ETAS Data Operator V1.2

User Guide

www.etas.com

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Data Operator V1.2 I User Guide R01 EN I 05.2025

Contents

1 Introduction

1.1 Intended use

ETAS Data Operator software is designed to streamline the preprocessing of measurement files, ensuring consistency and uniformity in the data preparation process. The intuitive graphical user interface allows users to easily perform quality checks, conversions, resampling, and trimming of measurement data. This software is particularly beneficial when dealing with a large number of files that need to be processed uniformly, as it eliminates the risk of non-identical results that can occur when using different preprocessing tools. By validating and preparing data in a uniform manner, ETAS Data Operator facilitates efficient processing of measurement data recorded in different formats and unknown states.

1.2 Target group

This product is intended for trained and qualified personnel involved in the development and calibration of automotive ECUs. The content is tailored to meet the specific needs of individuals with expertise in handling measurement files in the automotive sector.

1.3 Classification of Safety Messages

Safety messages warn of dangers that can lead to personal injury or damage to property:

DANGER

DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE indicates a situation that, if not avoided, could result in damage to physical property and/or digital property like data loss, data corruption and data vulnerability.

ATTENTION

ATTENTION indicates a hazardous situation that, if not avoided, could result in data loss, data corruption, compromised data integrity, or data vulnerability.

1.4 Safety Advice

Adhere to the ETAS Safety Advice for Data Operator V1.2, which is available within the Data Operator product. ETAS GmbH cannot be made liable for damage that is caused by incorrect use and not adhering to the safety instructions. Take all information on environmental conditions into consideration before setup and operation (see the documentation of your computer, hardware, etc.).

1.5 Data protection

If the product contains functions that process personal data, legal requirements of data protection and data privacy laws shall be complied with by the customer. As the data controller, the customer usually designs subsequent processing. Therefore, he must check if the protective measures are sufficient.

1.6 Data and information security

To securely handle data in the context of this product, see the next sections about data and storage locations as well as technical and organizational measures.

1.6.1 Data and storage locations

The following sections give information about data and their respective storage locations for various use cases.

1.6.1.1 License management

When using the ETAS License Manager in combination with user-based licenses that are managed on the FNP license server within the customer's network, the following data are stored for license management purposes:

Data

- Communication data: IP address
- User data: Windows user ID

Storage location

- FNP license server log files on the customer network

When using the ETAS License Manager in combination with host-based licenses that are provided as FNE machine-based licenses, the following data are stored for license management purposes:

Data

- Activation data: Activation ID
  - Used only for license activation, but not continuously during license usage

Storage location

- FNE trusted storage

  `C:\ProgramData\ETAS\FlexNet\fne\license\ts`

1.6.2 Technical and organizational measures

We recommend that your IT department takes appropriate technical and organizational measures, such as classic theft protection and access protection to hardware and software.

1.7 Licensing

A valid license is required to use the software. You can obtain a license in one of the following ways:

- from your tool coordinator
- via the self-service portal on the ETAS website at www.etas.com/support/licensing
- via the ETAS License Manager

To activate the license, you must enter the Activation ID that you received from ETAS during the ordering process.

For more information about ETAS license management, see the ETAS License Management FAQ or the ETAS License Manager help.

To open the ETAS License Manager help

The ETAS License Manager is available on your computer after the installation of any ETAS software.

1. From the Windows Start menu, select **E** > **ETAS** > **ETAS License Manager**.

   The ETAS License Manager opens.
2. Click in the ETAS License Manager window and press F1.

   The ETAS License Manager help opens.

1.7.1 License Variants

Each license has its own purchase number and must be ordered separately.

DATAOPERATOR_GUI

Allows you to start and use the Data Operator graphic user interface (GUI).

DATAOPERATOR_WORKER

Required for the background process used for data conversion. Each job that is run binds one worker license. If you want to run multiple jobs at the same time, multiple worker licenses are required.

2 Installation

2.1 System Requirements

The following minimum system prerequisites have to be met:

Required hardware	1,0 GHz PC 4 GB RAM Graphics with a resolution of at least 1024 x 768, 32 MB RAM
Required operating system	Windows® 10, Windows® 11
Required free disk space	1 GB (not including the size for application data)

The following system prerequisites are recommended:

Required hardware	2,0 GHz Dual-Core PC or equivalent 32 GB RAM Graphics with a resolution of 1680 x 1050, 128 MB RAM
Required operating system	Windows® 10, Windows® 11
Required free disk space	>2,0 GB

2.2 Installing

1. Navigate to the location of the `Data Operator X.X x64.exe` and double-click it.

   The installation wizard opens.
2. Select the **Destination Folder** for the Data Operator installation.

   Click **Browse** to browse for the destination folder.
3. Click **Install**.
4. After the installation is finished, select whether to directly run Data Oper-

ator by activating/deactivating the **Run Data Operator** checkbox.

