
Matrox Imaging Library (MIL) X Update 94
Release Notes (MIL CoPilot)
June 2020
(c) Copyright Matrox Electronic Systems Ltd., 1992-2020.

This document outlines what is new with MIL CoPilot and explains the current limitations and particularities of this product.

It also presents last minute information that did not make it into the manual or on-line help. Note that this text file serves to complement your manual. The information found in this file overrides your formally documented material.

Main Table of Contents

Section 1: What's new in MIL X Update 94 (MIL CoPilot)
Section 2: What's new in MIL 10 Update 80 (MIL CoPilot)
Section 3: What's new in MIL 10 Update 59 (MIL CoPilot)
Section 4: What's new in MIL 10 Update 44 (MIL CoPilot)

Section 1: What's new in MIL X Update 94 (MIL CoPilot)

Table of Contents for Section 1

1. Overview
 2. Installation notes
 3. New functionalities and improvements
-

1. Overview

MIL X Update 94 (MIL CoPilot) includes new processing functionalities and utilities, as well as general usability improvements. In particular, this new release provides:

- . Support for the Classification module.
- . Support for the String Reader module.
- . Support for user-defined functions.
- . New raster image editor to draw and modify images.
- . Support for MIL_UNIQUE_ID and vector<> in C++ code generation.
- . New optimizations to improve load time and performance.
- . New examples and many more add-ons to discover.

This release also includes many bug fixes, including the resolution of intermittent crashes and interactivity flaws.

2. Installation notes:

- The minimum requirement for this update is MIL X Service Pack 4.
- Windows' automatic 8.3 file name creation needs to be enabled in order for the MIL CoPilot installer to access the temp folder when the user name contains a space. This option allows Windows to create short file/folder name aliases for ones with long names for programs, such as the MIL CoPilot installer, that don't support spaces in the file/folder names. Alternatively, the MIL CoPilot installer needs to run from a user account that belongs to the administrators group and has no spaces in it. Note that the same applies for uninstalling MIL CoPilot.
- The MIL X Update 94 setup installs the .NET runtime version 4.7.1.

3. New functionalities and improvements

This release includes many new features and modifications to the interface's look and feel to improve the user's experience, including:

- Improvement: general usability of MIL CoPilot has been improved.
- New: Classification Module is now supported in MIL CoPilot.
- New: Raster Image Editor to modify and draw in MIL image buffers.
- New: String Reader Module is now supported in MIL CoPilot.
- New: Users can now generate C++ code using M_UNIQUE_ID for MIL_IDs
- New: Users can now define their own functions in MIL CoPilot. They can add calls to their user defined function and pass objects and values available from the object browser and variable watcher. Finally, users can generate code for these functions, where the function is defined as a normal function, using the MIL Mfunc module, or as a python script.
- New: MIL CoPilot now remembers the position and layout of windows and panes. A reset window layout item was also added to the home ribbon.
- New: Advanced and Basic preference was removed from MIL CoPilot. Users can now see all controls, ribbons, and UI elements. This allows customers to find controls and options more easily.
- New: Opening a workspace saved using previous versions of MIL CoPilot will upgrade the workspace to this version (MIL X Update 94) and produce a report with the list of modifications.
- New: Users can now use the back and forward buttons to navigate between the last selected Object or Operation. Additionally, keyboard shortcuts and mouse back/forward buttons are supported by this feature.
- New: Users can now easily grab a snapshot from their default system and digitizer with the "Grab into New Buffer" item in the Home Ribbon.
- New: Users can now see Image Statistics for color buffers.
- New: Users can now expose the MIL Overlay ID of a MIL Display once MdispSelect has been called.
- New: Users can now easily move the insertion bar beneath a selected operation using the "Move Insertion Bar Below" item in the selected operation's context menu. This helps when the operation list is very long and you want to insert a function at a particular location.
- Improvement: Users can now export the data presented in the line profile tools.
- Improvement: Users can now see if F1 is supported on a control in the control's associated tooltip.
- Improvement: Users can now set variables in parameters that take MIL constants in the Function Editor.
- Improvement: Overall optimization and search performance improvements made to the Variable Watcher window, Operation List, and Object Browser.
- Improvement: Users can now use UNC network paths in the custom sequence selection control.
- Improvement: Added new keytips to ribbons to support keyboard navigation.
- Improvement: Added MAX_LABEL_VALUE to the BlobGetResult table.
- Improvement: General bug fixes and improvements.

