OPERATING INSTRUCTIONS

Stream Editor

3D machine vision

SICK
Sensor Intelligence.

Described product

Stream Editor

Manufacturer

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Legal information

Original document

This document is an original document of SICK AG.

Contents

1 About this document

1.1 Information on the operating instructions

These operating instructions provide important information on how to use devices from SICK AG.

Prerequisites for safe work are:

- Compliance with all safety notes and handling instructions supplied.
- Compliance with local work safety regulations and general safety regulations for device applications

The operating instructions are intended to be used by qualified personnel and electrical specialists.

NOTE
Read these operating instructions carefully to familiarize yourself with the device and its functions before commencing any work.

The operating instructions are an integral part of the product. Store the instructions in the immediate vicinity of the device so they remain accessible to staff at all times. Should the device be passed on to a third party, these operating instructions should be handed over with it.

These operating instructions do not provide information on the handling and safe operation of the machine or system in which the device is integrated. Information on this can be found in the operating instructions for the machine or system.

1.2 Explanation of symbols

Warnings and important information in this document are labeled with symbols. Signal words introduce the instructions and indicate the extent of the hazard. To avoid accidents, damage, and personal injury, always comply with the instructions and act carefully.

DANGER
... indicates a situation of imminent danger, which will lead to a fatality or serious injuries if not prevented.

WARNING
... indicates a potentially dangerous situation, which may lead to a fatality or serious injuries if not prevented.

CAUTION
... indicates a potentially dangerous situation, which may lead to minor/slight injuries if not prevented.

NOTICE
... indicates a potentially harmful situation, which may lead to material damage if not prevented.

NOTE
... highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

1.3 Further information

Release notes:

- Available via SICK Support Portal: **supportportal.sick.com**

2 Safety information

2.1 Intended use

Stream Editor is a computer software application used to solve machine vision tasks. Stream Editor can be used together with:

- Ruler3000
- Ranger3

SICK AG assumes no liability for losses or damage arising from the use of the product, either directly or indirectly. This applies in particular to use of the product that does not conform to its intended purpose and is not described in this documentation.

2.2 Limitation of liability

Relevant standards and regulations, the latest technological developments, and our many years of knowledge and experience have all been taken into account when compiling the data and information contained in these operating instructions. The manufacturer accepts no liability for damage caused by:

- Non-adherence to the product documentation (e.g., operating instructions)
- Incorrect use
- Use of untrained staff
- Unauthorized conversions or repair
- Technical modifications
- Use of unauthorized spare parts, consumables, and accessories

2.3 Modifications and conversions

NOTICE
Modifications and conversions to the device may result in unforeseeable dangers.

Interrupting or modifying the device or SICK software will invalidate any warranty claims against SICK AG. This applies in particular to opening the housing, even as part of mounting and electrical installation.

2.4 Cybersecurity

Overview

To protect against cybersecurity threats, it is necessary to continuously monitor and maintain a comprehensive cybersecurity concept. A suitable concept consists of organizational, technical, procedural, electronic, and physical levels of defense and considers suitable measures for different types of risks. The measures implemented in this product can only support protection against cybersecurity threats if the product is used as part of such a concept.

You will find further information at www.sick.com/psirt, e.g.:

- General information on cybersecurity
- Contact option for reporting vulnerabilities
- Information on known vulnerabilities (security advisories)

As the device, which the software and API communicates with, complies with the GigE Vision®/GenICam™ standard, please note the following:

- The device does not support operating entity authentication. Anyone who can connect to the device over Ethernet can perform all operations (firmware update, reboot, and configuration), without entering credentials such as passwords.
- All communication (images, configuration, logs) between the device and the computer is transmitted unencrypted using the UDP protocol.
- The device and computer (including Stream Setup/Stream Editor) must be upgraded to the most recent firmware/software to get security updates.
- The GigE Vision® device discovery is done using UDP port 3956 and further communication is done using dynamic UDP ports.
- When connecting a device, it must be placed on a private network where access control is handled by, e.g., separate firewalls. The recommended connection is to use a separate network card on the computer connected directly to the device.

NOTE

The provided software and APIs are delivered without cybersecurity considerations. It is expected that when using the provided APIs into a solution, cybersecurity requirements for the solution is considered and implemented as necessary for final solution.

3 Product description

3.1 Overview

Stream Editor is an image processing software for Ranger3 and Ruler3000 cameras. The purpose of the software is to support users utilize step programming and solve machine vision tasks.

The software allows users to create custom image processing workflows through a series of modular steps. Each step represents a specific image processing operation such as filtering, segmentation, or feature extraction. Users can preview the results of each step in real-time, facilitating quick adjustments and optimizations and interactive debugging tools to analyze the impact of each processing step on the image.

With the provided API, the step program is easily integrated into the complete machine vision solution infrastructure.

Stream Editor complies with the GenICam™ and the GigE Vision® standards.

4 Installation

4.1 Software installation

4.1.1 System recommendations

The computer requirements for the system will depend on your application, but as a general guideline the following is recommended for minimal operation:

- Windows 10, 64 bit.
- Open GL 3.3 or later
- Microsoft .NET framework, version 4.7.2

NOTE
Please read the release notes for detailed information.

4.1.2 Installing computer software

The latest version of the **Stream Editor** can be downloaded from the SICK Support Portal.

1. Log in to the SICK Support Portal.
2. Navigate to the **Stream Editor** page: supportportal.sick.com/downloads/stream-editor/.
3. Download the **Stream Editor Installer** and unzip the file.

The zip file contains the **Stream Editor** software, which is used for the operation procedures described in this manual. To start the installation, click the **StreamEditorInstaller.exe** file.

Accept the license terms and conditions, and follow the instructions in the setup wizard to install **Stream Editor**.

