matrices between consecutive video frames. The subsystem calculates the transformation matrix between the current and the first video frame, and then overlays the current video frame on to the output image. By repeating this process, the subsystem generates a mosaic image.

Disparity Estimation for Stereo Vision

The enhanced Disparity Estimation for Stereo Vision demo uses the Corner Detection block to find image features. If you would like to feed your own data into the demo you may wish to explore the various corner detection methods and other settings of the Corner Detection block.

Tunability Status Modified for Several Block Parameters

The Video and Image Processing Blockset parameter tunability is modified in several blocks. The blocks where the tunability has been modified are listed in the table below.

Block	Parameter	Old Tunability Status	New Tunability Status
Contrast Adjustment	Percentage of pixels to saturate [low high] (in %)	Simulation only	Off for Simulation and Code Generation
Histogram Equalization	Histogram	Simulation only	Off for Simulation and Code Generation
Gamma Correction	All	Simulation only	Off for Simulation and Code Generation
Autothreshold	Minimum value of input	Simulation only	Off for Simulation and Code Generation
	Maximum value of input	Simulation only	Off for Simulation and Code Generation
Draw Shapes	Value(s)	Simulation only	On for Simulation and Code Generation when Use antialiasing is turned off
	Opacity factor (between 0 and 1)	Simulation only	On for Simulation and Code Generation
Blob Analysis	Specify maximum blob area in pixels	Simulation only	On for Simulation and Code Generation

Compatibility Considerations

To change the non-tunable parameters while you are working with a model, you must stop a running simulation, change the parameter, and then start the simulation again.

Enhanced From Multimedia File Block

The Video and Image Processing From Multimedia File block now allows for proper synchronization of video and audio. Also, the determination of the Frames Per Second (FPS) in the From Multimedia File Block was improved for increased accuracy. As a result of these changes, this block might provide a different sample time to the model. For more information about the calculation of the default sample time by the this block, please consult the From Multimedia File block reference page.

Compatibility Considerations

Your existing models might error out if you are combining the output from a From Multimedia File block with the output from another source block due to the change in the From Multimedia File block. Sample time might now be different from the sample time from another source block in your model, causing the model to error. If this happens, you can either change the sample time of the other source block to `-1` (inherited), or explicitly specify the sample time you want to use in the From Multimedia File block's **Desired sample time** parameter.

Enhanced Blob Analysis Block

The **Specify maximum blob area in pixels** parameter in the Blob Analysis Block is now tunable for both Simulation and Code Generation. To accommodate this enhancement the **Specify maximum blob area in pixels** parameter has been modified to no longer accept `inf`. The maximum allowable value is now calculated to be the maximum of `uint32` data type.

Compatibility Considerations

Entering `inf` for the **Specify maximum blob area in pixels** parameter will cause an error.

Blocks Obsoleted

The following 2-D blocks have been obsoleted. Equivalent N-D blocks are available.

- 2-D Variance
- 2-D Standard Deviation
- 2-D Mean
- 2-D Histogram
- 2-D Median

Hough Transform

An internal calculation for the Hough Transform block has been corrected. Specifically, the rho output calculation was corrected to match the **Rho Resolution** given in the input.

Compatibility Considerations

The Hough matrix, and the Rho outputs returned by the block will have different results than those obtained from the same block in previous releases.

Version 2.4 (R2007b) Video and Image Processing Blockset

This table summarizes what's new in Version 2.4 (R2007b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes Summary	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this version are:

- “Corner Detection Block Finds Corners in Images” on page 16
- “Demo Blocks Upgraded” on page 17
- “Demos Added and Updated” on page 17
- “Demo Recategorization” on page 18
- “Lucas-Kanade Method of Optical Flow Block Enhanced” on page 20
- “Performance Improvements” on page 21
- “Removed DirectX Component Registration Limitations of From Multimedia File, To Multimedia File, and To Video Display Blocks” on page 22
- “Rounding Modes Added” on page 22
- “Write AVI File Block Obsoleted” on page 22

Corner Detection Block Finds Corners in Images

The Corner Detection block calculates the corner metric matrix and finds corners in images. For more information, see the Corner Detection block reference page.

Demo Blocks Upgraded

If you used the following demo blocks in your models, you need to update your models with the latest versions of these blocks. Because these blocks have been improved, you need to update their parameters to suit your applications.

