

# ETAS MODEL-SIMULATOR V3.1



Admin Guide

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# 1 Introduction


In this chapter, you can find information about the intended use, the addressed target group, and information about safety and privacy related topics.

## 1.1 Intended Use

ETAS Cloud-Services is a cloud-based platform intended for virtualization purposes by providing a toolchain for continuous integration, test and validation of software in automotive electrical/electronic (e/e) systems.

With the MODEL-SIMULATOR it is possible to run simulations or automated test executions in the cloud, in order to significantly speed up this process in particular for large simulation and test tasks. As a result a report for simulation projects can be retrieved, and simulation or test execution results can be downloaded. The results of the simulation depend on the quality of the plant models and software models as well as on the choice of suitable excitation signals (input stimuli), quality and representativeness or tests procedures for the intended development task. The results should therefore be checked for suitability for subsequent investigations by the user.

ETAS Cloud-Services runs in a native cloud environment and is offered as a service (SaaS).

ETAS GmbH cannot be made liable for damage which is caused by incorrect use and not adhering to the safety information. See **Support**  → **Safety advice** (Header).

## 1.2 Target Group

This product is directed at trained qualified personnel in the simulation and calibration sector of powertrain ECUs (e.g. calibration engineer, function developer or simulation model developer). Technical knowledge in simulation of vehicle systems and control unit engineering as well as pre-calibration or calibration of those is a prerequisite.

The Admin Guide focusses on the setup steps. More and detailed information about conceptual background or operating the product can be found in the Admin Guide.

## 1.3 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.

## 1.4 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.

### 1.4.1 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.

## 2 About MODEL-SIMULATOR

ETAS Cloud-Services is a highly secured cloud-based platform, operated by ETAS GmbH. One of the offered services within this platform is a MODEL-SIMULATOR service, that enables massive parallelization of simulations with up to 1000 simulations in parallel. This massive parallelization of simulations allows many simulations within short time and thus increases software development efficiency for model based developments. Furthermore, massive parallelization of simulations enables statistical evaluation of systems.

The MODEL-SIMULATOR supports the simulation of models, that are generated with the ETAS product COSYM. Basically, these models can be open-loop or closed-loop models. Simulations can be triggered by combining a simulation model with a test scenario (campaign) within a project.

After successful simulation, the simulation outputs are aggregated in a report and can be downloaded for analysis. Besides a report, the MODEL-SIMULATOR provides simulation results for download.



### Note

MODEL-SIMULATOR V3.1 is released with the CLI client V2.1.0.

### Features at a Glance

- up to 1000 simulations in parallel
- allows simulation of complex systems like vehicle networks, consisting of virtual vehicle control units, vehicle buses and simulation models
- measurement of 1000 signals within every simulation run
- generating simulation results
- generating reports based on customized report layout
- highly secured cloud environment by fulfillment of information security standards according to ISO/IEC 27000 & 27001
- support of third party test automation tool ECU-Test for test executions
- Support of COSYM and VLAB as simulators

### Use Cases

- statistical evaluation of (complex) system models
- parameter studies with separate parametersets for simulations on simulation run level
- determination of the probability of failure against the development target
- time-efficient execution of (large) software testing tasks, e.g. regression tests in the DevOps work mode

## Dependencies/Licenses

The uploaded artifacts should not contain:

- any reference to external libraries/dependencies
- any artifacts (e.g. FMUs/VECUs) which are needing additional licenses



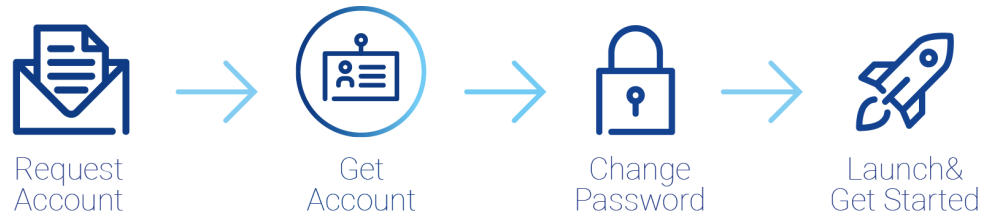
### Note

If you are using **VECU-BUILDER**, then use **Go License** for your artifacts.

## 3 Onboarding

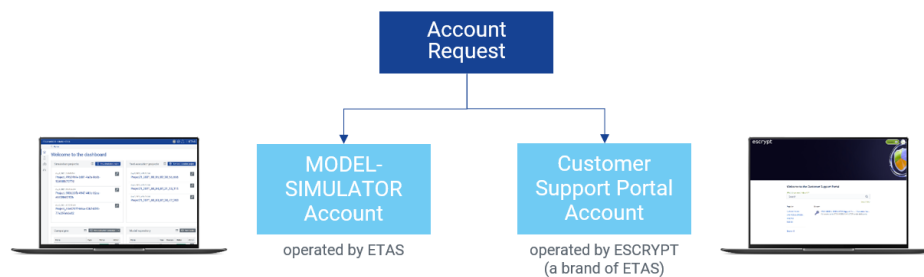
With onboarding we consider the process steps after contracting until use of the MODEL-SIMULATOR.