5. Click **Finish**.

➪ The installation is completed. You can now use Data Operator:

2.3 Uninstalling

1. Navigate to the Data Operator installation folder.
2. Double-click Uninstall `DataOperatorX.X.exe`.
   The uninstall wizard opens.
3. Click **Uninstall**.
4. After the uninstallation is finished, click **Finish**.

➪ The uninstallation is completed.

3 Quick start guide

Start a job

1. In the **Sources** step, add files to the job.
2. Apply the operations you want to perform to the measurement files

   or

   Click **Skip**.
3. In the **Destination** step, select the destination format and folder and click **Start job**.

⇨ The job starts. You can view the status of the job in the Jobs progress step.

4 Working with Data Operator

4.1 Navigation

To navigate through the steps, use the buttons.

Returns to the last step and saves your entries.

Proceeds to the next step and skips the current step.

Proceeds to the next step and saves your entries.

4.2 Add files

1. In the **Sources** step, click 

.
2. In the file selection dialog, select the files you want to add to the job.

   Allowed file formats are: `*.a2l`, `*.ascii`, `*.dat`, `*.dxl`, `*.mat`, `*.mf4`, `*.mock`, `*.mrf`, `*.parquet`, `*.tsv`, and `*.dia`.

   The validity of MF4 files is checked when they are added. The icon in the **Valid** column indicates their validity.
3. Click **Open**.

All files listed will be processed.

4. To delete files from the list, use  .
5. To delete all files and folders, use  .

4.3 Add a folder

1. In the **Sources** step, click  .
2. In the file selection dialog, select the folder you want to add to the job.
3. Click **Select Folder**.

   The folder is added as an expandable section.
4. To validate all MF4 files in the folder, click  .

   The validity is indicated by a green check mark or a red cross icon.
5. To filter the files in the folder, expand the folder section and use the **File selection filter** input field.

   Use * as a wildcard for multiple characters and ? for single characters.

   For more complex filters, use a regular expression in ES6 format.
6. To create a subfolder for the output files of this folder, enter a name in the **Output sub path** input field.
7. To validate MF4 files, click  .

   The icon in the **Valid** column indicates their validity.
8. Changes to the folder are not updated automatically. To do this, click  .
9. To delete the folder from the sources, use  .
10. To delete all files and folders, use  .

4.4 Filter signals

Filtering signals requires a LAB file containing the signals to keep. To create such a LAB file using Data Operator, see "Creating a LAB file for filtering signals" on page 20.

1. In the **Filter** step, click  .
2. In the file selection dialog, select the file you want to use for filtering.
3. Click **Open**.

4.5 Resample data

You can define a new sampling rate, which can effectively reduce the file size.

1. In the **Resample** step, enter a positive value in the input field.
2. To select the time unit, use the drop-down list.

4.6 Trim files

Files can be trimmed at one time step using only one input field, or at two time steps using both input fields.

1. In the **Trim/Cut** step, enter a positive value in the **Start** and/or **End** input field.

   The file is cut after the specified time step relative to the start time of the measurement file.
2. To select the time unit, use the drop-down list.

4.7 Combine files

The files of the job can either be merged into a single file based on their timestamps on the same time line, or they can be appended to a single file one after the other.

Merge

1. In the **Combine** step, activate the checkbox to combine all files of the job into one.
2. Select **Merge**.
3. Select whether to **Keep** or to **Reduce** the gap between data.
4. If you select **Reduce**, you must define a **Fixed gap** and a **Gap threshold**. To select the unit, use the drop-down list.
   - **Gap threshold**: Set a threshold value that defines the minimum size of the gap at which the gap should be reduced.
   - **Fixed gap**: The gap size to which the gaps identified by the gap threshold are reduced.

Append

1. In the **Combine** step, activate the checkbox to combine all files of the job into one.
2. Select **Append**.
3. Select whether to use the **Creation time** of the files or the **Sequence** of files added in the **Source** step as the order.
4. In the **Fixed gap** input field, type a value as the time gap between files. To select the unit, use the drop-down list.

4.8 Slice data

Files can be divided into time-based slices of a defined duration.

1. In the **Duration Slice** step, to set the length of each slice, enter a positive number in the input field.
2. To select the time unit, use the drop-down list next to the input field.

4.9 Annotate GPS

GPS data can be annotated with information retrieved form © OpenStreetMap.

1. In the **Longitude signal name** input field, enter the exact name of your longitude signal.
2. In the **Latitude signal name** input field, enter the exact name of your latitude signal.
3. From the Annotation types checkboxes, select the annotations you want to add to your data. See also, "Annotate GPS" on page 29.

4.10 Start the job

When you are satisfied with all the settings made in the **Operations** steps, you can start the job.

1. In the **Destination** step, select a **Format family** from the drop-down.
2. Select a **Format** from the drop-down.