Old Block Name	New Block Name	Demo Name	New Path to Block
Bit pack	Bit Pack	Video compression	vipcodec_intensity>Encoder>Block Processing1>Block iterator>sub-block process>Transform coding>Bit Pack
Bit unpack	Bit Unpack	Video compression	vipcodec_intensity>Decoder>Block Processing>Block iterator>sub-block process>Transform decoding>Bit Unpack

Compatibility Considerations

Update your models with the latest versions of these blocks.

Demos Added and Updated

The Video and Image Processing Blockset contains three new or updated demos for R2007b.

Video Mosaicking Demo Added

The new Video Mosaicking demo shows how to stitch video frames together to form a mosaic image that provides a comprehensive view of a scene.

Pattern Matching Demo Allows User-Selected Tracking Target

The Target block in the Pattern Matching demo uses the Image Processing Toolbox `imrect` function to let you manually select the size and position of the region of interest you want to detect.

Traffic Warning Sign Recognition Demo Improvements

The Traffic Warning Sign Recognition demo now uses a more robust template matching technique to identify the signs. In addition, the demo now uses labels to show the detected signs.

Demo Recategorization

The Video and Image Processing Blockset demos have been recategorized into the following libraries.

Demo Title	New Library Location	Old Library Location
Abandoned Object Detection	Industry Examples	Detection and Tracking
Lane Departure Warning System	Industry Examples	Detection and Tracking
Surveillance Recording	Industry Examples	Detection and Tracking
Traffic Warning Sign Recognition	Industry Examples	Detection and Tracking
Cell Counting	Analysis	Video Segmentation Using Morphology
Concentricity Inspection	Analysis	Video Analysis
Feature Extraction	Analysis	Video Segmentation Using Morphology
Object Counting	Analysis	Video Segmentation Using Morphology
Video Focus Assessment	Analysis	Video Analysis
Image Compression	Compression	Compression
Video Compression	Compression	Compression
Motion Detection	Detection and Recognition	Detection and Tracking

Demo Title	New Library Location	Old Library Location
Pattern Matching	Detection and Recognition	Detection and Tracking
Scene Change Detection	Detection and Recognition	Video Analysis
Surveillance Recording	Detection and Recognition	Detection and Tracking
Traffic Warning Sign Recognition	Detection and Recognition	Detection and Tracking
Abandoned Object Detection	Tracking	Detection and Tracking
Lane Departure Warning System	Tracking	Detection and Tracking
People Tracking	Tracking	Detection and Tracking
Tracking Cars Using Background Estimation	Tracking	Detection and Tracking
Tracking Cars Using Optical Flow	Tracking	Detection and Tracking
Disparity Estimation for Stereo Vision	Registration	Video Analysis
Panorama Creation	Registration	Miscellaneous
Video Mosaicking	Registration	n/a
Video Stabilization	Registration	Video Enhancement
Color Segmentation	Segmentation	Detection and Tracking
Edge Detection	Segmentation	Video Analysis
Histogram Equalization	Enhancement	Video Enhancement
Periodic Noise Reduction	Enhancement	Video Enhancement
Rotation Correction	Enhancement	Video Enhancement
Bouncing Balls	Display and Graphics	Miscellaneous

Demo Title	New Library Location	Old Library Location
Histogram Display	Display and Graphics	Video Analysis
MPlay Simulink Tutorial	Display and Graphics	Video Playback
Object Extraction and Replacement	Display and Graphics	Video Segmentation Using Morphology
Picture in Picture	Display and Graphics	Miscellaneous
Projecting Videos onto a Rotating Cube	Display and Graphics	Geometric Transformation
Visual Effects	Display and Graphics	Miscellaneous
Edge Detection with Live Video Acquisition	Live Video Processing	Video Analysis
Histogram Display with Live Video Acquisition	Live Video Processing	Video Analysis

Lucas-Kanade Method of Optical Flow Block Enhanced

The Optical Flow block now has two options for solving the optical flow constraint equation when you set the **Method** parameter to Lucas-Kanade:

- **Difference filter [-1 1]** — This was the only option available in previous releases, and is the default option.
- **Derivative of Gaussian** — This option is new in this release.

Use the new **Temporal gradient filter** parameter to select the filter option.

The Optical Flow block supports fixed-point data types when the **Method** parameter is set to Lucas-Kanade and the **Temporal gradient filter** parameter is set to **Difference filter [-1 1]**.

For more information about these enhancements, see the Optical Flow block reference page.

Performance Improvements

The Video and Image Processing Blockset contains three performance enhancements for R2007b.

Label Block Has More Efficient Labeling Algorithm

The old block implementation was based on a flood-fill algorithm, while the new algorithm is union-find based. As a result, the new labeling algorithm uses less memory and is a more cache efficient.