Section 2: What's new in MIL 10 Update 80 (MIL CoPilot)

Table of Contents for Section 1

1. Overview
2. Installation notes
3. New functionalities and improvements

1. Overview

MIL 10 Update 80 (MIL CoPilot) includes new processing functionalities and utilities, as well as general usability improvements. In particular, this new release provides:

- . Additional image processing primitives.
- . Support for image processing contexts.
- . Support for the Edge Finder module.
- . Support for the Rectangle Shape Finder context in the Model Finder module.
- . Support for the Segment Shape Finder context in the Model Finder module.
- . Support for adding FOR loops and IF statements to the operations list.
- . New optimizations to improve load time and performance.
- . Drag and drop multiple files on MIL CoPilot to open them.

. New examples and many more adds-on to discover.

This release also includes many bug fixes, including the resolution of intermittent crashes and interactivity flaws.

2. Installation notes:

- The minimum requirement for this update is MIL 10 with Processing Pack 3.
- Windows' automatic 8.3 file name creation needs to be enabled in order for the MIL CoPilot installer to access the temp folder when the user name contains a space. This option allows Windows to create short file/folder name aliases for ones with long names for programs, such as the MIL CoPilot installer, that don't support spaces in the file/folder names. Alternatively, the MIL CoPilot installer needs to run from a user account that belongs to the administrators group and has no spaces in it. Note that the same applies for uninstalling MIL CoPilot.
- Note that the MIL 10 Update 80 setup installs the .NET runtime version 4.6.1 as well as MIL 10 Update 63.

3. New functionalities and improvements

This release includes many new features and modifications to the interface's look and feel to improve the user's experience, including:

- Improvement: general usability of MIL CoPilot has been improved.
- New: Edge Finder Module is now supported in MIL CoPilot.
- New: Rectangle Shape Finder Context in the Model Finder Module is now supported in MIL CoPilot.
- New: Segment Shape Finder Context in the Model Finder Module is now supported in MIL CoPilot.
- New: MimFilterAdaptive() is now supported in MIL CoPilot.
- New: MimProjection() is now supported in MIL CoPilot.
- New: MimRemap() is now supported in MIL CoPilot.
- New: Augmentation Context is now supported in MIL CoPilot.
- New: Binarize Adaptive and Binarize Adaptive from Seed Context is now supported in MIL CoPilot.
- New: Linear Filter IIR Context is now supported in MIL CoPilot.
- New: Flat Field Context is now supported in MIL CoPilot.
- New: Histogram Equalize Adaptive Context is now supported in MIL CoPilot.
- New: Match Context is now supported in MIL CoPilot.
- New: adding FOR loops and IF statements to the list of operations is now supported.
- New: a Processing Objects ribbon for the now supported primitives with contexts.
- New: a String Operation ribbon to help users define string variables.
- New: a search field in the variable watcher window to help users locate variables.
- New: a search field in the Options view to help users find options.
- New: a custom sequence selection now lets users define a sequence that includes multiple directories and files from different locations.
- New: drag and drop multiple files on MIL CoPilot to add them to the workspace.
- New: an Export to Zip feature to package your workspace and associated files to share with other MIL CoPilot users.
- New: a button in advanced mode to delete all unused objects in the workspace.
- New: opening a workspace saved using previous versions of MIL CoPilot will upgrade the workspace to this version (MIL 10 Update 80) and produce a report with the list of modifications.
- Improvement: Function editor now opens as a central tab and has been reworked to better present errors and warnings.
- Improvement: a Browse button was added to the operation list items that reference a path on disk.
- Improvement: a list of undo/redo actions are listed beside the undo and redo buttons, allowing users to undo/redo several actions at a time.
- Improvement: a user can now copy the full path of an object that was restored or that has a related path using a contextual menu in the object browser.