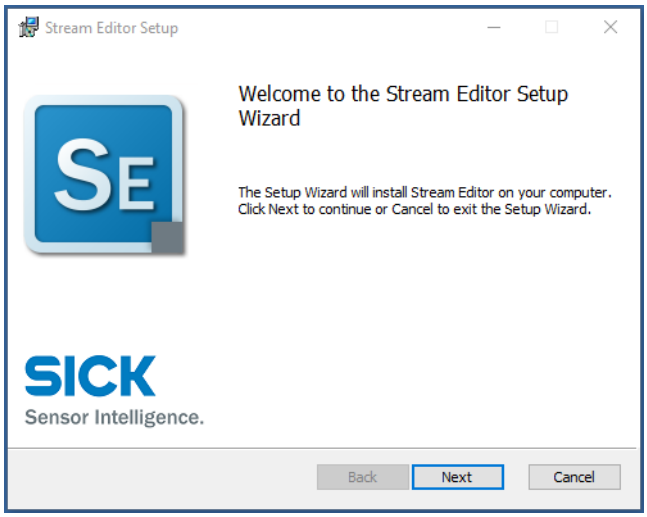


Figure 1: Setup wizard, Stream Editor

4.2 Activating a license

Use the SICK License Central to handle a license. The majority of the features in the software is not possible to use until a license is activated.

The activation process:

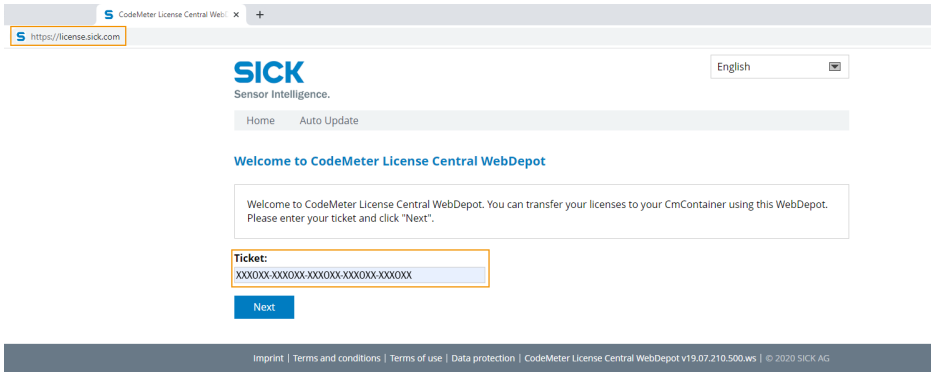
- Direct license transfer, see "Direct license transfer", page 10

The direct license transfer requires an internet connection while connected to the computer.

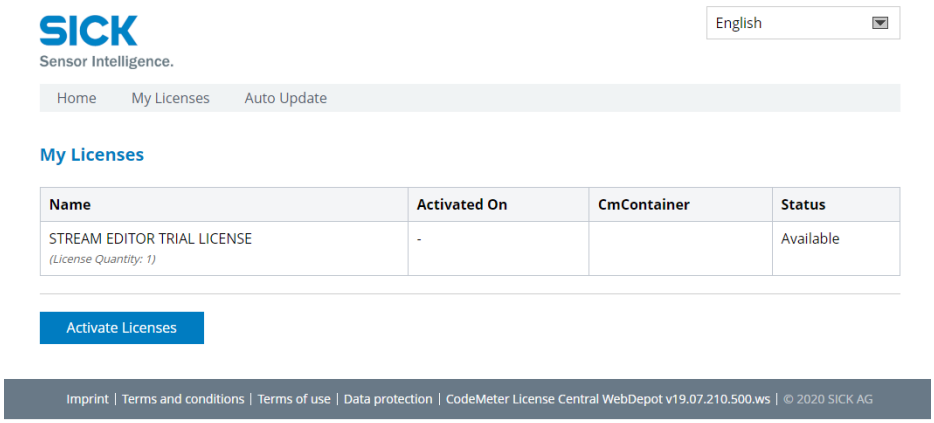
4.2.1 Direct license transfer

NOTE
The license can also be reused on a different computer.

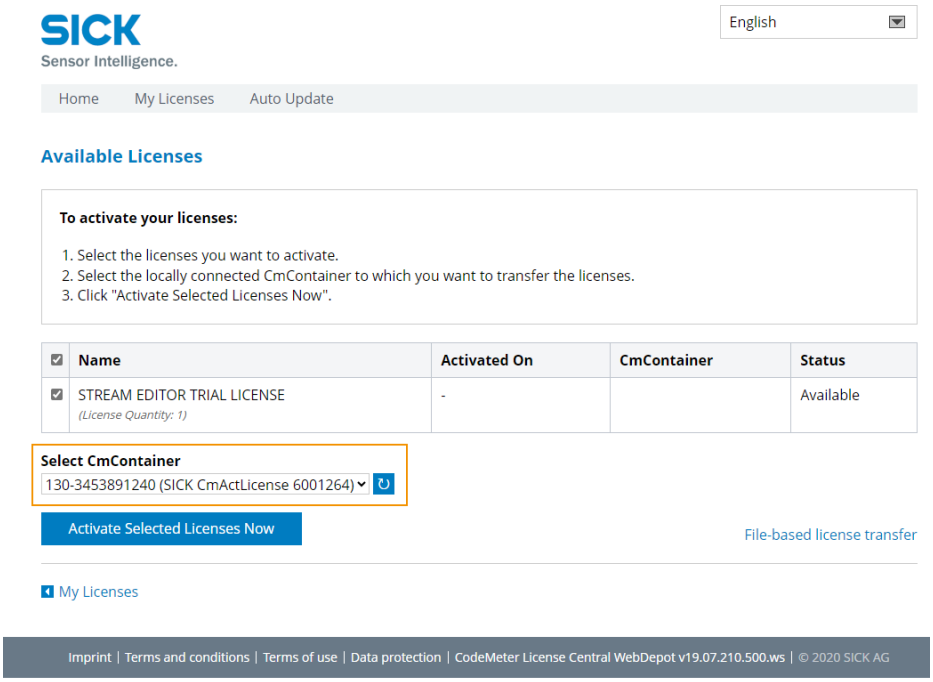
1. Make sure that the computer has internet access. Open a web browser and enter **https://license.sick.com/**.



