

ETAS MODEL-SIMULATOR V2.1



Quick Start Guide

Copyright

The data in this document may not be altered or amended without special notification from ETAS GmbH. ETAS GmbH undertakes no further obligation in relation to this document. The software described in it can only be used if the customer is in possession of a general license agreement or single license. Using and copying is only allowed in concurrence with the specifications stipulated in the contract.

Under no circumstances may any part of this document be copied, reproduced, transmitted, stored in a retrieval system or translated into another language without the express written permission of ETAS GmbH.

© Copyright 2023 ETAS GmbH, Stuttgart

The names and designations used in this document are trademarks or brands belonging to the respective owners.

MODEL-SIMULATOR V2.1 - Quick Start Guide R01 EN - 07.2023

1 Welcome!

Welcome to the User Assistance of ETAS MODEL-SIMULATOR. With this Quick Start Guide we want to provide you a selection of existing information. Click on a tile and choose one of the topics and have a quick start.



Click
me :)

WHAT?



Overview & Workflow

HOW TO START?



First Steps

UI INFO




Overview & Navigation

EXPLANATIONS



Definitions & Abbreviations

Note

More and detailed information especially about conceptual background or safety information can be found in the User Guide. See  **Support > User**

documentation in the header or visit the ETAS Download Center

<https://www.etas.com/de/downloadcenter/38151.php>

2 What? Overview & Workflow

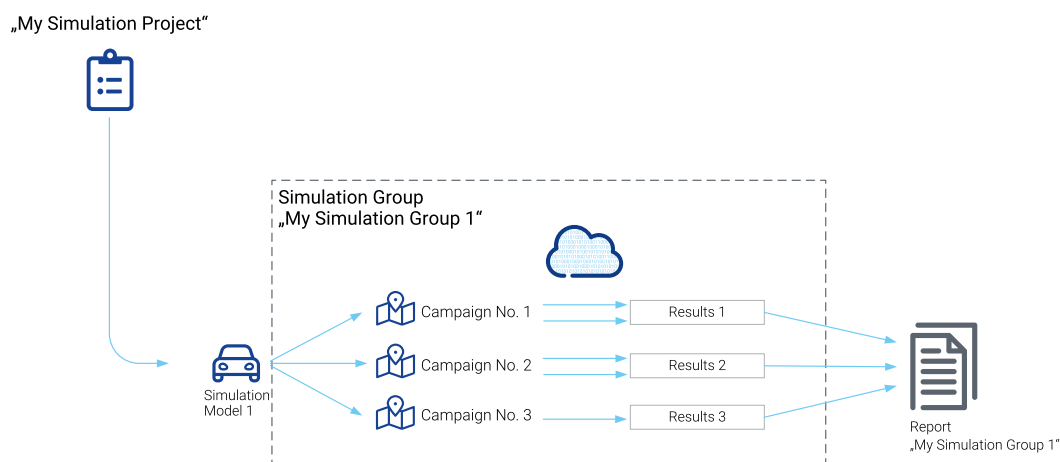
The MODEL-SIMULATOR enables the user to execute simulations in the cloud. Models and stimuli files are used as input, result files and reports are the output.



For this procedure the user has to create a simulation project or test execution project which consists of a simulation model and one or more campaigns. A campaign is integrated in a simulation group within the simulation project or in a test execution group within a test execution project. Beside simulation results, a report is generated after the simulation in a simulation project. The user can download the report.

The MODEL-SIMULATOR provides a model repository, where users can upload and manage simulation models. It also provides a Campaigns overview, where all campaigns can be uploaded and managed. In addition, users can upload a report template to create a customized report according to used signals.

Major elements of the MODEL-SIMULATOR are simulation models (models) and stimuli files (campaigns), which are brought together in a simulation project or in a test execution project.



The typical workflow in the MODEL-SIMULATOR is designed in the following steps.

1. Create a model by uploading simulation model.
2. Create a campaign by uploading stimuli files for simulation or test execution.
3. Optional: Create a report template by uploading an EATB template (if not already available).
4. Create a simulation project or test execution project by selecting one model from the model repository and a default report template.
5. Add a simulation group to the simulation project or test execution group to test execution project by selecting campaigns.
6. Run the simulation in the simulation project or test execution in the test execution project.
7. Wait until the simulations or the test executions are completed.
8. Download the report (*.html) or simulation results as MDF files (*.mf4) or test execution results (*.zip).



1 How to start? First Steps

This chapter gives you an overview and rough information of the first steps and how to start.