Compatibility Considerations. The new labeling algorithm might label the objects in the image with different label numbers.

Morphological Blocks Experience Speed Increase

The speed of simulation and the speed at which your generated code runs will increase, if you meet all of the following conditions:

- You are using any of the blocks in the Morphological Operations library except the Label block.
- You are working with intensity images.
- The structuring element you are using has four or more contiguous elements that form a horizontal line, a vertical line, or a shape that the block can decompose into a set of horizontal lines, vertical lines, or both.

For more information about structuring elements, see the `strel` function reference page in the Image Processing Toolbox documentation.

Row-Major Data Format Supported by Chroma Resampling, Deinterlacing, and Insert Text blocks

The Chroma Resampling, Deinterlacing, and Insert Text blocks give you the option to process data that is stored in row-major format when you select the **Input image is transposed (data order is row major)** check box. For more information, see the Chroma Resampling, Deinterlacing, and Insert Text block reference pages.

Removed DirectX Component Registration Limitations of From Multimedia File, To Multimedia File, and To Video Display Blocks

Previously, you were unable to use the From Multimedia File, To Multimedia File, or To Video Display blocks without first having someone with system administrator privileges register the DirectX components associated with these blocks on your Windows machine. This limitation has been removed.

Rounding Modes Added

The **Rounding mode** parameter on the Fixed-point pane of Video and Image Processing Blockset blocks now has two additional options, **Zero** and **Ceiling**. For more information about this parameter, see “Rounding Modes” in the *Signal Processing Blockset User’s Guide*.

Write AVI File Block Obsoleted

The To Multimedia File block now supports AVI files on UNIX platforms. Consequently, the Write AVI File Block has been obsoleted to remove duplicate functionality.

Compatibility Considerations

Replace any instances of the Write AVI File block with the To Multimedia File block.

Version 2.3 (R2007a) Video and Image Processing Blockset

This table summarizes what's new in Version 2.3 (R2007a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes Summary	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this version are:

- “Block Parameters Support Additional Data Types” on page 24
- “Color Data Management Simplified Using 3-D Array Representation” on page 24
- “Color Data Support Added to 11 Blocks” on page 24
- “Contrast Adjustment Block Improved” on page 25
- “Demo Blocks Upgraded” on page 25
- “Disparity Estimation for Stereo Vision Demo Computes the Disparity Map Between Stereo Images” on page 26
- “Improved Tracking Algorithms in People Tracking and Lane Departure Warning System Demos” on page 26
- “Insert Text Block Now Supports Placing Multiple Text Strings on Images” on page 27
- “Removed Lane Detection and Tracking and Continuous Image Rotation Demos” on page 27
- “Video and Image Processing Blocks Are Now Forward Compatible” on page 28

Block Parameters Support Additional Data Types

Previously, the Video and Image Processing Blockset block dialog box parameters supported only double-precision, floating-point data types. They now support additional data types. For more information about Simulink data types, see “Specifying Numeric Parameter Values” and “Working with Data Types” in the Simulink documentation.

Color Data Management Simplified Using 3-D Array Representation

Video and Image Processing Blockset enables you to work with color images and video signals as multidimensional arrays. This change improves the usability of the blockset. For more information, see “Color Image Processing” in the *Video and Image Processing Blockset User’s Guide*.

Compatibility Considerations

If you open an old model that links to a block that now supports multidimensional arrays, an asterisk appears next to the model name, and you are prompted to save the model before you close it. After you save the model, you won’t experience this behavior again.

Color Data Support Added to 11 Blocks

Color data support has been added to the following blocks:

- Compositing
- Deinterlacing
- Frame Rate Display
- Gamma Correction
- Gaussian Pyramid
- Image Data Type Conversion
- Image Pad
- Resize
- Rotate

- Shear
- Translate

Contrast Adjustment Block Improved

This release removes an unnecessary parameter from this block.

Compatibility Considerations

If you open a old model that contains a Contrast Adjustment block, you might see the following warnings:

```
Warning: In instantiating linked block  
'mcontrastadjust/Contrast Adjustment1':  
Contrast Adjustment block (mask) does not  
have a parameter named 'accumMode'.
```

```
Warning: In instantiating linked block  
'mcontrastadjust/Contrast Adjustment1':  
Contrast Adjustment block (mask) does not  
have a parameter named 'accumWordLength'.
```

```
Warning: In instantiating linked block  
'mcontrastadjust/Contrast Adjustment1':  
Contrast Adjustment block (mask) does not  
have a parameter named 'accumFracLength'.
```

You can ignore these warning messages. After you save the model, you won't experience this behavior again.