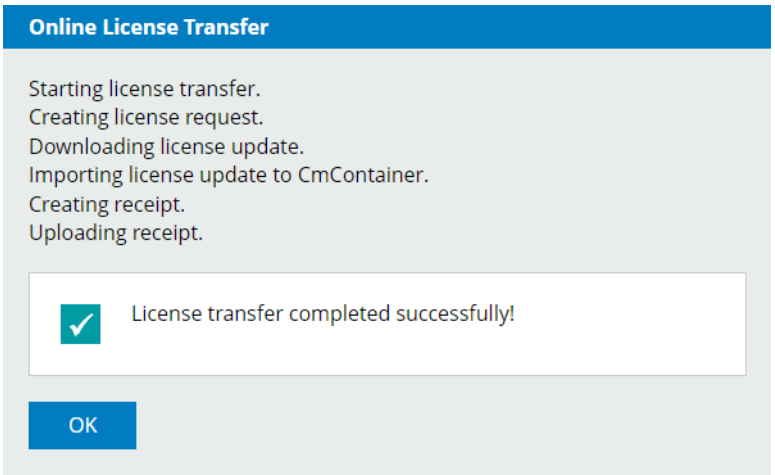
2. Enter the ticket ID purchased from SICK.com or reused from another computer.
3. Click **Next** to see available licenses. Click **Activate Licenses**.



4. Select the license and use the default CmContainer shown in **Select CmContainer**. Select **Activate Selected License Now**.



5. The license activation starts. Click **OK** when completed.

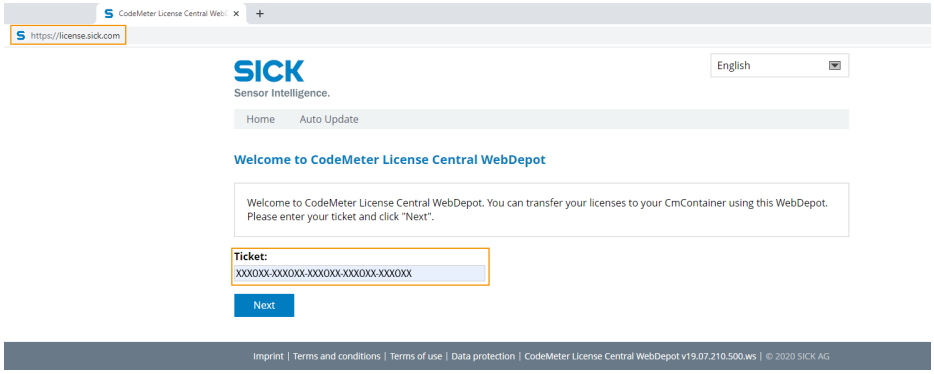


✓ The license is now activated on the computer.

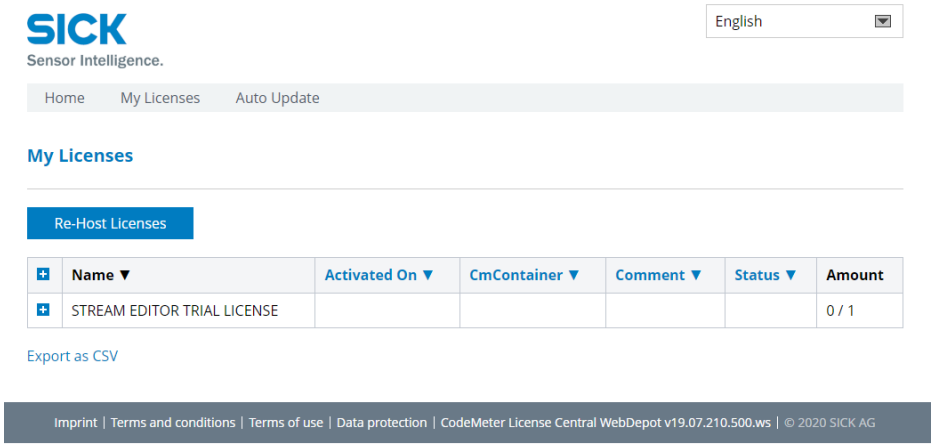
4.2.2 Re-hosting licenses

Make sure that the license you want to re-host is located in a CmContainer on the computer.

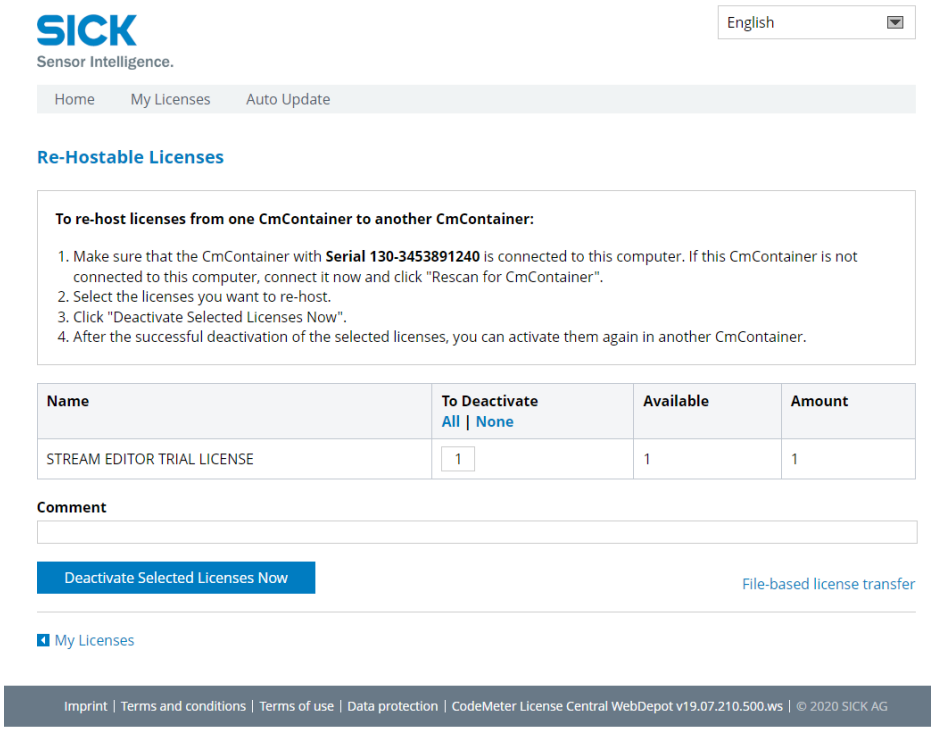
1. Make sure that the computer has internet access. Open a web browser and enter https://license.sick.com/.