   The available formats depend on the format family.
3. To select the destination folder, click 

.
4. In the file selection dialog, select the destination folder.
5. Click **Select Folder**.
6. Select an option to handle naming conflicts in the destination folder:
   - **Keep both/Resolve conflicts**: Keeps all files and adds a suffix to the name of the new file.
   - **Overwrite existing**: Overwrites existing files with the same name.
7. In the **Output file prefix/sufix** input fields, enter a prefix/suffix you want to add to the file names.
8. Activate the checkboxes to apply the following optional settings:
   - **Copy MDF4 events**: Only relevant if both the source and destination file formats are MDF4. Copies the events from the source to the target MDF4 file.
   - **Detect duplicates**: Detects duplicate signals in measurement files. The results of this operation can be found in the job log. Can have sig-

nificant performance impact.

- **Export workflow**: Exports the workflow with all settings as JSON file. It can be used with the Data Operator CLI.

9. Click Start job .

➪ The job starts. You can view the status of the job in the Jobs progress step.

5 CLI guide

The Command Line Interface (CLI) allows automated data processing with Data Operator.

It is especially useful for incorporating tasks such as automatic filtering and resampling of measurement data into CI/CD pipelines or other automation workflows.

> **Note**
>
> A valid **DATAOPERATOR_WORKER** license is required during processing when using the CLI functionality of Data Operator.

5.1 Working with the CLI

> The commands you can use with Data OperatorCLI are described here:"Commands" on the next page

In order to use the CLI, first a workflow must be created using the Data Operator GUI application.

Generate a workflow

1. In Data Operator make your desired settings as described in "Working with Data Operator" on page 12.
2. In the **Destination** step, activate the **Export workflow** checkbox.
3. Click **Start job**.

➪ The workflow is saved as JSON file in the destination folder.

Open Data Operator with powershell

1. Open the Data Operator installation folder.
2. Click in the path field on top of the explorer.
3. Type `powershell` and press ENTER.

   Windows Powershell opens.
4. To start Data Operator CLI, use the following command:

   ```
   .\DataOperatorCLI.exe
   ```

➪ You can now use Data Operator CLI.

Open Data Operator with cmd

1. Open the Data Operator installation folder.
2. Click in the path field on top of the explorer.
3. Type `cmd` and press ENTER.

Cmd opens.

4. To start Data Operator CLI, use the following command:
   `DataOperatorCLI.exe`

➪ You can now use Data Operator CLI.

Run commands with Powershell

```
.\DataOperatorCLI.exe run [command]
```

EXAMPLE
`.\DataOperatorCLI.exe run --help`

Run commands with cmd

```
DataOperatorCLI.exe run [command]
```

EXAMPLE
`DataOperatorCLI.exe run --help`

5.2 Commands

`-h/--help`

Display all available commands along with their descriptions.

`-v/--version`

Outputs the version number.

`-d/--destination <path>`

Set the output path where the processed data will be saved.

`-s/--source <path>`

Specify the path of the source file/folder you want to process.

`-w/--workflow <path>`

Specify the path of the workflow (`*.js`)you want to use.

Note

Note: Enclose paths containing spaces in double quotation marks.

EXAMPLE

```
DataOperatorCLI.exe run -w C:\your\path\example.js -s
"C:\your\source\file or folder" -d C:\y-
our\destination\path
```

6 Use cases

6.1 Creating a LAB file for filtering signals

If you want to filter out signals from a measurement file, you need a LAB file containing the signals you want to keep (see "Filter signals" on page 13).

To create such a LAB file with Data Operator, follow the steps below.

1. In the **Sources** step, add the measurement files whose signals you want to filter later.
2. In all operation steps, click Skip.
3. In the **Destination** step, select **LabFile** from the **Format family** drop-down list.
4. Select any LAB file format from the **Format** drop-down list.
5. Select the destination folder with Select folder.
6. Click Start job.

   The LAB file is saved to the selected folder.
7. Go to the destination folder and open the LAB file with an editor of your choice (e.g., Notepad++).
8. Delete the signals you want to remove from the measurement file later.
9. Save the LAB file.

➪ Now you can use the created LAB file to filter the signals of your measurement files in the Filter signals step.