Demo Blocks Upgraded

If you used the following demo blocks in your models, you need to update your models with the latest versions of these blocks. Because these block have been improved, you need to update their parameters to suit your applications.

Old Block Name	New Block Name	Demo Name	New Path to Block
Merge Box	Merge blobs belonging to the same target	Color Segmentation People Tracking Traffic Warning Sign Recognition	vipcolorsegmentation>Color Segmentation>Region Filtering>Extract Face and Hand viptrackpeople>Detection vipwarningsigns>Warning Sign Recognition>Region filtering (red)
Background Estimator – Temporal Median Estimator	Background Estimator	Tracking Cars Using Background Estimation	viptraffic

Compatibility Considerations

Update your models with the latest versions of these blocks.

Disparity Estimation for Stereo Vision Demo Computes the Disparity Map Between Stereo Images

You can find this demo in the Video Analysis section of the Video and Image Processing Blockset demos. You can open the demo model by typing `vipstereo` at the MATLAB command prompt or click `vipstereo`.

Improved Tracking Algorithms in People Tracking and Lane Departure Warning System Demos

Improvements to the tracking algorithms in these demos make them more robust. As part of the improvements, the demos now contain the new Kalman Filter block in Signal Processing Blockset. For more information, see the Kalman Filter block reference page. You can open these demo models by typing `viptrackpeople` or `vipldws` at the MATLAB command prompt. Alternatively, click `viptrackpeople` or `vipldws`.

Insert Text Block Now Supports Placing Multiple Text Strings on Images

You can use the Insert Text block to place multiple text strings on images. For more information, see “Annotating AVI Files at Two Separate Locations” in the *Video and Image Processing Blockset User’s Guide*. This block has been changed in two other ways:

- The Select port expects zero-based inputs. Previously, this port expected one-based inputs.
- If the input image is a floating-point data type, the input to the Opacity port must be the same floating-point data type.

These changes make the Insert Text block more consistent with the other blocks in Video and Image Processing Blockset. For more information, see the Insert Text block reference page.

Compatibility Considerations

To prevent incorrect results in your existing models, you need to verify that the signal connected to the Select port contains zero-based inputs. Also, if the input image is a floating point-data type, verify that the input to the Opacity port is the same floating-point data type.

Removed Lane Detection and Tracking and Continuous Image Rotation Demos

The Lane Departure Warning System demo now incorporates the functionality illustrated by the Lane Detection and Tracking demo.

The Continuous Image Rotation demo illustrated the use of Simulink busses for color processing. You no longer need to use this technique because we introduced color data processing using 3-D array representation.

Compatibility Considerations

If you want to continue to work with these demos, you need to save them to a separate directory on your system before installing Video and Image Processing Blockset Version 2.3 (R2007a).

Video and Image Processing Blocks Are Now Forward Compatible

When you save R2007a models in R2006b format, the Video and Image Processing blocks do not produce any errors or warnings.

Version 2.2 (R2006b) Video and Image Processing Blockset

This table summarizes what's new in Version 2.2 (R2006b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes Summary	Bug Reports Includes fixes	Printable Release Notes: PDF Current product documentation

New features and changes introduced in this version are:

Contrast Adjustment Block Linearly Scales Pixel Values

The Contrast Adjustment block adjusts the contrast of an image by linearly scaling the pixel values between upper and lower limits. For more information, see the Contrast Adjustment block reference page.

Demosaic Block Converts Bayer's Format Images to RGB

The Demosaic block takes in images in Bayer's format and outputs RGB images. For more information, see the Demosaic block reference page.

Trace Boundaries Block Returns Object Boundary Pixel Coordinates in Binary Images

The Trace Boundaries block traces object boundaries in binary images. For more information, see the Trace Boundaries block reference page.

Blob Analysis Block Outputs Orientation Angles in Radians

The Blob Analysis block now outputs a vector of angles in radians at the Orientation port. Previously, the block output a vector of angles in degrees. This change makes the block consistent with other blocks in Video and Image Processing Blockset. For more information, see the Blob Analysis block reference page.

Compatibility Considerations

If you performed any calculations with the Orientation port output, you must take into account that the angle values are now in radians.

Draw Markers Block Supports Antialiasing

You can now draw markers using an antialiasing algorithm if you select the **Use antialiasing** check box. For more information, see the Draw Markers block reference page.