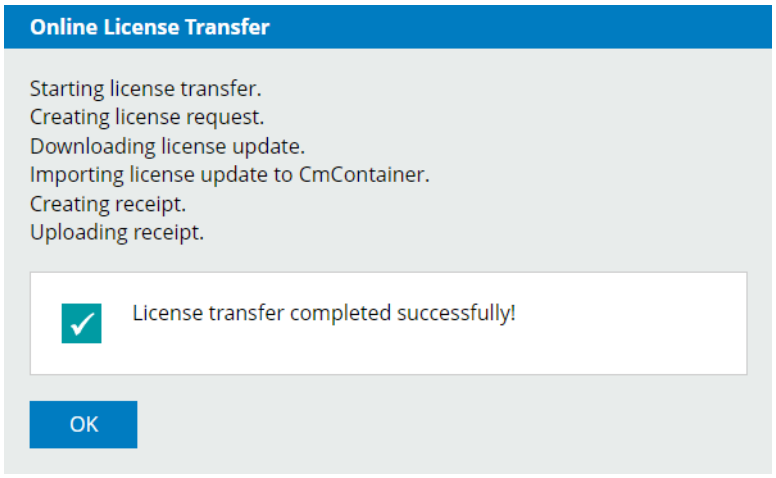
2. Enter the ticket ID purchased from SICK.com.
3. Click **Next** to see available licenses. Click **Re-Host Licenses**.



4. Follow the instructions and select **Deactivate Selected License Now.**



5. The license deactivation starts. Click **OK** when completed.



✓ The license is now deactivated from the computer and possible to reuse.

5 Operation

5.1 Stream Editor graphical user interface

Stream Editor is used to solve image processing tasks for Ranger3 and Ruler3000 applications. The software does not offer a full solution for an application, since this normally also includes parameter settings of the camera, as well as result handling.

NOTE
It is not possible to change the parameters while the step program is running.

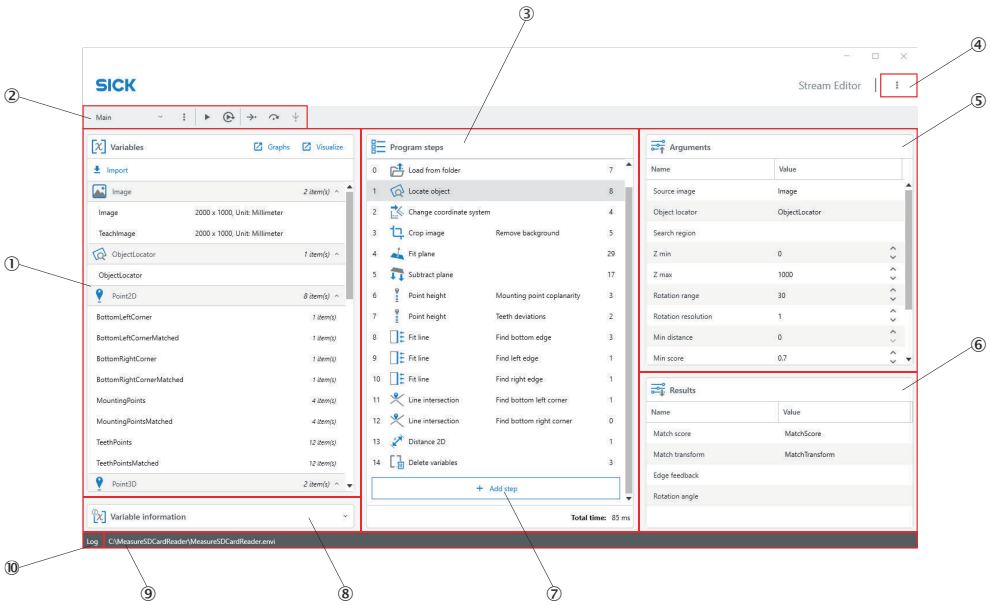


Figure 2: Graphical user interface

① Variables list panel
② Program controls
③ Program steps panel
④ Menu
⑤ Arguments panel
⑥ Results panel
⑦ Add step button
⑧ Variable information panel
⑨ Environment file path
⑩ Log section

This section gives an introduction to **Stream Editor** with its different panels and functionalities.

5.1.1 Menus

Program controls

In the program controls section you find the name of the currently selected step program along with possibilities to create new programs. Use the buttons to run the program in different ways.

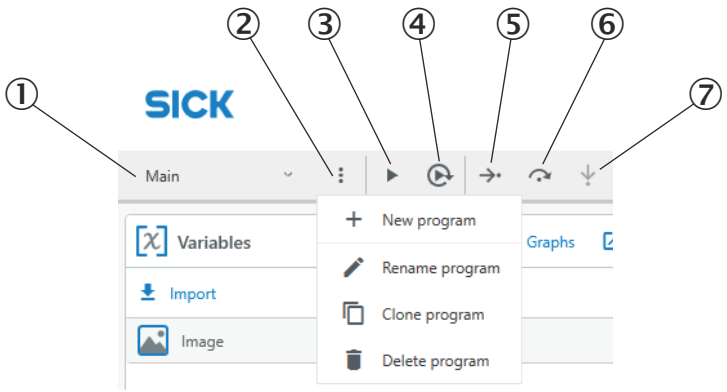


Figure 3: Program controls GUI reference

① Program name
② Program menu
③ Run the selected step program (F5)
④ Run the selected step program continuously
⑤ Run the selected step (F9)
⑥ Run the selected step and move to the next step (F10)
⑦ Step into a Run step program step (F11)

Menu

The menu includes options to get further help with and knowledge about the software, e.g. the application version and API documentation.