6.2 Validating MF4 files

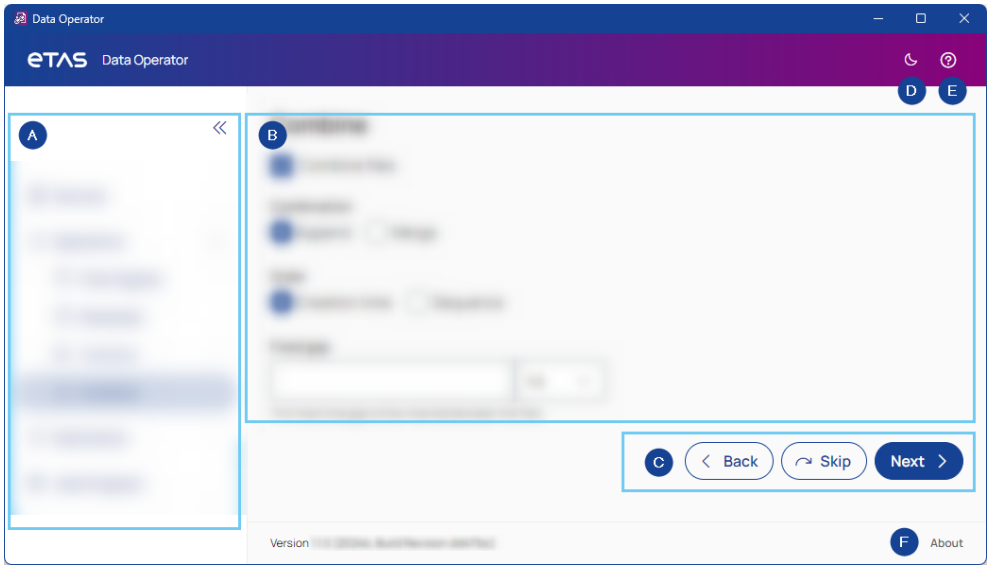
To quickly check the validity of MF4 files, follow the steps below:

1. In the **Sources** step, click Add files.
2. In the file selection dialog, select the MF4 files you want to check.

➪ The validity of the files is checked and displayed in the **Valid** column. A green checkmark means valid, a red cross means corrupt.

7 User interface

7.1 Main window



A. **Navigation sidebar**

   Lists all steps of Data Operator for easy navigation.

   To expand or collapse the sidebar, use the arrows in the top right corner.

B. **Content**

   Shows the main content of each step with all the settings you can make.

C. **Navigation buttons**

   To navigate through the steps, use the buttons.

   < Back

   Returns to the last step and saves your entries.

   Skip

   Proceeds to the next step and skips the current step.

Next >

Proceeds to the next step and saves your entries.

D. **Dark/Light mode**

To toggle between light and dark mode, click the sun/moon in the top right corner.

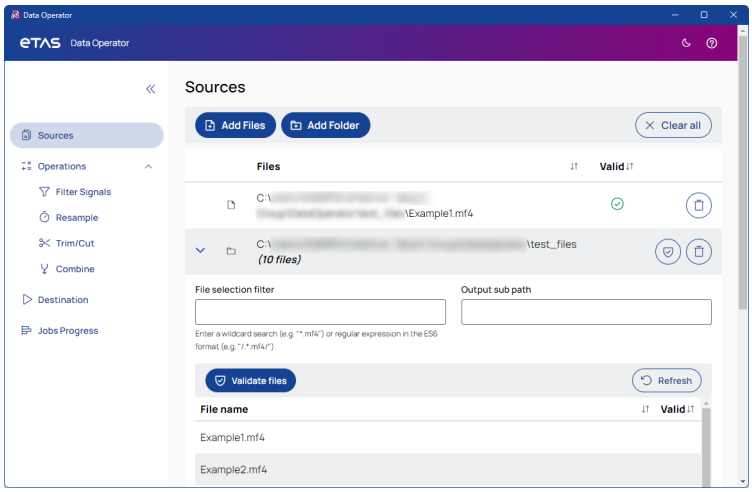
E. **Help**

Opens the PDF User Guide.

F. **About**

Shows the meta data of the app.

7.2 Sources



+ Add files

Opens a file selection dialog where you can select the files to add to the job.

See also, "Add files" on page 12.

Add folder

Opens a folder selection dialog where you can select the folder to add to the job.

See also, "Add a folder" on page 13

× Clear all

Removes all files and folders from the job.

Files

Lists all files for the job, sorted by most recently added.

To sort the list alphabetically, ascending or descending, click the header.

Valid

The icon in this column indicates whether an MF4 file is valid or corrupt. A green checkmark means valid, a red cross means corrupt.

Validates all MF4 files in the folder. The validity is indicated by a green check mark or a red cross icon.

When a filter is applied, only the filtered files are validated.

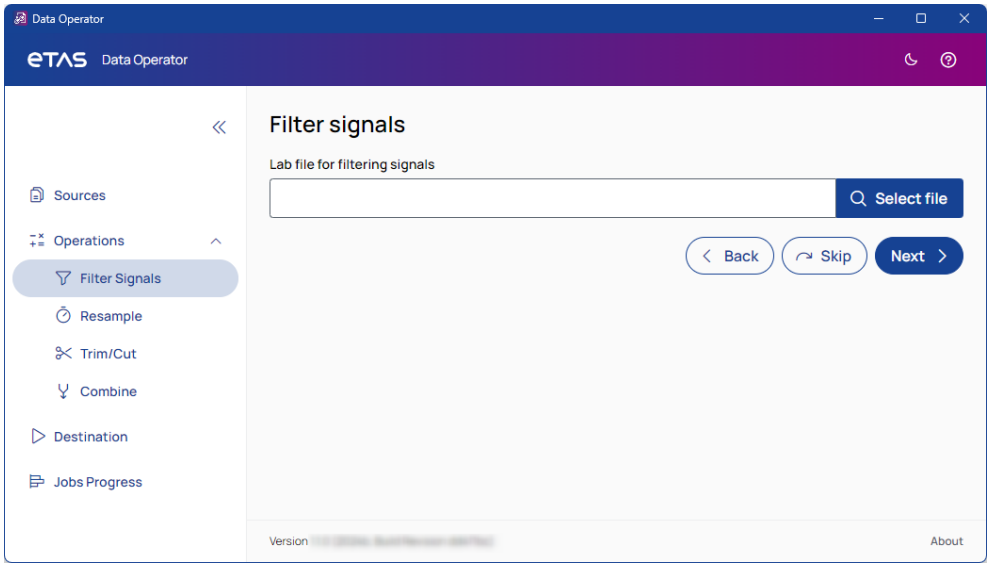
Removes the file from the job.