From Multimedia File Block Supports Uncompressed AVI Files on UNIX

This block now supports uncompressed AVI files on UNIX platforms. As a result, you no longer need to use separate blocks to import multimedia files if you are working on both Windows and UNIX platforms.

Read AVI File Block Obsoleted

The From Multimedia File block now supports AVI files on UNIX platforms. Consequently, the Read AVI File Block has been obsoleted to remove duplicate functionality.

Compatibility Considerations

Replace any instances of the Read AVI File block with the From Multimedia File block.

Resize Block Enhanced

The Resize block has been improved in three ways:

- You can now resize a particular region of an image if you select the **Enable ROI processing** check box.
- The block's algorithm is optimized when the **Resize factor in %** parameter is an integer value.
- The block now uses a different axis for resampling. This change reduces edge artifacts and makes the block output more consistent with the output of the `imresize` function in Image Processing Toolbox.

For more information, see the Resize block reference page.

Compatibility Considerations

Due to the different axis that is used for resampling, you might observe different block output as compared to previous releases.

Shear and Translate Blocks Support Background Fill Values

You can now specify the intensity of the background pixels.

Abandoned Object Detection Demo Illustrates a Tracking Algorithm

You can find this demo in the Detection and Tracking library. Open the demo model by typing `vipabandonedobj` at the MATLAB command prompt.

Concentricity Inspection Demo Examines a Cross-Section of Optical Fiber

You can find this demo in the Video Analysis library. Open the demo model by typing `vipconcentricity` at the MATLAB command prompt.

Lane Departure Warning Demo Supports Fixed Point

This demo is now available in a fixed-point version. You can find this demo in the Detection and Tracking library. Open the demo model by typing `vipldws` at the MATLAB command prompt.

Pattern Matching Demo Provides Additional Functionality

Now, in addition to changing the pyramiding factor, you can change the number of targets to track and specify the domain in which to perform the cross-correlation.

People Tracking Demo Supports Fixed Point

This demo is now available in a fixed-point version. You can find this demo in the Detection and Tracking library. Open the demo model by typing `viptrackpeople` at the MATLAB command prompt.

Demos Might Require Downloading Source Files

For some demos, you must download source files from The MathWorks Web site. When you attempt to run these demos, a dialog box opens and asks you if you want to download files from the MathWorks Web site. If you click Yes, a Web page that explains how to download the necessary files opens. If you click No, the dialog box closes, and you are unable to run the demo.

Compatibility Considerations

The Scene Change Detection, Traffic Warning Sign Recognition, and Abandoned Object Detection demo source files have been moved to the MathWorks Web site. Before you can run these demos, you need to download the required video files.

Version 2.1 (R2006a) Video and Image Processing Blockset

This table summarizes what's new in Version 2.1 (R2006a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes—Details labeled as Compatibility Considerations , below. See also Summary.	Bug Reports at Web site	No

New features and changes introduced in this version are

Autothreshold Block Enhanced

The Autothreshold block lets you scale the threshold value computed by Otsu's method using the new **Scale threshold** and **Threshold scaling factor** parameters.

Draw Shapes Block Enhanced

For lines, polylines, polygons, and circles, the Draw Shapes block can now draw antialiased shapes.

isfilterseparable Function Added

Use the `isfilterseparable` function to determine whether filter coefficients are separable.

Lane Departure Warning System Demo Added

You can find this demo in the Detection and Tracking library. Open the demo model by typing `vipldws` at the MATLAB command prompt.

MPlay GUI Access Changed

Before, you could open the MPlay GUI using the MPlay block or by typing `mplay` at the MATLAB command prompt. The MPlay block has been removed. So, you can only open the GUI using the command prompt.

Compatibility Considerations

Delete the MPlay blocks in your old models.

Version 2.0 (R14SP3+) Video and Image Processing Blockset

This table summarizes what's new in Version 2.0 (R14SP3+):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports at Web site	No

New features and changes introduced in this version are

Blocks Added

Block Matching

Use the Block Matching block to estimate motion between images or video frames.

Deinterlacing

Use the Deinterlacing block to remove motion artifacts by deinterlacing the input video signal.

Gaussian Pyramid

Use the Gaussian Pyramid block to perform Gaussian pyramid decomposition.

Optical Flow

Use the Optical Flow block to estimate object velocities.

Projective Transformation

Use the Projective Transformation block to transform a quadrilateral into another quadrilateral.

PSNR

Use the PSNR block to compute the peak signal-to-noise ratio (PSNR) between two images.