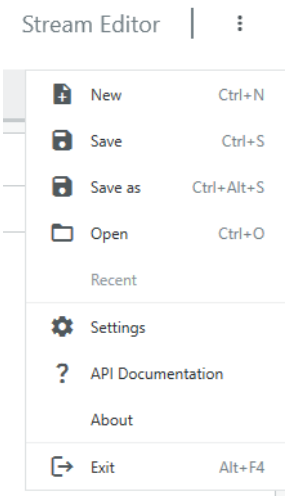


Figure 4: Stream Editor menu GUI reference

Open **Settings** to set up the environment for automatic saving and define the time interval.

5.1.2 Panels

5.1.2.1 Variables panel

The **Variables** panel shows the step results as variables in a variable list. A variable can also be loaded directly from file, using the button **Import**. A variable needs to have a unique name, since the name identifies the variable when used as input to the step arguments.

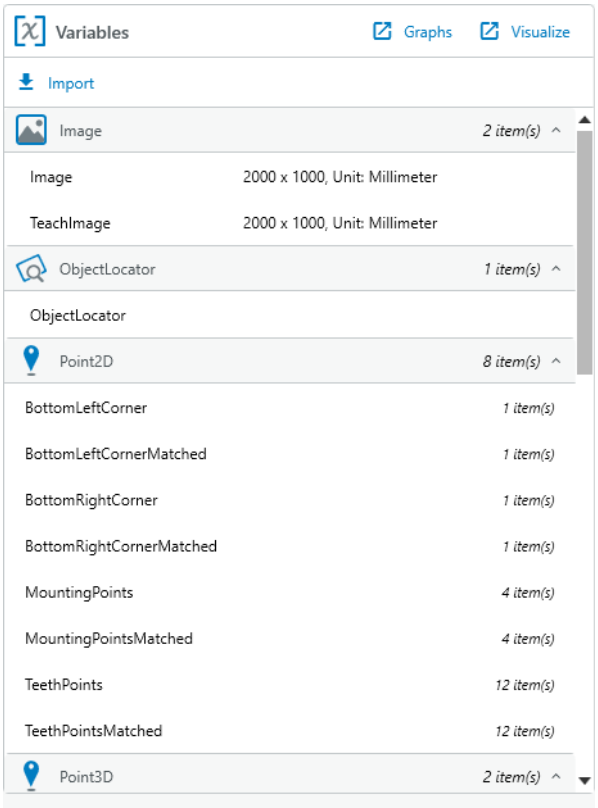


Figure 5: Variables panel GUI reference

5.1.2.2 Program steps panel

Use the **Program steps panel** to add the steps to solve image processing tasks. A step contains a tool that takes a list of arguments as inputs and returns a list of results. The results can be used as input arguments to steps located further down in the step program.

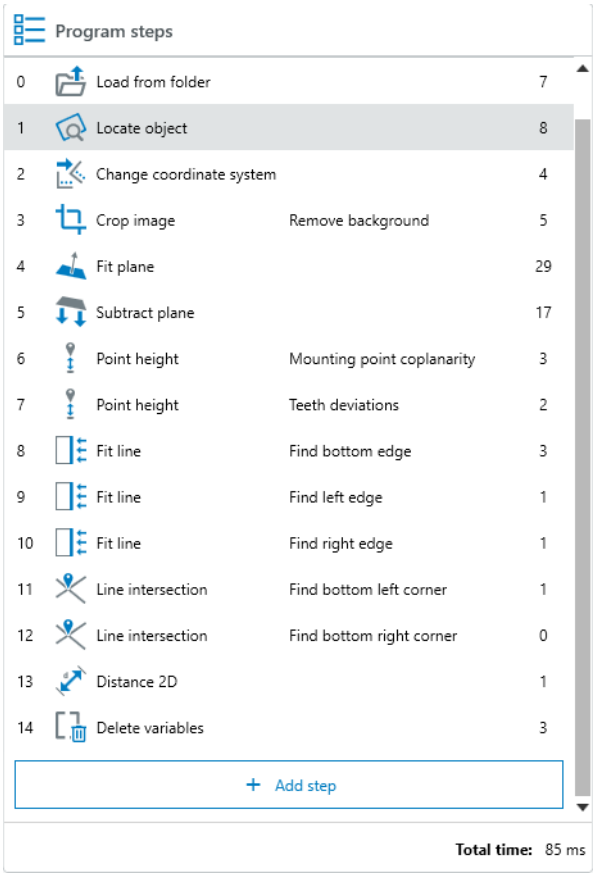


Figure 6: Program steps panel GUI reference

5.1.2.3 Arguments panel

The step arguments can use different types of input.

- **Variable**: Use a variable as input.
- **Fixed value**: Use a number, selection from a dropdown list box, or a checkbox as input.
- **Optional**: The argument can be empty. The argument description explains how an optional argument is treated when it is empty.

Hoover over an argument to see the description.

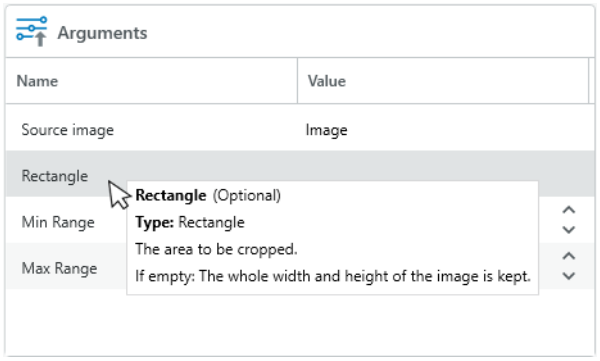


Figure 7: Arguments panel GUI reference

5.1.2.4 Results panel

A step produces one or multiple result variables. The result list of the step specifies the names of the result variables. A result can be optional. When leaving an optional result empty, the result will not produce any variable when running the step.

