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ETAS SCODE-ANALYZER 2.6.2

Release Notes

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Contents

1 Introduction

ETAS SCODE-ANALYZER employs the SCODE Essential Analysis approach, which is a structured method used to increase the understanding of a problem and to reduce the complexity in the subsequent software and systems design. Often the term SCODE is used as a synonym for the SCODE Essential Analysis method. However, in a more general way, SCODE stands for System Co-Design, thus the co-engineering across different disciplines, e.g. control, software and hardware engineering.

ETAS SCODE-ANALYZER focusses on mastering the complexity of the software in automotive systems. Drivers for the complexity are increasing functionality, real-time behavior and customer variance. The Essential Analysis for physically dominated systems is an analysis method that allows reducing the system complexity to the unavoidable inherent problem complexity. This method has been applied successfully on several product relevant subsystems.

ETAS SCODE-ANALYZER is an Eclipse-based product. If you are familiar with using an Eclipse environment, then you should feel at home.

1.1 References

- ETAS SCODE-ANALYZER Getting started.pdf
- Safety Advice.pdf

Both are available in the installed product.

1.2 Conventions

The following typographical conventions are used in this document:

Choose **File → Open**.	Menu commands are shown in blue boldface.
Click **OK**.	Buttons are shown in blue boldface.
Press <ENTER>.	Keyboard commands are shown in angled brackets.
The "Open File" dialog box is displayed.	Names of program windows, dialog boxes, fields, etc. are shown in quotation marks.
Select the file `setup.exe`.	Text in drop-down lists on the screen, program code, as well as path- and file names are shown in the Courier font.
A *distribution* is always a one-dimensional table of sample points.	General emphasis and new terms are set in italics.

1.3 User Documentation

The ETAS SCODE-ANALYZER user's documentation is provided as PDF (Getting Started) and online help. The online help is available at any time via the **Help → Help Contents** menu.

The Getting Started manual in PDF format can be found on the installation disk and in the `documents` subfolder of your installation directory.

2 Product Definition

2.1 Functions at a Glance

ETAS SCODE-ANALYZER yields a decomposition of the overall problem in several smaller sub-problems, which can be solved separately and more easily. The integration of the sub-problem solutions then provides the overall solution to the original problem. Main features of the tool are:

- An editor to define the input and output space by a Zwicky box in terms of Dimensions and Alternatives
- An editor to define modes by assigning input sets to output sets taking into account different analyses on input and output spaces
- An editor to define mode transitions to specify which context changes cause a transition between system modes
- A graphical editor to show the decision tree for modes and transitions which can be optimized to find the shortest transition between system modes
- Extensible code generators that can translate the system into code. This code can be executed or simulated, or post processed and integrated in real life production code

2.2 General Description

2.2.1 System Prerequisites

The following minimum system prerequisites have to be met:

Required Hardware	2.0 GHz Dual-Core PC or equivalent 4 GB RAM DVD-ROM drive (applicable for DVD based installation only) Network adapter Graphics with a resolution of at least 1024x768
Required Operating System	Windows® 10 64 bits
Required Free Disk Space	800 MB (not including the size for application data)

The following system prerequisites are recommended:

Recommended Hardware	2,0 GHz Quad-Core PC or equivalent 8 GB RAM DVD-ROM drive (applicable for DVD based installation only) Network adapter Graphics with a resolution of 1920x1080
Recommended Operating System	Windows® 10 64 bits
Recommended Free Disk Space	>2,0 GB

2.2.2 Software Prerequisites

MATLAB installation is required for seamless integration between ETAS SCODE-ANALYZER and MATLAB/Simulink.

2.2.3 Release Test Configuration

This release has been tested on the following host systems:

- Windows 10 64bit

Tests have been performed with

- MATLAB 2015b (64bit), 2016b, 2017b, 2018b

2.3 Delivery

The software is delivered with an installation routine on a DVD including ETAS SCODE-ANALYZER software, documentation, tools, utilities, and further information. All software documentation is available in the Portable Document Format (PDF), which requires Adobe® Reader®.

The DVD contains the following items:

File or Directory	Description
`Autostart.exe`	The executable for starting the ETAS Product Installation program.
`Start.exe`	The ETAS Product Installation program.
`Start.ico`	The ETAS SCODE-ANALYZER icon.
`install\ETAS_SCODE-ANALYZER_2.6.2`	Directory containing the software installation of ETAS SCODE-ANALYZER.
`\Documentation`	Directory containing copies of the PDG user documentation.

File or Directory	Description
\Documentation\Open Source Software	Directory containing information about 3rd party open source software used in or provided for use with ETAS SCODE-ANALYZER. Including copies of the licenses under which this software is used.
\HTML	Directory containing text and images for the DVD.