Block Enhancements

2-D Mean, 2-D Standard Deviation, and 2-D Variance

The 2-D Mean, 2-D Standard Deviation, and 2-D Variance blocks let you compute the statistic value over a particular region of interest (ROI).

Blob Analysis

The Blob Analysis block lets you calculate the perimeter of blobs.

Color Space Conversion

The Color Space Conversion block lets you specify the standard to use for conversions between R'G'B' and Y'CbCr color spaces. Your choices are Rec. 601 (SDTV) or Rec. 709 (HDTV).

Compositing, Image Data Type Conversion, Median Filter, and SAD

The Compositing, Image Data Type Conversion, Median Filter, and SAD blocks accept Boolean data types on their input ports.

MPlay

The mplay GUI has been enhanced, so it is easier to use and has greater capabilities.

Demos Added

Projecting Videos onto a Rotating Cube

You can find this demo in the Geometric Transformation library. Open the demo model by typing `viprm` at the MATLAB command prompt.

Tracking Cars Using Optical Flow

You can find this demo in the Detection and Tracking library. Open the demo model by typing `viptraffico` at the MATLAB command prompt.

Traffic Warning Sign Recognition

You can find this demo in the Detection and Tracking library. Open the demo model by typing `vipwarningsigns` at the MATLAB command prompt.

Demo Enhancements

Periodic Noise Reduction

You can find this demo in the Video Enhancement library. Open the demo model by typing `vipstripes` at the MATLAB command prompt. This demo now includes a frequency domain filtering technique.

Version 1.2 (R14SP3) Video and Image Processing Blockset

This table summarizes what's new in Version 1.2 (R14SP3):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes—Details labeled as Compatibility Considerations , below. See also Summary.	Bug Reports at Web site	No

New features and changes introduced in this version are

Block Enhancements

2-D FIR Filter

The 2-D FIR Filter block now supports separable filters.

Blob Analysis

The Blob Analysis block lets you specify the size of the blobs you want to find and to exclude the blobs touching the image border.

Color Space Conversion

The Color Space Conversion block supports conversions between the R'G'B' and HSV, sR'G'B' and XYZ, and sR'G'B' and La*b* color spaces.

Draw Shapes

The Draw Shapes block lets you draw filled polygons on your video.

Edge Detection

The Edge Detection block supports the Canny edge detection method for floating-point arithmetic.

Location Port of the Insert Text and Compositing Blocks No Longer Supports as Many Data Types

The Location port of the Insert Text and Compositing blocks used to support double-precision floating-point, single-precision floating-point, and Boolean data types as well as 8-, 16-, and 32-bit signed and unsigned integers. Now this port supports only double-precision floating-point and single-precision floating-point data types when the block input is a floating-point data type.

Compatibility Considerations. You might need to change the data type of the signal input to the Location port.

MPlay

The mplay GUI can stop and start a Simulink simulation. Also, its interface has been enhanced, so it is easier to use and has greater capabilities.

Read AVI File, Read Binary File, and From Multimedia File

The Read AVI File, Read Binary File, and From Multimedia File blocks can return an end-of-file indicator, which lets you determine when the end of your video file has been reached.

Read Binary File and Write Binary File

The Read Binary File and Write Binary File blocks let you specify the byte ordering in custom files. You can choose between big endian and little endian data organization.

Fixed-Point Support

The Autothreshold block now supports fixed-point data types.

Demos Added

Cell Counting

You can find this demo in the Video Segmentation Using Morphology library. Open the demo model by typing `vipcellcounting` at the MATLAB command prompt.

Color Segmentation

You can find this demo in the Detection and Tracking library. Open the demo model by typing `vipcolorsegmentation` at the MATLAB command prompt.

MPlay Simulink Tutorial

You can find this demo in the Video Playback library. Open the demo model by typing `vipmplaytut` at the MATLAB command prompt.

People Tracking

You can find this demo in the Detection and Tracking library. Open the demo model by typing `viptrackpeople` at the MATLAB command prompt.

Visual Effects

You can find this demo in the Miscellaneous library. Open the demo model by typing `vipecffects` at the MATLAB command prompt.

Version 1.1 (R14SP2) Video and Image Processing Blockset

This table summarizes what's new in Version 1.1 (R14SP2):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes—Details labeled as Compatibility Considerations , below. See also Summary.	Bug Reports at Web site	No

New features and changes introduced in this version are

Blocks Added

Blob Analysis

Use the Blob Analysis block to compute statistical values for labeled regions.