Refreshes the folder. Changes made are updated.

Proceeds to the next step and saves your entries.

7.3 Operations

7.3.1 Filter signals



Select file

Opens a file selection dialog where you can select the LAB file to be used for filtering the signals.

Alternatively, you can type the path in the input field.

To create a LAB file for filtering signals with Data Operator, see "Creating a LAB file for filtering signals" on page 20.

Back

Returns to the last step and saves your entries.

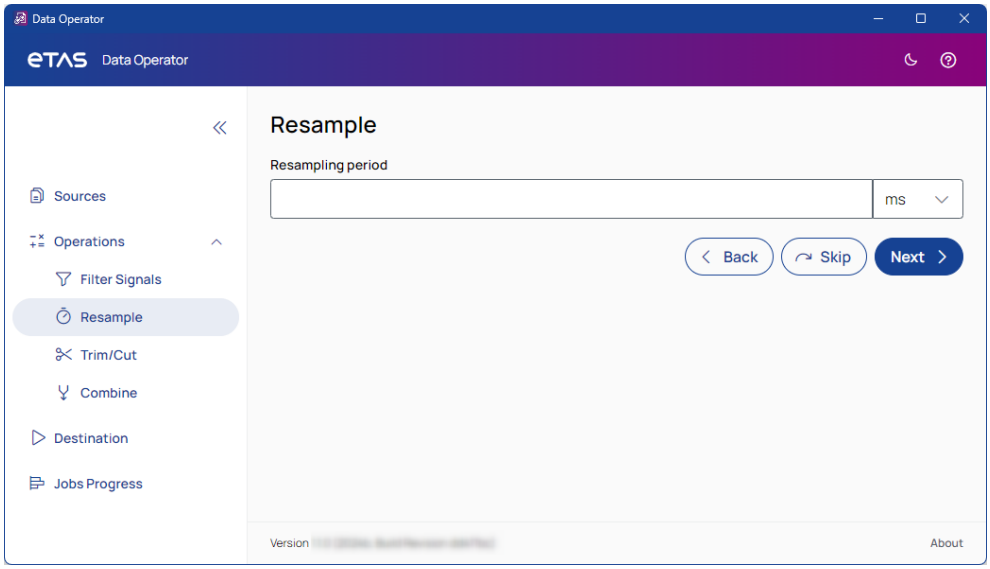
Skip

Proceeds to the next step and skips the current step.

Next

Proceeds to the next step and saves your entries.

7.3.2 Resample



Resampling period

Enter a positive integer as the resampling period. To select the unit, use the drop-down list.

Back

Returns to the last step and saves your entries.

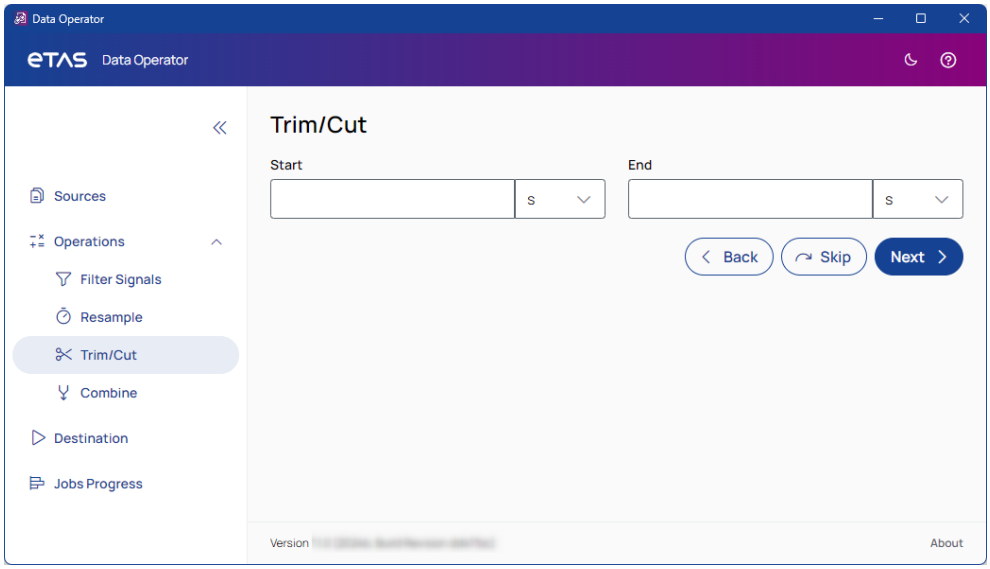
Skip

Proceeds to the next step and skips the current step.