2.3.1 Used 3rd Party Software

ETAS SCODE-ANALYZER makes use of third-party software components. Licensing information for these components can be found in `Documentation\ETAS SCODE-ANALYZER 2.6.2 OSS Attributions.pdf`.

2.4 Installation

ETAS SCODE-ANALYZER is distributed as a standard Microsoft Windows installer. Run `setup.exe` and follow the on-screen instructions to install the ETAS SCODE-ANALYZER tool.

Installation procedures and hints can be found in `Documentation\ETAS SCODE-ANALYZER 2.6.2 Getting Started.pdf`.

2.5 Licensing

Licenses can be ordered via your regional ETAS sales representative.

For evaluation of the product, there is the possibility to request evaluation licenses with a 3 months duration. Please contact your regional ETAS Sales Representative.

3 Changes

This chapter describes changes with respect to the previous version of ETAS SCODE-ANALYZER.

3.1 What's New in ETAS SCODE-ANALYZER 2.6.2

In this section, we give a rough overview over the new features available since version 2.5.0:

- Improvements in the layout of decision trees:
  - Display the decision tree either horizontally or vertically
  - Display the decision tree as a compressed directed acyclic graph (displaying identical subgraphs only once)
- Improved influence on code generation:
  - Representation types and values can be taken from extern and are used "verbatim"
  - Inclusion of external header file in C-Code generation
  - Option to choose the default of the encoding when using "external encoding" to normal unsigned integer types from 0 ... n
  - Options to create and use code generator specific subfolders
  - Option to generate code for a mode based on the mode decision tree
  - The target location for generated code can now be configured for each generator to the same project, to another project in the workspace or to an external location
- ESDL code generation has been enhanced:
  - An ETAS SCODE-ANALYZER tool logo is displayed on generated ESDL blocks
  - The layout of generated ESDL blocks has been improved
  - Along with the ESDL code a layout file is also generated for each flow
- Report generation has been made configurable with respect to its content and may include the mode transition diagram as well as the decision tree
- General
  - The ETAS SCODE-ANALYZER model is now validated upon editing and save. Validation issues (errors, warning) etc. are shown in the Problems View with quick fixes to resolve most of them. Code generation is not possible for models with errors or if a model contains no valid states or modes with no rules
  - The ETAS SCODE-CONGRA perspective can now be activated via the perspective bar
  - A new dimension type "Zwicky box" has been added to make the modes of another ETAS SCODE-ANALYZER model available as alternatives (hierarchical Zwicky box)
- Code Generation
  - ETAS SCODE-ANALYZER can generate code from the Decision Trees for Modes ("Generation Source = Mode Transition Matrix" and "Rule Generation Type = Mode decision tree"). Since Decision Trees are built based on their potential input states and Non-System states are assumed to be physically impossible, some alternatives may not be displayed in Decision Trees (the filter "Show Non-System States" is only effective for outgoing states). Consequently, the code generator ignored Non-

System States and did not generate query statements for them. This behavior is in line with the physical meaning of Non-System states. It was, however, inconsistent with the computed fingerprint, which also includes all Non-System States. As a consequence, we modified code generation to add code also for Non-System States.

3.2 Compatibility to Earlier Releases

It is recommended to use a new workspace with each new release. Additional semantic checks and analyses introduced may cause models originally developed in earlier releases to generate new warnings and errors.

3.3 Known Issue Reports

If a product issue develops, ETAS will prepare a Known Issue Report (KIR) and post it on the internet. The report includes information regarding the technical impact and status of the solution. Therefore, you must check the KIR applicable to this ETAS product version and follow the relevant instructions prior to operation of the product.

The Known Issue Report (KIR) can be found here:

http://www.etas.com/kir

3.4 Known Problems

This section describes the set of known problems.

3.4.1 Software-Related Items

Issue Reference	Description
SCT-77	**Renaming a project should not lead to collapse its expanded items** When a project name is changed then the Collapse All behavior is replicated on this project in the Project Explorer. **Workaround:** None.
SCT-86	**Warnings are logged in the .log file when commands have no category defined** The `*.log` file may contain warnings from an Eclipse plug-in that Commands should have a category. **Workaround:** None, since these warnings have no functional impacts
SCT-88	**Decision tree: performing undo/redo multiple times leads to crash the layout** **Workaround:** Click on Reorder Globally to retrieve the graph.
SCT-178	**Code changes even without saving model** Code gets generated for an unsaved file even though there was no change in saved state of model. **Workaround:** Save model manually before generating code.