- Improvement: a user can now insert a GetResult operation for general results, using the contextual menu item in the result table header or the button to the left of each general result.
- Improvement: a user can now see the name of image buffers presented in image galleries.
- Improvement: a user can now navigate with the keyboard using key-tips, where pressing Alt displays keys over various controls and menus that can be pressed to activate the button or menu.
- Improvement: a user can now navigate between ribbon tabs and select buttons in the ribbons.
- Improvement: Result tables are now paginated, where the number of results on a given page is controlled by the "Number of results per page" option. This improves performance when many results are displayed in a table. Additionally, when results are not grouped and shown in a flat table, pagination is removed to allow the user to see all their results.
- Improvement: a user can now press F1 when the cursor is placed over a button or control type combo to get contextualized help. Additionally, they can place the cursor inside controls or parameter fields in modal ribbons and get more specific contextual help based on the function's values or parameters.
- Improvement: a user can now edit the selected operation by pressing the "Edit Operation" button in the Operation Viewer.
- Improvement: a user now receives a warning when they select a buffer allocated in the processing function to an external display. This is to alert them to the flickering effect that will occur as the MbufFree in the processing loop causes the display to close.
- Improvement: a user now receives a warning when their displays view mode is different in the generated code compared to the one they have set in MIL CoPilot.

Section 3: What's new in MIL 10 Update 59 (MIL CoPilot)

Table of Contents for Section 2

1. Overview
2. Installation notes
3. New functionalities and improvements

1. Overview

MIL 10 Update 59 (MIL CoPilot) includes new processing functionalities and utilities, as well as general usability improvements. In particular, this new release provides:

- . additional image processing primitives,
- . support for the SureDotOCR module,
- . support for the Code Reader module,
- . support for running a list of operations on a sequence of images,
- . a utility to generate a sequence of images,
- . right-click support on a specific result for quickly adding a MIL "GetResult" operation,
- . new examples and many more adds-on to discover!

This release also includes many bug fixes, including the resolution of intermittent crashes and interactivity flaws.

2. Installation notes:

- The minimum requirement for this update is MIL 10 with Processing Pack 2.
- Windows automatic 8.3 file name creation needs to be enabled in order for the MIL CoPilot installer to access the temp folder when the user name contains a space. This option allows Windows to create short file/folder name aliases for ones with long names for programs, such as the MIL CoPilot installer, that don't support spaces in the file/folder names. Alternatively, the MIL CoPilot installer needs to run from a user account that belongs to the administrators group and has no spaces in it. Note that the same applies for uninstalling MIL CoPilot.
- Building the generated code using Visual Studio 2015 or 2017 also requires

the presence of Windows SDK version 8.1, which is installed from the Visual Studio setup.

- Note that the MIL 10 Update 59 setup installs the .NET runtime version 4.6.1 as well as MIL 10 Update 63.

3. New functionalities and improvements

This release includes many new features, as well as modifications improving the look and feel, and the user's experience, including:

- Improvement: general usability of CoPilot has been improved.
- New: MblobReconstruct() is now supported in CoPilot.
- New: MimZoneOfInfluence() is now supported in CoPilot.
- New: MimTransform() is now supported in CoPilot.
- New: MimHistogramEqualize() is now supported in CoPilot.
- New: MimDistance() is now supported in CoPilot.
- New: MimLabel() is now supported in CoPilot.
- New: executing a list of operations on a sequence of images is now supported.
- New: a ribbon to facilitate the acquisition of a sequence of images is now available.
- New: a "GetResult" operation can now be easily inserted in the Operation List by right-clicking on a result cell in a result table.
- New: the ribbon to edit an MgenLutFunction LUT now supports the M_POWER function.
- New: opening a workspace saved using the previous version of MIL CoPilot (MIL 10 Update 44) will upgrade the workspace to this version (MIL 10 Update 59) and produce a report with the list of modifications.
- New: a copy to clipboard button is now supported in the Object Properties.
- Improvement: the central view now auto-scrolls when a rectangular area is interactively defined.
- New: a menu item to open the Start Page is now available in the Home Show/Hide Windows.
- New: the File menu now includes a link to the Start Page.
- New: a check-box now allows locking the range to the depth of the source image in the line profile utility.
- New: the preferences now includes the default display view mode option.
- New: a warning now indicates when the insertion bar is not at its default location.
- New: a contextual menu is now supported for the Object Properties.
- New: the operation code snippet now supports the copy to clipboard.
- Improvement: the utility tab is now brought on top when the associated image is selected.
- Improvement: a graphic is now selected when when the corresponding utility tab is selected.
- Improvement: in the Variable Watcher, the type of variable is now displayed according to the selected programming language.
- New: it is now possible to rename a variable in the Variable Manager.
- New: the Operation List is now split into multiple sections such as the Processing Function section.
- Improvement: the workspace now keeps track of the latest generated Visual Studio solution.
- New: the preferences now includes the default maximum number of results to report.
- New: the Recent Workspaces list now has a contextual right-click menu to, for example, remove a workspace from the list.
- New: a hint icon may now appear for items in the Operation List and in the Object Browser to indicate potential workspace optimizations.
- Improvement: in the code generation, the status icon now indicates a compilation error occurred.
- New: corresponding variables are now automatically created when MxxxInquire and MxxxGetResult operations are created.
- New: in the code generation, a warning is shown if the code has been externally modified.
- New: in the ribbons, the destination buffers can now be set to a Clone as source, or Reset as source.
- New: in the code generation, the generation of Visual Studio 2017 solutions is now supported.
- New: it is now possible to find operations related to a given variable name.
- New: it is now possible to find variables related to a given operation.

- New: links to "Matrox Vision Academy" have been added to the Start Page and to the interface's QuickAccess (at the top-right of the main window).
- New: a drop-down has been added to the interface's QuickAccess to open the MIL and MIL CoPilot helps.
- New: in Advanced mode, a button to delete all the operations has been added in the Home ribbon.
- New: the generated code header now lists the minimum MIL requirements and updates.
- New: a dialog box to manage the invalid path when opening a workspace is available.
- Improvement: interactive definition of a Pattern Matching region can now be done in World units when the target image is calibrated.
- New: a button to reset the highlighted sections in the generated code is available.
- New: in the code generation, an Open Folder button has been added.
- Improvement: in the Model Finder ribbon, the first model is now selected by default if no model has not been selected.
- New: in the status bar of the current view, a menu to modify the display View Mode is now available.
- New: in the generated code, it is now possible to disable the MIL errors.
- New: a Help (?) button is now available in most panes to get quick access to the most appropriate MIL CoPilot Help page.
- New: previews of LUTs and arrays are now available.
- New: a tool-tip now indicates the path of objects loaded from files.
- Improvement: the different Model Finder ribbons for defining models have been standardized.
- New: MIL Function ribbons support additional functions such as Mdmr and Mcode functions; MdigControl and Inquire; MimBinarizeAdaptative, MimFlatField, MimMatch, MimShift, and MimHistogramEqualizeAdaptive; MobjAlloc, Control and Inquire.
- Improvement: destination buffers are now generated using MbufClone() instead of MbufAllocColor()
- Improvement: the histogram utility has been re-factored and improved for usability.
- Improvement: the image statistics pane has been re-factored and improved for usability.
- Improvement: the Function Editor's Apply button is now disabled when a parameter is incorrect.
- Improvement: a new workspace is by default saved into the default folder "My Documents\Matrox CoPilot Workspaces" to speed up the opening of files. The default folder can be changed in the MIL CoPilot Options pane.

Section 4: What's new in MIL 10 Update 44 (MIL CoPilot)

Table of Contents for Section 2

1. Overview
2. New functionalities
 - 2.1 Supported MIL functions
 - 2.2 Utilities
 - 2.3 Examples
3. Known limitations
4. Known issues

1. Overview

- MIL CoPilot provides a unified interactive environment to experiment with MIL; allowing programmers to test one or more approaches for an application, before writing any code.
- MIL CoPilot is centered on the image, giving access to MIL image processing and analysis operations through a contextual ribbon menu with an interactive configuration.
- MIL CoPilot records applied operations in a list that it converts into executable code in one of the programming languages, supported by MIL.
- Particular aspects of images can be studied using an assortment of provided utilities.