Activate your account




The activation link is sent to the registered e-mail address and valid for a limited time frame. Set your initial password as soon as possible. If your link got invalid, order a new one by contacting the support team or Admin User. Beside the MODEL-SIMULATOR account you get an account for the Customer Support Portal.

Note

You may check your spam e-mail folder as the registration e-mails sometimes got there.

Sign in with multi-factor authentication



With each sign in you will receive an authentication code as time-based one-time password (TOTP) to authenticate your user. Find more details in the User Guide. See  **Support** > **User documentation** in the header or visit the ETAS Download Center <https://www.etas.com/de/downloadcenter/38151.php>

Welcome to the dashboard

To successfully create a simulation project / test execution project (3) we recommend to start with your model upload (1) and your campaign creation (2).



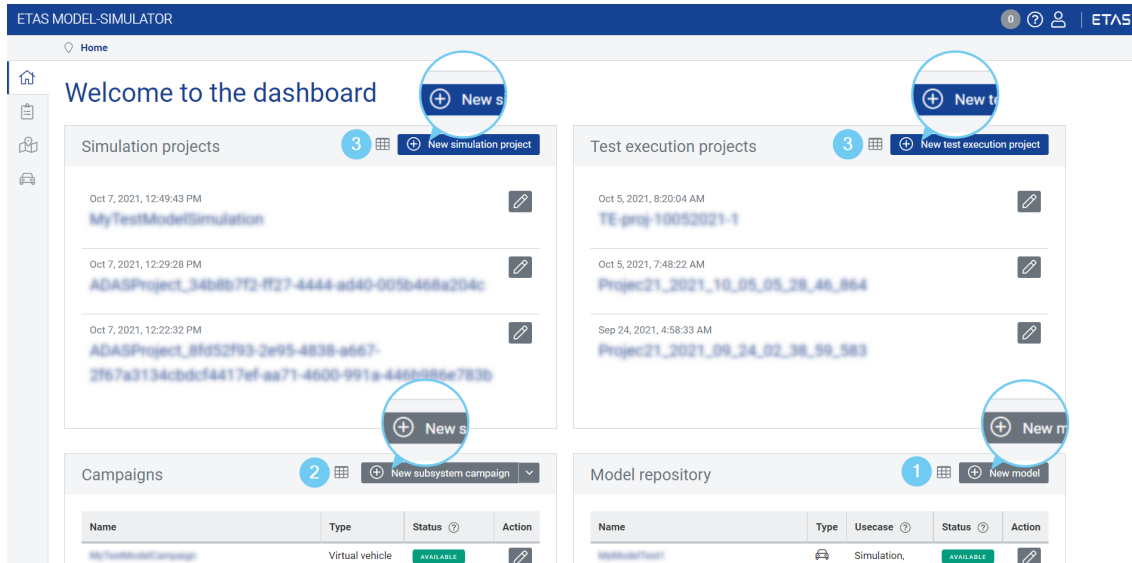


Fig. 1-1: First steps in the MODEL-SIMULATOR

Step 1: Upload your simulation model into the model repository



The model repository is a dedicated space to upload and manage all models. You can either select a virtual vehicle or a subsystem. Information about pre-processing steps can be found in the MODEL-SIMULATOR User Guide.

Both model types require a ZIP file to be uploaded. The ZIP must include the deployables as a ZIP and a simConfig folder including an STI file at least – both in a folder called COSYMrj.



Note

Only the deployables (`cloud_deployable.zip`) can be generated with COSYM. The overall ZIP file and the remaining files and the folder inside must be created and added manually.

You can enable cloud deployable creation via **View > Settings** in COSYM. For more details see topics "Settings" and "Build" in COSYM User Guide or press F1 in COSYM and navigate to *User Interface > Settings* and *System Build > Build*.

Step 2: Create a campaign and upload or generate your stimuli file(s)



Campaigns are used to manage simulation campaigns with individual scope.

You can either select a virtual vehicle campaign, subsystem campaign or test execution campaign according to your selected model.

A subsystem campaign requires one or more measurements files in MDF format (*.mf4). A virtual vehicle campaign must be uploaded as one ZIP file, with a subordinate folder containing one or multiple folders for each simulation run (trip). Each of these folders contains one stimuli file (*.mf4) and optionally one parameter file (*.cdfx). For the test execution campaign you need a ZIP file with your ECU-Test project folder, without Report folder.


Step 3: Create a project and run simulations



Simulation projects or test execution projects are used to create and manage individual simulation or test execution tasks. Assign a model and one or multiple campaigns to the project.