SCT-762	**Dropdown for description font and size in the property page is shown only half** **Workaround:** Clicking on the dropdown lets you choose the font and size.
SCT-993	**Simulink integration may not work if multiple versions of ETAS SCODE-ANALYZER are installed** A double-click on a Simulink block may fail to open the corresponding ETAS SCODE-ANALYZER project if more than one version of ETAS SCODE-ANALYZER is installed. **Workaround:** Launch the desired version of ETAS SCODE-ANALYZER first and then perform the double-click on the Simulink block
SCT-13163	**Folders and projects may be renamed by invalid names** It is possible to use invalid names for folder and project names via F2 or rename. This may impede code generation. **Workaround:** Rename folders and projects watchfully.
SCT-13588	**Report truncates tables/rules in Word and PDF export files that are too wide** **Workaround:** Edit the document and use smaller fonts or suitable page settings.
SCT-14285	**Problems with mex compilation in MATLAB 2018b** Automatic mex compilation might fail when using MATLAB R2018b depending on the system setup. **Workaround**: Deactivate automatic compilation and compile manually.
SCT-14310	**CMEX generation doesn't call version specific `mex.bat` from MATLAB** Selecting a version of MATLAB for compile MEX function has no effect on calling `mex.bat` from exactly this MATLAB version, because the ComboBox does not know where the MATLAB installation is. **Workaround**: None. **Additional Information:** R2018b does not deliver a `mex.bat`.
SCT-14311	**CMEX generator does not use specific subfolder for C code** Using "Use generator specific subfolder" has no effect on CMEX generation. **Workaround**: The C code is generated in the subfolder for the MATLAB code.
SCT-14583	**Decision trees for modes do not consider explicit non-transitions to Non-System states** Decision trees are generated based on the problem space excluding Non-System states. **Workaround**: Define all states in regular system modes and refrain from using Non-System modes.

SCT-14666	**Performance issues with very large models** Very large ETAS SCODE-ANALYZER models may suffer from very long response times due to model validation after every change. **Workaround**: Close the Outline View.
SCT-14698	**Out of memory exception when running verify code feature** Generating and executing code verification may lead to memory exception. **Workaround:** Increase memory reservation for eclipse in the `SCODE.ini` file using the "–Xmx" flag.
SCT-14729	**Method Body not generated for AMD Versions 6.3.1 and 6.4.3** Code does not contain Method Body for external encoding option. **Workaround:** Use internal encoding.
SCT-14816	**Lost data when using Save As ... to overwrite an existing file** Trying to overwrite an existing ETAS SCODE-ANALYZER file using the Save As … command will open the existing file. All changes made to the file to be saved will be lost. **Workaround:** Delete the existing file instead of overwriting it.
SCT-14849	**Internal error when generating ESDL and MATLAB code with quotes in implementation names** The usage of quotes in implementation names will lead to an internal error during generation of ESDL and MATLAB code. **Workaround:** Refrain from using quotes in implementation names.
SCT-14863	**Problem view shows no warnings and errors before a change is made to a newly opened model** The validation of the model is not triggered when a `*.scode` file is opened in the editor. **Workaround:** Make any change to the model, save a rule or apply preferences or properties without change.
SCT-14870	**Generator dependent validations not triggered after editing project and file properties** The validation of the model is not triggered after changes to project and file specific generator properties. **Workaround:** Make any change to the model, save a rule or re-apply preferences or properties without change.
SCT-14883	**Exceptions when creating a `*.scode` file with "New File" wizard** Creating a `*.scode` file using the "New File" wizard leads to error messages and creates a corrupt `*.scode` file. **Workaround:** Use the "New SCODE File" wizard to create a new `*.scode` file.

SCT-14891	**Exception when creating a `*.scode` file with identical name but other case** Creating a `*.scode` file using the same name as an existing file but with other case leads to an exception. **Workaround:** Refrain from using identical case sensitive file names.
SCT-14892	**Tab selection in editor not in sync with the Project Explorer** The highlighted element in the Project Explorer does not always correspond to the opened element in the editor. **Workaround:** None.
SCT-14896 and SCT-14921	**Exception when only INFO and/or ACTION dimensions in Problem Space** An exception occurs when only INFO and/or ACTION dimensions are defined and the problem space does not contain any CONDITION or COND.VARIANT dimension. **Workaround:** Add a CONDITION and/or COND.VARIANT dimension to the problem space.
SCT-14898	**Blank item in Project Explorer when user deletes the last `*.scode` file.** A blank element is shown in the project explorer tree in case the user deletes last `*.scode` file. **Workaround:** Close and reopen the project tree.
SCT-14911	**Enumeration values and symbols cannot be reused for external encoding** External symbols and enumerations are not checked for uniqueness. **Workaround:** Use unique symbols and enumerations for external encoding.
SCT-14918	**Multiple ETAS SCODE-ANALYZER installations share the same update site location** Uninstalling plugins may affect also other installations of ETAS SCODE-ANALYZER. This only applies to concurrent installations of the same ETAS SCODE-ANALYZER version. **Workaround**: Avoid multiple installations of the same ETAS SCODE-ANALYZER version.
SCT-14922	**"Text Compare" shows no differences in text** The Diff window of the Text Compare does not show any differences. **Workaround**: Use third party apps until this issue is fixed.
SCT-14923	**Exception when comparing with an empty `*.scode` file** Comparing two `*.scode` files throws an exception when one of the files is empty. **Workaround**: Avoid comparing with an empty `*.scode` file.