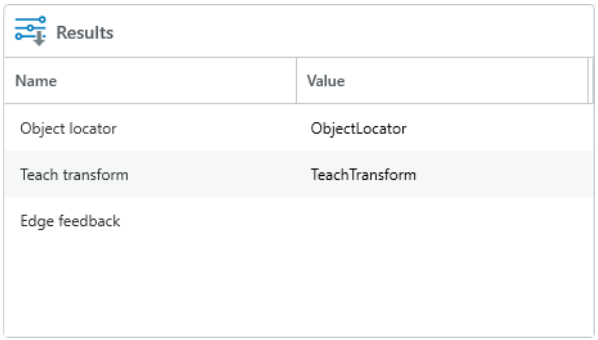


Figure 8: Results panel GUI reference

5.1.2.5 Variable information panel

The **Variable information** panel shows detaild information about the selected variable.

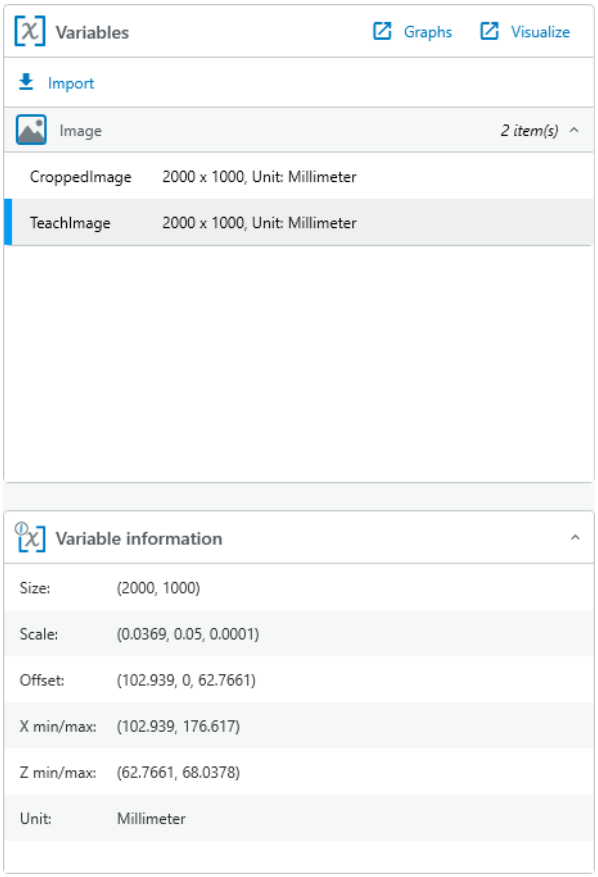


Figure 9: Variable information GUI reference

There are different types of variables. Some of the variables are built up of a list consisting of multiple variable elements. Many of the variables can be visualized in one or multiple viewers.

Table 1: Variable types

Icon	Variable type	Format	Visualization
	CalibrationModel	Single	None
	ObjectLocator	Single	None
	Ellipse	List	2D
	Image	Single	2D/3D
	Line2D	List	2D
	Number	List	None
	PixelRegion	List	2D
	Plane	List	3D
	Point2D	List	2D
	Point3D	List	3D/Graph
	PointCloud	Single	3D
	Profile	List	Graph
	Rectangle	List	2D
	String	List	None
	Transform2D	List	None
	Transform3D	List	None

5.2 Visualization

5.2.1 2D viewer

Use the **2D viewer** to show images and 2D geometric variables. Click on **Visualize** from the **Variables** panel to open the **2D viewer** window.

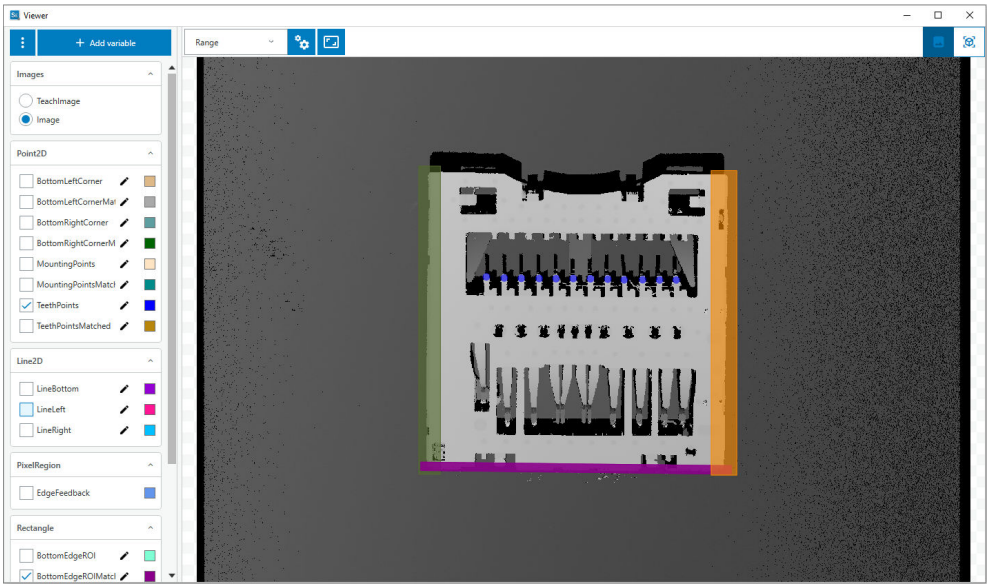


Figure 10: 2D viewer GUI reference

Use the button Add variable to create variables directly in the 2D viewer. When creating a variable in the viewer, it is added to the variable list. These variable types can also be modified by clicking on the edit button next to the variable.

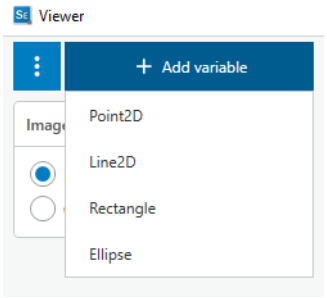


Figure 11: Add variable menu in the 2D viewer

5.2.2 3D viewer

Use the **3D viewer** to show images and 3D geometric variables. Click on **Visualize** from the **Variables** panel and select the button 3D to open the **3D viewer** window.