Next

Proceeds to the next step and saves your entries.

7.3.3 Trim/Cut



> **Note**
>
> Files can be trimmed at one time step using only one input field, or at two time steps using both input fields.

Start

Enter a positive value for the start of the trimmed file. To select the unit, use the drop-down list.

End

Enter a positive value for the end of the trimmed file. To select the unit, use the drop-down list.

Back

Returns to the last step and saves your entries.

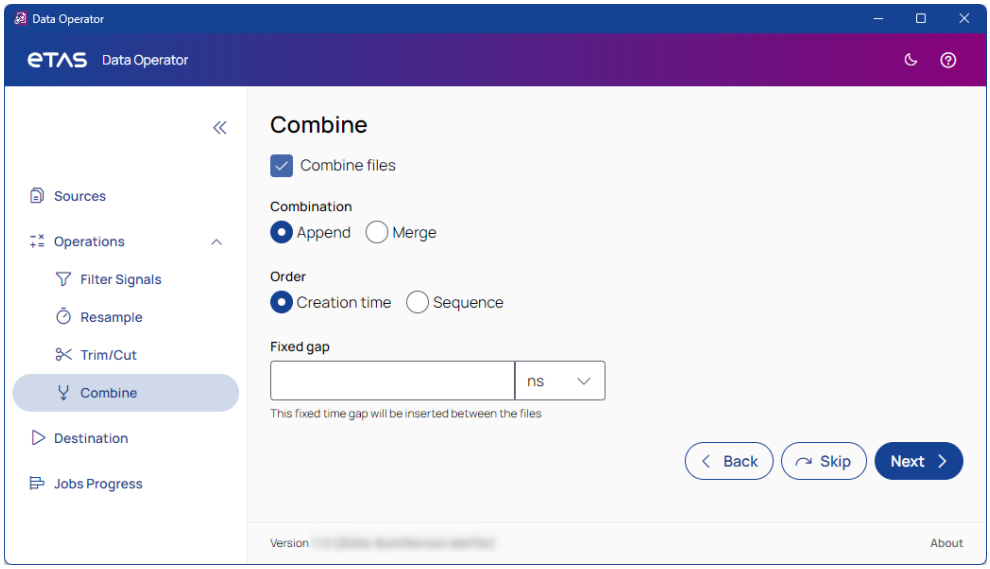
Skip

Proceeds to the next step and skips the current step.

Next

Proceeds to the next step and saves your entries.

7.3.4 Combine



Combine files

Activate the checkbox to combine the files of the job into one.

Combination

Append

Appends the job's files one after another into a single file.

Order

Creation time: Creation time of the measurement files.

Sequence: Sequence of files added in the **Source** step.

Fixed gap: Fixed time gap between the appended files.

Merge

Merges the data from the job's files depending on their time stamps on the same timeline into a single file.

Gap

Keep: The gaps remain as they are.

Reduce: Set the following:

- **Gap threshold**: Set a threshold value that defines the minimum size of the gap at which the gap should be reduced.
- **Fixed gap**: The gap size to which the gaps identified by the gap threshold are reduced.

Back

Returns to the last step and saves your entries.

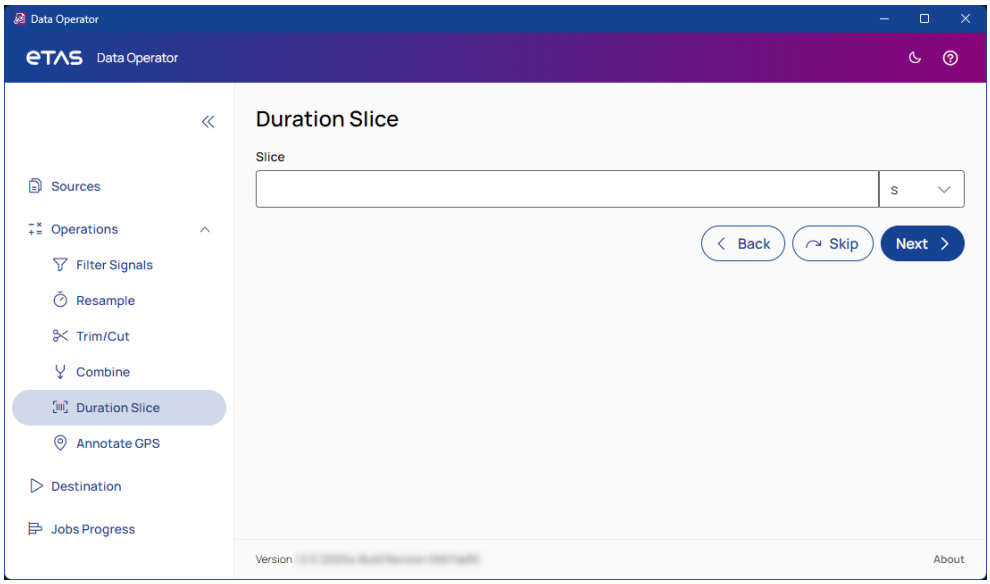
Skip

Proceeds to the next step and skips the current step.