Draw Markers

Use the Draw Markers block to mark locations by drawing circles, x-marks, plus signs, stars, or squares.

Draw Shapes

Use the Draw Shapes block to draw rectangles, lines, polygons, or circles on images.

Find Local Maxima

Use the Find Local Maxima block to find local maxima in matrices.

Hough Lines

Use the Hough Lines block to find Cartesian coordinates of lines that are described by rho and theta pairs.

Image Data Type Conversion

Use the Image Data Type Conversion block to convert and scale input image to specified output data type.

MPlay

Use the mplay GUI to block to convert and scale input image to specified output data type.

Read Binary File

Use the Read Binary File block to read binary video data from files.

Variable Selector

Use the Variable Selector block to select a subset of rows or columns from input.

Write Binary File

Use the Write Binary File block to write binary video data to files.

Demos Added

Bouncing balls

You can find this demo in the Miscellaneous library. Open the demo model by typing `vipbouncingballs` at the MATLAB command prompt.

Lane detection and tracking

You can find this demo in the Detection and Tracking library. Open the demo model by typing `vipdetectlane` at the MATLAB command prompt.

Tracking cars in video

You can find this demo in the Detection and Tracking library. Open the demo model by typing `viptraffic` at the MATLAB command prompt.

Block Obsoleted

Draw Shape

The Draw Shape block is obsolete. It may be removed in a future version of Video and Image Processing Blockset. Use the replacement block Draw Shapes.

Compatibility Considerations. Replace the Draw Shape blocks in your models with Draw Shapes blocks.

Version 1.0.1 (R14SP1) Video and Image Processing Blockset

This table summarizes what's new in Version 1.0.1 (R14SP1):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Fixed bugs	No

New features and changes introduced in this version are

Picture in Picture Demo Added

You can find this demo in the Miscellaneous library. Open the demo model by typing `vippip` at the MATLAB command prompt.

Panorama Creation Demo Added

You can find this demo in the Miscellaneous library. Open the demo model by typing `vippanorama` at the MATLAB command prompt.

Video stabilization (fixed-point version) Demo Added

You can find this demo in the Video Enhancement library. Open the demo model by typing `vipstabilize_fixpt_win` (Windows only) or `vipstabilize_fixpt_all` (Platform independent) the MATLAB command prompt.

Version 1.0 (R14) Video and Image Processing Blockset

This table summarizes what's new in Version 1.0 (R14):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	No bug fixes	No

New features and changes introduced in this version are

Introduction to Video and Image Processing Blockset

Video and Image Processing Blockset is a tool used for the rapid design, prototyping, graphical simulation, and efficient code generation of video processing algorithms. The Video and Image Processing Blockset blocks can import streaming video into the Simulink environment and perform two-dimensional filtering, geometric and frequency transforms, block processing, motion estimation, edge detection and other signal processing algorithms. You can also use the blockset in conjunction with Real-Time Workshop to automatically generate embeddable C code for real-time execution.

You can access the main Video and Image Processing Blockset library from the MATLAB command line by typing `vilib`. This main library has 11 libraries that contain 52 blocks.

Demos Introduced

Motion detection

You can find this demo in the Detection and Tracking library. Open the demo model by typing `vipmotion` at the MATLAB command prompt.

Surveillance recording

You can find this demo in the Detection and Tracking library. Open the demo model by typing `vipsurveillance` at the MATLAB command prompt.

Pattern matching

You can find this demo in the Detection and Tracking library. Open the demo model by typing `vippattern` at the MATLAB command prompt.

Video compression

You can find this demo in the Compression library. Open the demo model by typing `vipcodec` at the MATLAB command prompt.

Image compression

You can find this demo in the Compression library. Open the demo model by typing `vipimagecompression` at the MATLAB command prompt.

Histogram display

You can find this demo in the Video Analysis library. Open the demo model by typing `viphistogram` at the MATLAB command prompt.

Edge detection

You can find this demo in the Video Analysis library. Open the demo model by typing `vipedge` at the MATLAB command prompt.

Scene change detection

You can find this demo in the Video Analysis library. Open the demo model by typing `vipscenechange` at the MATLAB command prompt.

Video focus assessment

You can find this demo in the Video Analysis library. Open the demo model by typing `vipfocus` at the MATLAB command prompt.

Video stabilization

You can find this demo in the Video Enhancement library. Open the demo model by typing `vipstabilize` at the MATLAB command prompt.

Periodic noise reduction

You can find this demo in the Video Enhancement library. Open the demo model by typing `vipstripes` at the MATLAB command prompt.