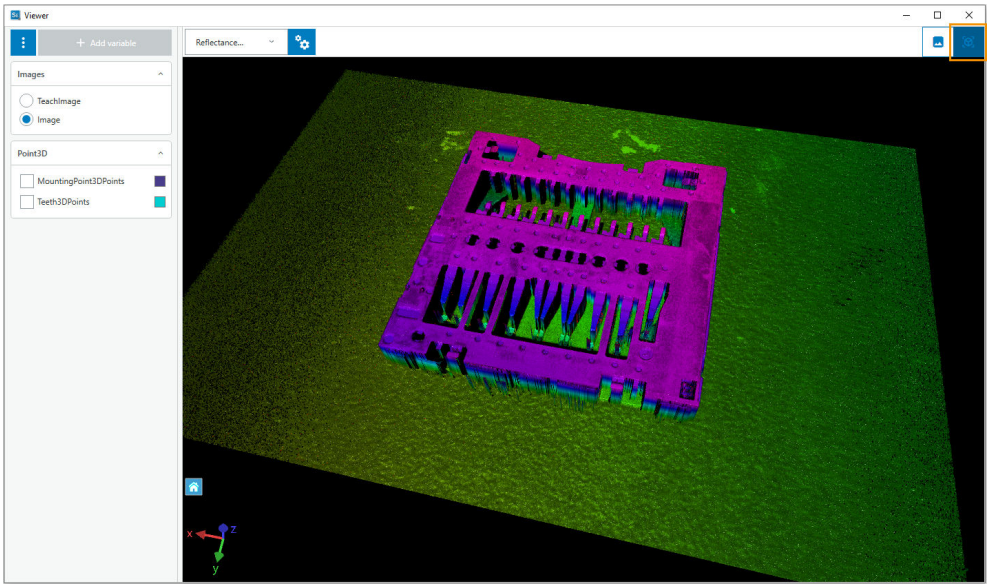


Figure 12: 3D viewer GUI reference

5.2.3 Graphs viewer

Use the **Graphs** viewer to visualize the **Profile** variable. The viewer can also show **Point3D** variables. Click on **Graphs** from the **Variables** panel to open the **Graphs** window.

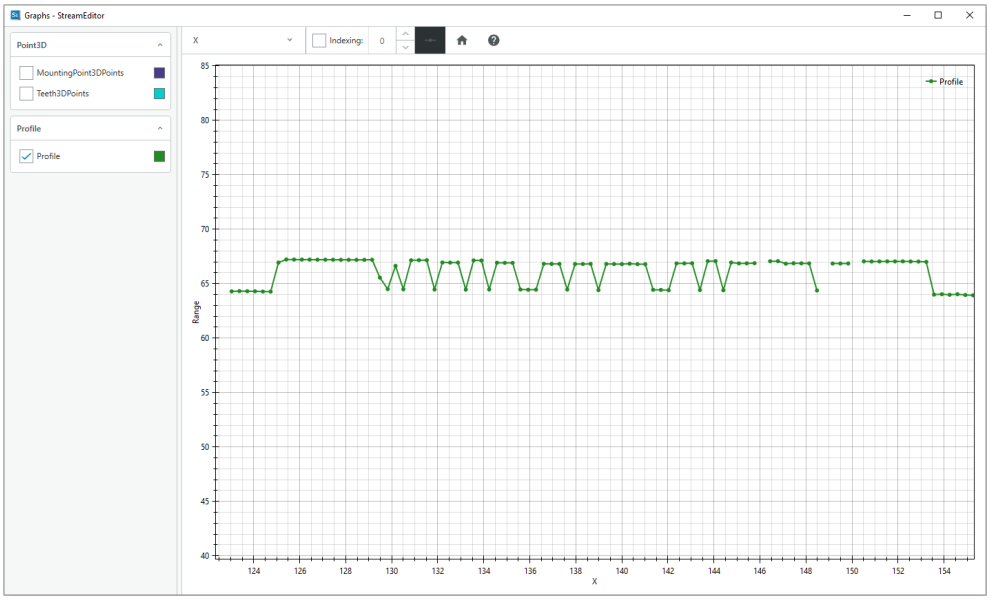


Figure 13: Graphs viewer GUI reference

5.3 Stream Editor API

Stream Editor comes with a C# API, which is used for integrating a developed step program into a vision system application. The API is distributed as a set of NuGet packages and can be used from a .Net application in Visual Studio. The API includes:

- Functions for loading and run step programs that have been created in Stream Editor.
- User controls for visualizations .
- Functions for creating step programs and variables directly from code.

NOTE
The installation includes API documentation and some C# examples.

The Stream Editor NuGet packages are available from the SICK hosted Artifactory package source (artifactory.sick.com). To add the source to your IDE, a SICK PartnerID is needed. The Stream Editor NuGet packages are available from the package source repository: artifactory.sick.com/ui/repos/tree/General/stream-editor-nuget-local

Adding the source

1. Click on the button **Set Me Up**.
2. Click on the the button **Generate Token & Create Instructions**.
3. Follow the instructions to add the package source to Visual Studio.

After adding the source, install the following NuGet packages to access the API

- Sick.Stream.Algorithms.DotNet
- Sick.Stream.Algorithms.Native
- Sick.Stream.Common
- Sick.Stream.Controls
- Sick.Stream.Processing