Next

Proceeds to the next step and saves your entries.

7.3.5 Duration slice



Slice

Enter a positive integer as the duration of the slices into which the data will be cut. To select the unit, use the drop-down list.

Back

Returns to the last step and saves your entries.

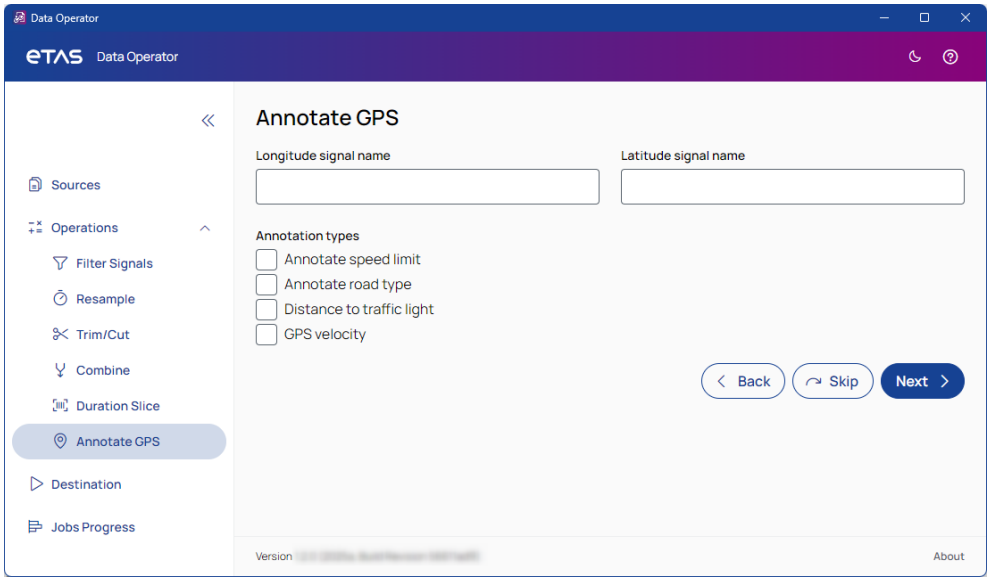
Skip

Proceeds to the next step and skips the current step.

Next

Proceeds to the next step and saves your entries.

7.3.6 Annotate GPS



Longitude signal name

Enter the exact name of the longitude signal.

Latitude signal name

Enter the exact name of the latitude signal.

Annotation types

Select the types of annotations you want to add to your GPS data. The information used is obtained from © OpenStreetMap.

Speed limit: Maximum speed limits for a section of a road.

Road type: Type of the road in a section, where the mapping is as follows:

Motorway: 1
Trunk: 2
Primary: 3
Secondary: 4
Tertiary: 5
Unclassified: 6
Residential: 7
Service: 8
Motorway link: 9
Trunk link: 10
Primary link: 11
Secondary link: 12
Tertiary link: 13

Distance to traffic light: Distance from the GPS position to the nearest traffic light.

GPS velocity: Instantaneous velocity calculated from changes in GPS position over time.

Back

Returns to the last step and saves your entries.