To assign one or multiple campaigns to a project, a new simulation group/test execution group has to be created in the simulations/tests tab.

The outputs of simulations are reports (*.html) and simulation results (*.mf4) or test execution results (*.zip). They can be downloaded in the reports, simulations or tests tab.

More detailed information can be found in the Quick Start Guide. See  **Support > User documentation** in the header or visit the ETAS Download Center <https://www.etas.com/de/downloadcenter/38151-38153.php>

Find all other available guides in the ETAS Download Center: <https://www.etas.com/de/downloadcenter/38151.php>

1.1 Check Campaign Data

Stimuli files used in MODEL-SIMULATOR have to be created in an appropriate way. You must ensure the correct mapping of measuring channels from the time series and the model inputs by providing an SMF file (see 1.3 "Check Model Data on page 12"). Deviating data cannot be processed by the application. See more information in the Quick Start Guide ("Compatibility of Campaigns and Models").

1.1.1 Data Structure for Subsystem Campaign

The following dedicated requirements have to be fulfilled:

- *.mf4 Version 4.1 (ASAM Standard for MDF)

After uploading the MF4 files are shown and downloadable in the **Files** tab of the campaign.

1.1.2 Data Structure for Virtual Vehicle Campaign

The following dedicated requirements have to be fulfilled:

- *.zip contains subordinate folder with one or multiple simulation run folders
- each folder with one *.mf4 (ASAM Standard for MDF) and optionally one *.cdfx file (ASAM Standard for CDF)

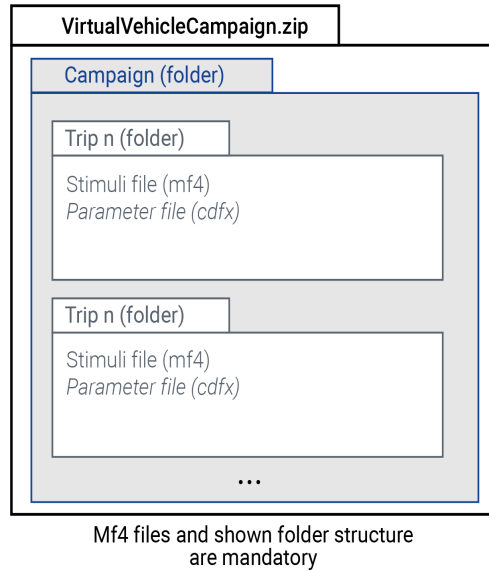


Fig. 1-2: Virtual vehicle campaign ZIP file composition (required structure)

See also [1.2 "Stimuli File Requirements \(*.mf4\)"](#) on page 11.

Note

It is necessary to ensure the compatibility of the simulation model and the used campaigns.

After upload the MF4 and CDFX files are shown and downloadable in the **Files** tab of the campaign.

1.1.3 Data Structure for Test Execution Campaign

The following dedicated requirements have to be fulfilled for campaigns without libraries:

- *.zip contains a folder (e.g. Test)
- test folder contains at least Packages, Configurations and .workspace folder of ECU-Test.

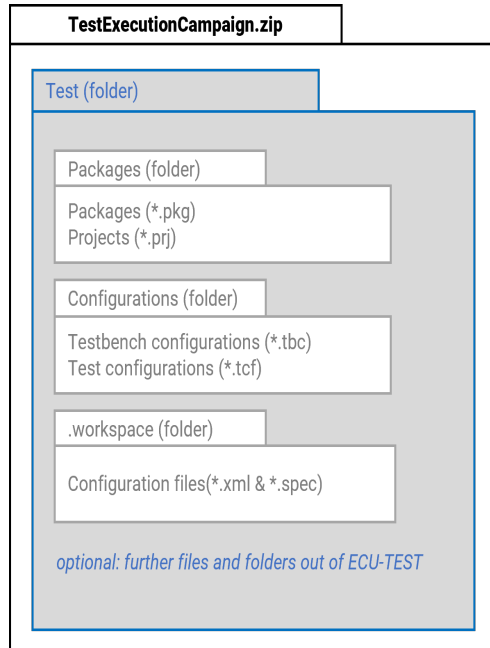


Fig. 1-3: Test execution campaign ZIP file composition for campaigns without libraries (required structure)

The following dedicated requirements have to be fulfilled for campaigns with libraries:

- *.zip contains a folder (e.g. Test)
- *.zip contains one or more library workspace folder
- *.zip contains the folder "Project"
- Project folder contains at least Packages, Configurations and .workspace folder of ECU test.