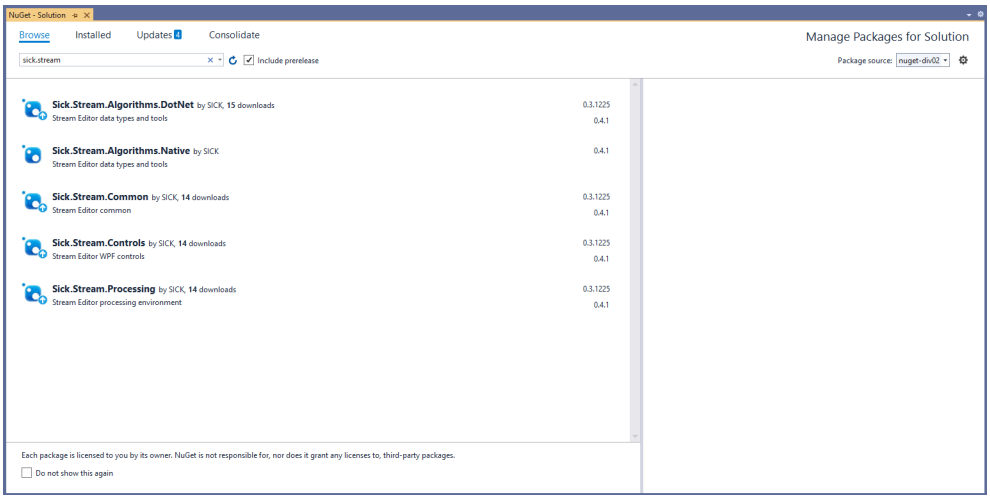


Figure 14: Manage NuGet packages

5.4 Workflow in Stream Editor

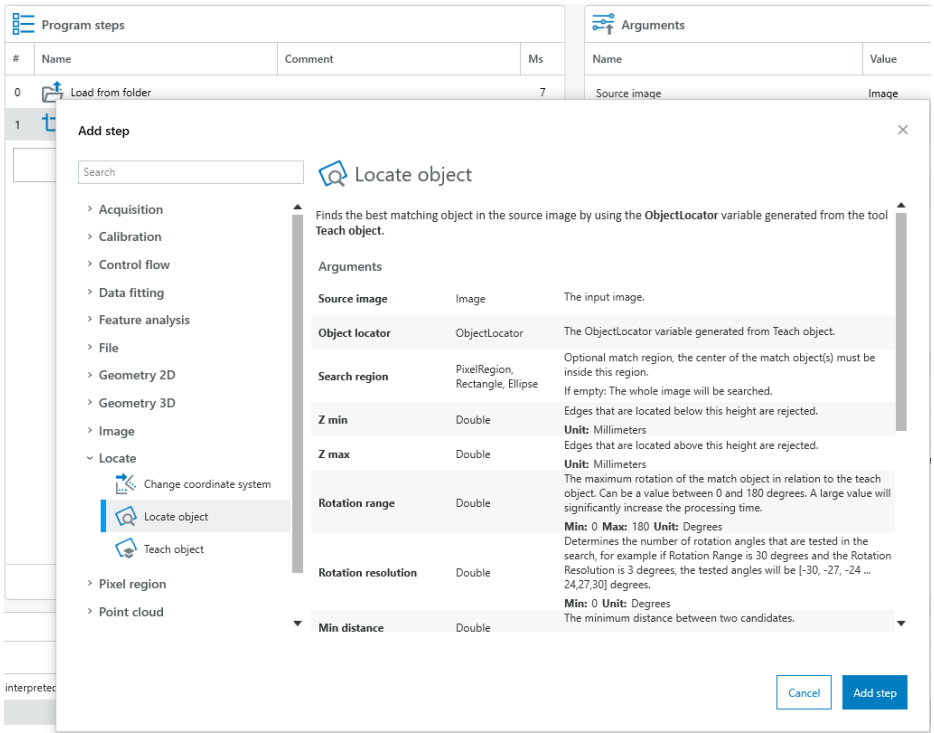
Before starting the work in **Stream Editor**, use the **Stream Setup** software to collect images. It is possible to acquire images from a camera directly in the step program. It is easier to use already collected images in this step. Using collected images makes it easy to tweak parameters and re-run the program with the same image collection, and compare the results.

NOTE
The **Stream Editor** software is not intended to solve a complete machine vision application. The user needs to configure the camera in **Stream Setup**. **Stream Setup** might also be used for calibration and for collecting images. A complete solution typically includes a custom-made C# application that runs the developed step program using the Stream Editor API. This part of the workflow is not covered in this manual.

5.4.1 Building the step program

Adding a step

1. Add a step to the bottom of the program using the button **+ Add step**. You can also select an existing step and select the RMB menus **Add before** or **Add after**. When selecting a step, explanations of the settings are shown.



2. Select **Add step** to include the step in the program.
3. Add a description to the step in the column **Comment** (optional).
4. Proceed to **Arguments** panel to set the parameters, see "Setting the parameters", page 23.
5. Continue with steps 1 to 4 until the program is finished.
6. Save the program as a processing environment file.

Deleting a step

1. Use the RMB menu.
2. Select **Remove**.

5.4.1.1 Setting the parameters

Use the **Arguments** and **Results** panels to define the input and output for each step. Use **F1** to open the descriptions for the selected step.

Different settings are available depending on the selected step. Specify the setting in the **Value** column for both arguments and results.

The variable name given in the result **Value** column can be used as input to a later step.

NOTE
The variable name is the identifier and must be unique.

5.4.2 Handling log messages

At the bottom of the main window, there is a section where log messages are available. The messages can be hidden and shown by clicking the **Log** button.

The system assigns each log message a level, either **Error**, **Warning**, or **Message**. Select the levels of interest to see the log messages. With the **Search log** function, it is possible to filter within the selected visible log messages.

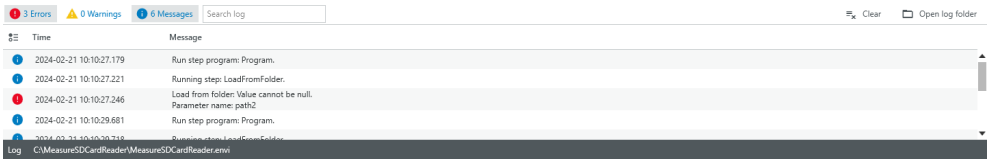


Figure 15: Messages and errors shown in the log

The **Clear** button clears all log messages. The saved log messages can be viewed using the **Open log folder** button. A file browser opens at the location of the log file, allowing easy access to the stored log.

6 Annex

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This program is provided for general use without warranty of any kind. This warranty disclaimer also extends to the implicit assurance of marketability or suitability of the program for a particular purpose.

More details can be found in the GNU General Public License.

For license texts see www.sick.com/licensetexts.

Printed copies of the license texts are also available on request.

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