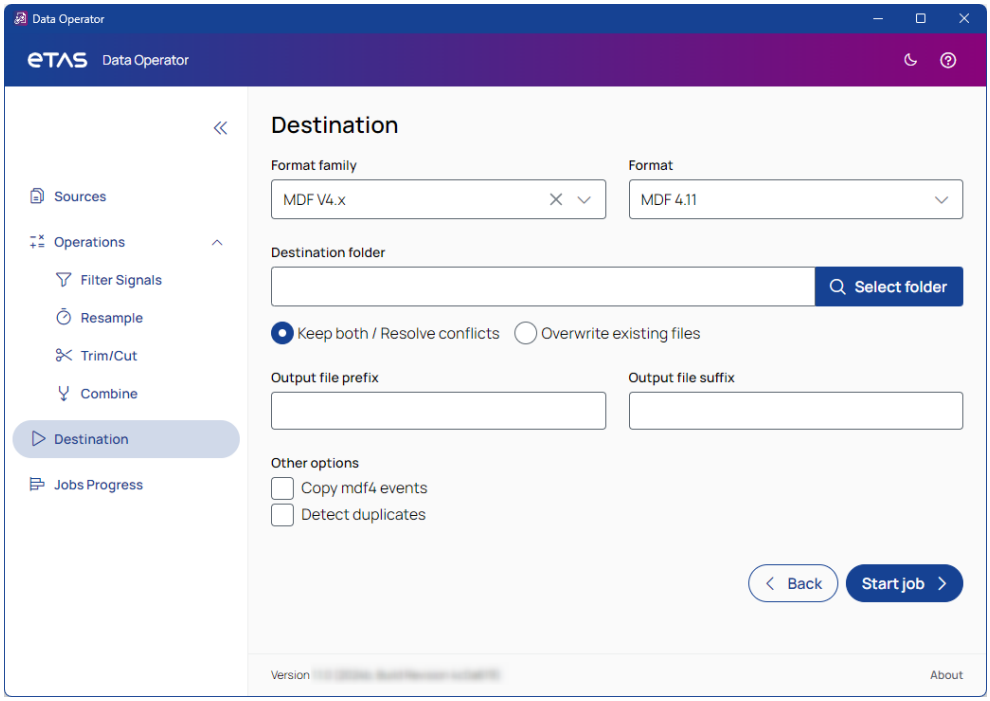
Skip

Proceeds to the next step and skips the current step.

Next

Proceeds to the next step and saves your entries.

7.4 Destination



Format family

To select the destination file format family, use the drop-down list.

Format

To select the destination file format based on the selected format family, use the drop-down list.

Destination folder

Select folder

Opens a folder selection dialog where you can select the destination folder to save the destination file to. Alternatively, you can type the path in the input field.

Select an option to handle naming conflicts in the destination folder:

Keep both/Resolve conflicts: Keeps all files and adds a suffix to the name of the new file.

Overwrite existing: Overwrites existing files with the same name.

Output file prefix/suffix

In the input fields, enter a prefix/suffix you want to add to the file names.

Other options

Copy MDF4 events: Only relevant if both the source and destination file formats are MDF4. Copies the events from the source to the target MDF4 file.

Detect duplicates: Detects duplicate signals in measurement files. The results of this operation can be found in the job log. Can have significant performance impact.

Export workflow: Exports the workflow with all settings as JSON file. It can be used with the Data Operator CLI.

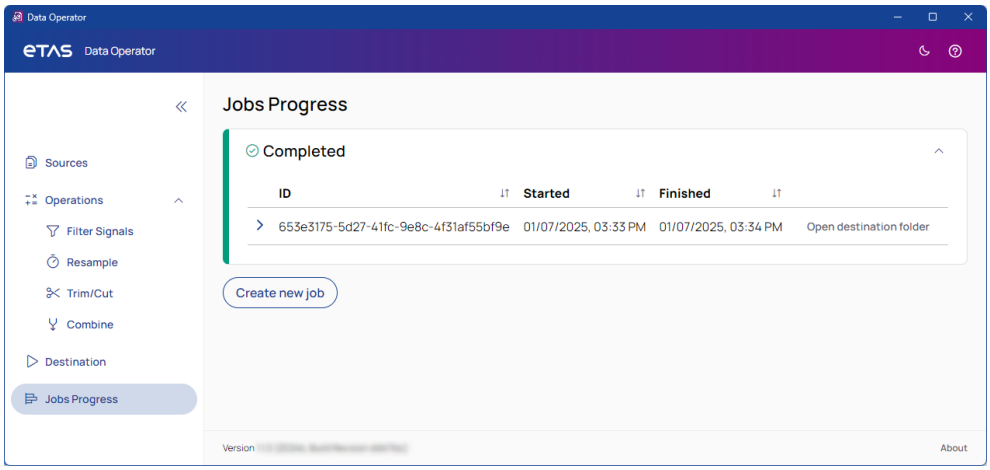
Back

Returns to the last step and saves your entries.

Start job

Starts the job with all the settings you made and opens the **Jobs progress** step, where you can see the status of the job's progress.

7.5 Jobs progress



Status panel

Shows the status and meta data of the jobs.

To collapse and expand the panel, use the arrow in the top right corner.

Status

Running: The progress bar shows the progress status.

Completed: The **Open destination folder** button opens the destination folder for the job files.

Failed: The job failed.

ID

Displays the ID of the job.

To sort the list alphabetically, ascending or descending, click the header.

To expand. click the arrow next to the ID:

Completed: The path of the destination folder is displayed. Click to open the folder.

Failed: The error message is displayed. To open the error log file, click Show log.

Started/Finished

Displays the time and date when the job was started and when it was finished.

To sort the list alphabetically, ascending or descending, click the header.

Create new job

Jumps to the **Sources** step where you can start a new job.

8 Contact Information

Technical Support

For details of your local sales office as well as your local technical support team and product hotlines, take a look at the ETAS website:

www.etas.com/hotlines

ETAS offers trainings for its products:

www.etas.com/academy

ETAS Headquarters

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