Histogram equalization

You can find this demo in the Video Enhancement library. Open the demo model by typing `viphisteq` at the MATLAB command prompt.

Rotation correction

You can find this demo in the Video Enhancement library. Open the demo model by typing `viphough` at the MATLAB command prompt.

Feature extraction

You can find this demo in the Video Segmentation Using Morphology library. Open the demo model by typing `vipspokes` at the MATLAB command prompt.

Object counting

You can find this demo in the Video Segmentation Using Morphology library. Open the demo model by typing `vipstaples` at the MATLAB command prompt.

Object extraction and replacement

You can find this demo in the Video Segmentation Using Morphology library. Open the demo model by typing `vipobj` at the MATLAB command prompt.

Continuous image rotation

You can find this demo in the Geometric Transformation library. Open the demo model by typing `viprotate` at the MATLAB command prompt.

Data Type Support

All Video and Image Processing blocks support double-precision and single-precision floating-point data types during simulation and code generation. The following two blocks *only* support double-precision and single-precision floating-point data types on their input and output ports:

- 2-D Standard Deviation
- Autothreshold

Many blocks also support fixed-point data types. To use any data type other than double-precision and single-precision floating point, you must install Simulink Fixed Point.

Full Support of Embedded Real-Time (ERT) C Code Generation

All Video and Image Processing Blockset blocks support embedded real-time (ERT) ANSI C code generation (requires the Real-Time Workshop Embedded Coder).

Compatibility Summary for Video and Image Processing Blockset

This table summarizes new features and changes that might cause incompatibilities when you upgrade from an earlier version, or when you use files on multiple versions. Details are provided in the description of the new feature or change.

Version (Release)	New Features and Changes with Version Compatibility Impact
Latest Version V2.7 (R2009a)	None
V2.6 (R2008b)	<p>See the Compatibility Considerations subheading for each of these new features and changes:</p> <ul style="list-style-type: none"> • “2D-FFT Block Correctly Applies Divide-By-Two on Butterfly Outputs” on page 9 • “Refined Pad Input Handling of 2D-FIR Block” on page 10
V2.5 (R2008a)	<p>See the Compatibility Considerations subheading for each of these new features and changes:</p> <ul style="list-style-type: none"> • “Tunability Status Modified for Several Block Parameters” on page 13 • “Enhanced From Multimedia File Block” on page 14 • “Hough Transform” on page 15

Version (Release)	New Features and Changes with Version Compatibility Impact
V2.4 (R2007b)	<p>See the Compatibility Considerations subheading for each of these new features and changes:</p> <ul style="list-style-type: none">• “Demo Blocks Upgraded” on page 17• “Label Block Has More Efficient Labeling Algorithm” on page 21• “Write AVI File Block Obsoleted” on page 22
V2.3 (R2007a)	<p>See the Compatibility Considerations subheading for each of these new features and changes:</p> <ul style="list-style-type: none">• “Color Data Management Simplified Using 3-D Array Representation” on page 24• “Contrast Adjustment Block Improved” on page 25• “Demo Blocks Upgraded” on page 25• “Insert Text Block Now Supports Placing Multiple Text Strings on Images” on page 27• “Removed Lane Detection and Tracking and Continuous Image Rotation Demos” on page 27

Version (Release)	New Features and Changes with Version Compatibility Impact
V2.2 (R2006b)	<p>See the Compatibility Considerations subheading for each of these new features and changes:</p> <ul style="list-style-type: none"> • “Blob Analysis Block Outputs Orientation Angles in Radians” on page 30 • “Read AVI File Block Obsoleted” on page 30 • “Resize Block Enhanced” on page 31 • “Demos Might Require Downloading Source Files” on page 32
V2.1 (R2006a)	<p>See the Compatibility Considerations subheading for this new feature or change:</p> <ul style="list-style-type: none"> • “MPlay GUI Access Changed” on page 34
V2.0 (R14SP3+)	None
V1.2 (R14SP3)	<p>See the Compatibility Considerations subheading for this new feature or change:</p> <ul style="list-style-type: none"> • “Location Port of the Insert Text and Compositing Blocks No Longer Supports as Many Data Types” on page 39

Version (Release)	New Features and Changes with Version Compatibility Impact
V1.1 (R14SP2)	See the Compatibility Considerations subheading for this new feature or change: <ul style="list-style-type: none">• “Block Obsoleted” on page 43
V1.0.1 (R14SP1)	None
V1.0 (R14)	None