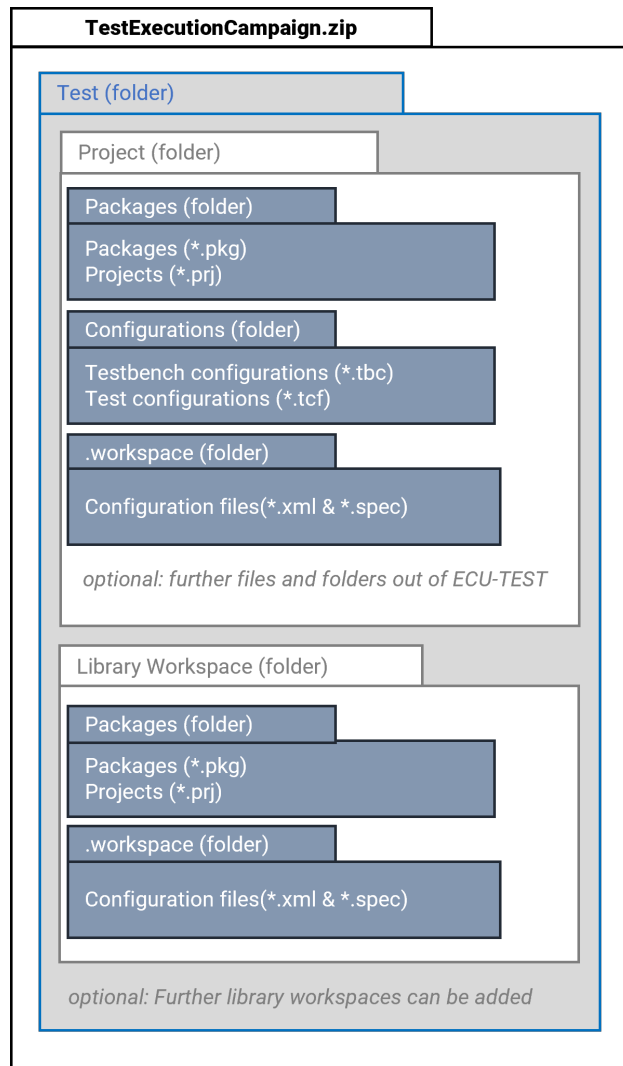


Fig. 1-4: Test execution campaign ZIP file composition (required structure) for campaigns with libraries

The ECU test project folder can be zipped (without Report folder) and uploaded. It is only important that the individual folders are embedded in a parent folder and that this folder is zipped. In the **Files** tab of the campaign only PRJ files are shown and downloadable. See also "ECU-Test Support and Limitations" in the Quick Start Guide.

1.2 Stimuli File Requirements (*.mf4)

The MDF format offers a wide range of possible applications. The following configuration is required for uploaded MF4 files to ensure a proper data processing:

- MDF 4.x format
- time stamps always start at 0 and are not negative
- only 1 channel group
- time unit is seconds
- sample rate is fixed

See more information: <https://www.asam.net/standards/detail/mdf/>

1.3 Check Model Data

Simulation models used in MODEL-SIMULATOR have to be created with COSYM Software V3.2V3.2 HF2 for simulation projects, V3.2V3.2 HF2 for test execution projects). Other models cannot be processed by the application.

Data Structure

The application expects a dedicated folder structure.

The `SimulationModel.zip` contains:

> `COSYMprj` folder with

- model binaries/executable as *.zip, e.g. `cloud_deployable.zip` (mandatory)
- configuration files in `simConfig` folder:
 - signal mapping file as *.smf (optional)



Note

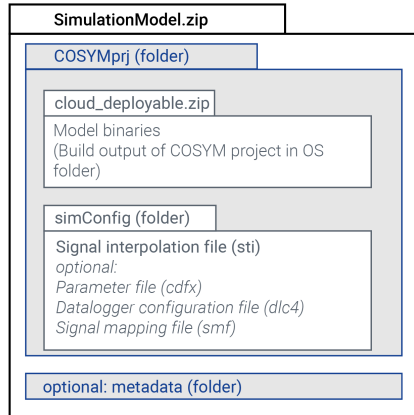
A signal mapping file is only required if the labels in the CDFX file do not match the model's internal calibration variable names to ensure correct mapping. Otherwise, this could lead to wrong simulation results.