2. New functionalities

2.1 Supported MIL functions

The following is a list of supported MIL functions:

- Buffer allocations and copies.
- Point-to-point and geometric transformations.
- Linear filters, rank filters, and morphology primitives.
- Calibration definition and operations.
- Pattern Matching and Model Finder tools.
- Measurement tool and Blob analysis.

2.2 Utilities

The following is a list of the utilities provided with MIL CoPilot:

- Line and arc measures and profiles .
- Image statistics and histogram.
- A compare image tool.
- Code and project generation for C++, C#, VB.net, and Python.
- Export results to a Microsoft Excel XML or CVS file.

2.3 Examples

Several workspace examples are provided with MIL CoPilot. These examples are available from MIL CoPilot start page but also from the MIL Example Launcher by selecting the MIL CoPilot platform.

3. Known limitations

The following is a list of known limitations with this product.

- Primitives based on a context, such as the dead pixel correction operation, are not yet available in MIL CoPilot.
- Running on a sequence of images or from a digitizer is not yet available in MIL CoPilot. To apply the operation on a new image, edit the source image path of the buffer's restore operation.

3.1 Unsupported constants

- The following constants are not supported:

M_INTERACTIVE	in all stream, save, import, export and restore functions.
M_LOAD and M_MEMORY	in all MxxxStream functions.
M_ALL and M_DEFAULT	in all MxxxGetResult (ResultIndex parameter)
M_WINDOW_HANDLE	in MdispInquire.
M_DELETE	in MmodDefine and MpatDefine.
M_AUTO_DEFINE	in MmodDefine.
M_MULTIPLE	in MpatDefine.
M_INCLUDED_BLOBS	in MblobGetResult.

3.2 Unsupported MIL functions

The following is a list of known limitations, by MIL module:

- Blob module:
 - MblobMerge and MblobReconstruct are not yet supported.
 - Blob post-calculation is not supported.
 - M_VECTOR_AND_RASTER regions are not supported.
- Calibration module:
 - McalGrid M_DISPLACE_..._COORD is not yet supported.
 - 3D calibration operations are not yet supported.
 - McalTransformImage with M_USE_DESTINATION_CALIBRATION is not yet supported.
- Measurement module:
 - Result statistics (M_MAX, M_MIN,...) are not yet supported.
- Model Finder module:
 - Advanced model definitions (auto-define, from edge result, from model finder result, merged model) are not yet supported.
 - Model weighted mask are not yet supported.

- Primitives:
 - The following primitives are not yet supported:
 - MimZoneOfInfluence,
 - MimWatershed,
 - MimWarp,
 - MimTransform,
 - MimPolarTransform,
 - MimLocateEvent,
 - MimLabel,
 - MimHistogramEqualize,
 - MimFindExtreme,
 - MimDistance,
 - MimCountDifference,
 - MimConnectMap,
 - MimArithMultiple,
 - McolProject,
 - McolDistance,
 - MbufBayer.

3.3 Utilities

The following is a list of utilities included with MIL CoPilot:

- 32-bit float buffers
 - Line and Arc Profiles are not available on 32-bit buffer.
- YUV buffers
 - YUV buffers are not supported by the utilities: Line and Arc profiles, Histogram, etc

4. Known issues

The following is a list of known issues with the product:

- When using the Blob module, several unavailable feret feature columns may be filled with uninitialized data. For example, enabling the binary version of a feature (specifically, M_FERET_PRINCIPAL_AXIS_ELONGATION, M_FERET_AT_PRINCIPAL_AXIS_ANGLE, M_FERET_AT_SECONDARY_AXIS_ANGLE) will result in erroneous columns filled for the equivalent grayscale feret features.
- The the "Compare Images" tool only works with image buffers. If you don't specify images buffers, MIL CoPilot will abruptly terminate.