The process contains 4 basis steps. The admin user account is automatically created when the contract is signed.



**Fig. 3-1:** Overview onboarding process flow

Besides an account for the MODEL-SIMULATOR, users will also get an account for the Customer Support Portal. The Customer Support Portal is used for creating accounts or requests in case of problems. The admin user can create user accounts in the Customer Support Portal. Support requests for the MODEL-SIMULATOR are handled by our brand ESCRYPY.




### 3.1 User Account Creation

For creating a user account "Request ETAS MODEL-SIMULATOR Account" is created by the admin user in the Customer Support Portal.

Subsequently, the user will get 2 e-mails with log in information.

- MODEL-SIMULATOR: access link, user name and initial password which has to be changed soon.
- Customer Support Portal: access link and user name, password is assigned when you log in for the first time with the link.

 **Note**

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For Sign in to the MODEL-SIMULATOR, a multi-factor authentication is required.

Within the Customer Support Portal the user can create requests to get support.



## 4 Check System Requirements

Before starting with MODEL-SIMULATOR, be sure you meet the general system requirements.

- Required firewall settings for general use: HTTPS traffic enabled (port TCP 443)
- Required COSYM version and license for model preparation (projects): Version V3.4 for test execution use case
- Required Visual Studio version and license for FMUs (FMI Version 2.0): 2013 or 2017  
Recommendation portable self-contained FMU without dependencies
- Required ECU-TEST version and license: V2023.2.3  
For ECU-TEST project (necessary for test execution campaign used in project) without external references to projects or packages, see
- Required EATB version and license for template creation: V5.0
- Required VLAB version and license: V2.8.3
- Required MOBI version: V5.0.1
- Recommended browser version for reports at least:
  - Mozilla Firefox: v72.0.2 (64-bit)
  - Google Chrome: v84.0.4147.135 (64-bit)
  - latest versions of the browser are recommended
- Recommended browser version for general use:
  - Mozilla Firefox: 91.8.0 (32-bit)
  - Google Chrome: 100.0.4896.127 (64-bit)
- Recommended screen resolution: 1920x1080 (Full HD), at least 1366x768 (Wide XGA)

See also supplied Release Notes for System Requirements.



### Note

Check whether there are company-specific restrictions regarding upload size. This has to be enabled by your administrator if necessary.

## 5 First Steps for Users

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 project (3) we recommend to start with your model upload (1) and your campaign creation (2).

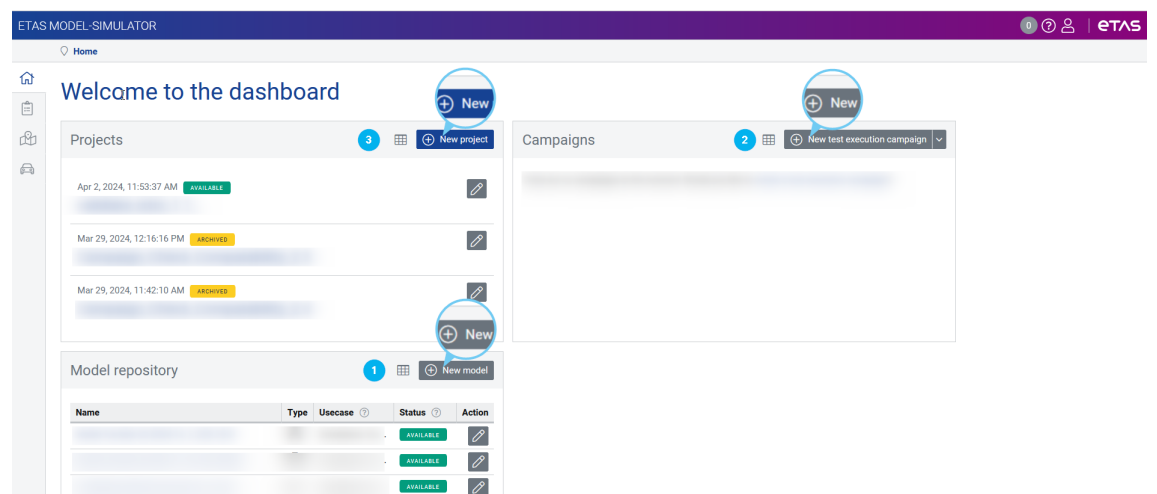


Fig. 5-1: First steps in the MODEL-SIMULATOR

### 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



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 /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 Admin 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>

## 6 Contact Information

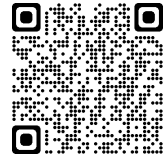
### Technical Support

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](http://www.etas.com/hotlines)

ETAS offers trainings for its products:

[www.etas.com/academy](http://www.etas.com/academy)



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## Glossary

This glossary contains abbreviations and explanations of special terms that are important.

### 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 projects, campaigns and models. You can create 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**

**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.