- parameter file as *.cdfx (optional)
- datalogger configuration file as *.dlc4 (optional)
- signal interpolation file as *.sti (mandatory)
- metadata folder

For test execution projects only the deployables (`cloud_deployable.zip` of COSYM) are required in the following composition.

USE CASE IDEPENDENT

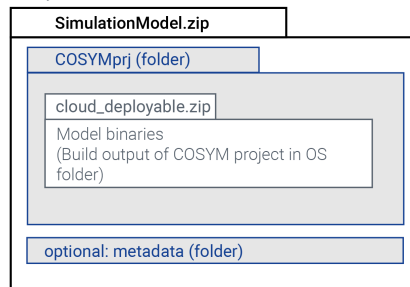
usable for simulation and test execution use case



Model binaries, sti file and shown folder structure are mandatory

TEST EXECUTION USE CASE

only usable for test execution use case



Model binaries and shown folder structure are mandatory

Fig. 1-5: Model ZIP file composition (required structure)

All data has to be zipped in a file for upload. You can enable cloud deployable creation via **View > Settings** in COSYM. For more details see topics "Settings" and "Build" in COSYM User Guide or press F1 in COSYM and navigate to *User Interface > Settings and System Build > Build*.

Note

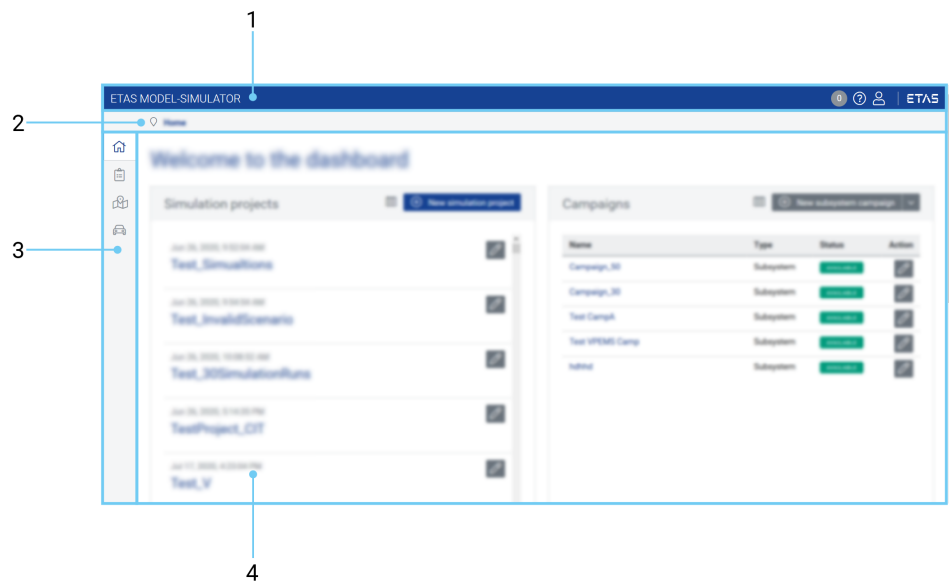
Only the deployables (`cloud_deployable.zip`) can be generated with COSYM. The overall ZIP file and the remaining files and the folder inside must be created and added manually.

Information about the preprocessing steps for Models or JSON file for real-world driving campaigns can be found in the Quick Start Guide.

2 UI Info: Overview & Navigation

The user interface is divided into 4 areas:

- **Header (1)**: gives you direct access to, among others, home screen, notifications of current processes or user documentation.
- **Breadcrumb (2)**: shows where you are and allows you to use for navigation.
- **Navigation bar (3)**: provides you access to home, Projects, Campaigns model repository and Report templates.
- **Interaction area (4)**: Depending on the selection in the navigation bar, different content is displayed and different features are available.



After signing in, you get to the home screen with your dashboard showing an extract of the latest simulation projects, test execution projects, campaigns and models each in a separate tile.

Every menu item of the navigation bar contains the possibility to open an overview or to create an item according to the selection.

Header

In the header you can check current processes (1) or open support section (2). With the user profile symbol (3) you can change your password and sign out. The ETAS logo brings you to the ETAS website (4), the breadcrumb (5) shows where you are and allows you to use for navigation.



3 Contact Information

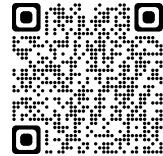
Technical Support

You can contact ETAS MODEL-SIMULATOR Service Desk:

[ETAS MODEL-SIMULATOR Service Project](#)

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 Headquarters

ETAS GmbH

Borsigstraße 24	Phone:	+49 711 3423-0
70469 Stuttgart	Fax:	+49 711 3423-2106
Germany	Internet:	www.etas.com

4 Definitions and Abbreviations

Campaign

A campaign is based on one or many stimuli files, which are used to feed the inputs of the simulation model. In the MODEL-SIMULATOR 3 types are selectable: subsystem campaign, virtual vehicle campaign and test execution campaign.

CDFX

Calibration Data Format ([ASAM standard](#)), created with e.g. COSYM, EE (Experiment Environment) or other ASAM CDF supported tool and used to parameterize the models. It can be part of a virtual vehicle campaign or of a model (configuration files) and must be created and added manually.

It stores calibration parameters of different data types, the physical values and unit. The XML-based format can be easily validated, edited, imported and exported by calibration tools and XML editors.

DLC4 (ETAS specific file format)

Datalogger configuration, created with e.g. EE (Experiment Environment), which is used to limit signals for data recording. The file can be used to reduce processing time, only the listed signals will be part of the simulation result instead of all. It can be part of a model (configuration files) and must be created and added manually.

Home/dashboard

The dashboard is the starting point in MODEL-SIMULATOR and gives an overview of latest simulation projects, campaigns and models. You can create simulation projects and campaigns or upload models.

MF4/MDF

Measurement Data Format ([ASAM standard](#)) used for time series data, e.g. simulation data results or input stimuli. It is part of a campaign.

Model

A model is a mathematical representation of a physical system.

It calculates the resulting system behavior (model outputs) according to the fed excitation signals (input stimuli). In the MODEL-SIMULATOR two types of model can be uploaded: subsystem model and virtual vehicle model.

While a subsystem model can represent any kind of system, a virtual vehicle model represents a powertrain system, hence expects the specific inputs vehicle target speed, gear and road slope.

Model repository

The model repository is a dedicated space to upload and manage all models in the MODEL-SIMULATOR.

Real time factor (RTF)

The RTF is a factor that describes how fast a simulation runs in comparison to real time. An initial value can be determined by running a simulation in COSYM and dividing the simulation time by the duration of stimuli file. **RTF = Duration of simulation/Duration of stimuli file**

Simulation group

A simulation group is created in the simulation project and contains the simulations to be run. A simulation group contains simulation jobs with simulation runs. A campaign is represented in a simulation job, whereas the data of a campaign (MF4 files or CDFX files) is represented in the simulation runs.

Simulation job

A simulation job contains the campaigns to be simulated, which in turn contain simulation runs.

Simulation project

A Simulation project is used to perform simulations of interest. The simulation project is based on a dedicated simulation model and suited test scenarios (campaigns) represented by simulation groups. The simulation project generates reports after a completed simulation of simulation groups.

Simulation result

Output of performed simulation in form of a MF4 file.

Simulation run

A simulation run is the smallest unit within the simulation group and therefore within a simulation. It contains a trip or an arbitrary measurement file, which provides the excitation signals for the model.

SMF (ETAS specific file format)

Signal mapping file, created with e.g. Sut Mapping File Editor (usually comes with COSYM) and used for global mapping of vehicle model variables to stimuli file signal names. It can be part of a model (configuration files) and must be created and added manually.

The XML-based format can be edited by an XML editor.

STI

Generic Simulator Interface ([ASAM standard](#)), Interpolation file, created with e.g. EE (Experiment Environment) and used to interpolate input signals. It must be part of a model (configuration files) and must be created and added

manually.

Stimuli files

Stimuli files are needed to feed the model inputs and thus needed to start a simulation. In the MODEL-SIMULATOR it can be measurement files as *.mf4 (subsystem campaign) or the combination of measurement files as *.mf4 and parameter files as *.cdfx in folders within a ZIP file (virtual vehicle campaign).

Subsystem campaign

A subsystem campaign is a campaign based on one or many measurement files (*.mf4).

Subsystem model

A subsystem model represents a part of the vehicle in form of a simulation model and can be used to represent any kind of system.

Test execution campaign

A test execution campaign is a campaign based on configured testunits created with ECU-Test. These tests are defined by packages/projects, configurations, data bases, utilities, test reports and configuration files handled in a workspace.

Virtual vehicle campaign

A virtual vehicle campaign is a campaign based on one or many trips (simulation runs). These trips are defined by one stimuli file (*.mf4) and one parameter file (*.cdfx), whereas the stimuli files have to contain vehicle target speed, gear and road slope.

Virtual vehicle model

A virtual vehicle model can be used to represent a whole vehicle in form of a simulation model with respect to a development domain like powertrain.