SCT-14924	**Preferences are not correctly enabled when toggling between pages** Dependencies of options might not be updated across preferences pages, i.e. an option can stay disabled even though it should be enabled due to a change on a different preference page. **Workaround:** Reopen the dialog.
SCT-14925	**Unhanded loop exception after drag and drop of a transition graph to the outline view** Dragging a `*.sdgm` file to the outline view can raise an unhandled loop exception. **Workaround:** Avoid drag and drop of `*.sdgm` files to the outline view.
SCT-14930 (1)	**Missing dependencies for C-MEX and Simulink options** The MATLAB language option "C-MEX" and the Simulink export option "Wrap MFunction as Simulink block" should not be available concurrently. **Workaround:** Do not enable the Simulink export option "Wrap MFunction as Simulink block" along with the MATLAB language option "C-MEX".
SCT-14930 (2)	**Missing dependencies for C-MEX and Simulink options** The "MATLAB Block Script" option and the "SFunction" option should not be available when "Based on C-MEX function" is chosen for the MFunction type. **Workaround:** Do not enable "MATLAB Block Script" and "SFunction" when generating MFunctions based on C-MEX.
SCT-14938	**Invalid ESDL verification code** "Print all evaluations (with Alternative Names)" may lead to non-interpretable ESDL code. **Workaround:** Delete invalid code sections manually.
SCT-14949	**Errors during ETAS SCODE-ANALYZER startup** In some cases it can happen that during startup of ETAS SCODE-ANALYZER a message box appears with the following message: "An error has occurred. See the log file <workspace_path>\.metadata\.log". **Workaround:** Press OK and restart ETAS SCODE-ANALYZER.
SCT-15007	**Function argument mismatch in ESDL action code for option "Generate mode transition as statemachine"** The generated action code supplies the current mode as an argument although it is retained internally. **Workaround:** Manually remove the currentMode argument from the generated action code.

SCT-15136	**Seamless integration is not reestablished if the `.scode` file and the SCODE-ANALYZER project are not present in the current Workspace.** A double click on an existing ETAS_SCODE_ANALYZER_MFunction_ Block does not automatically create a SCODE-ANALYZER project and copy the corresponding `.scode` file from the MATLAB current folder to the SCODE Workbench. **Workaround:** Manually create the project and copy the `.scode` file from the MATLAB current folder to the SCODE-ANALYZER project.
SCT-15441	**Reduce rules not working correctly when an exclude rule contains all alternatives of a dimension** Reducing exclude rules which contain all alternatives of the same dimension can lead to a modified rule set that makes the model incomplete and inconsistent. **Workaround:** Deselect all alternatives of a dimension instead of selecting all of them in exclude rules.

Further Information	
1	In S-Function simulation, if a `*.scode` file is renamed/deleted, the transfer of data from MATLAB block is not supported
2	Re-layout mode transition graph should be performed when a new mode or event is added to the model
3	The Replace SCODE file action does not change the old diagram (`*.sdgm`) files. It is recommended to delete these diagram files manually

4 Notes

4.1 General

- Edit functionality in mode transition graph is not supported.
- Non-system modes are not excluded while calculating decision tree for outgoing events.
- The `*.sdgm` and `*.scode` files are tightly coupled by the name. Renaming of the `*.scode` file will make the nodes and edges in the `*.sdgm` diagram file appear with (X).
- On changing the model, the `*.sdgm` diagram will only be updated after the changes are saved in the `*.scode` file.
- C Code is compiled and verified on MinGW and is checked for MISRA compliance up to warning level 3
- Bit field representation is not supported for any code type other than C.
- State machine code for binary decision tree is not supported for ASCET/ESDL.
- Use of macros/extended macros is not supported with dimension representation as enumeration for C code.

4.2 MATLAB/Simulink

- For round trip engineering between ETAS SCODE-ANALYZER and MATLAB, connection between the tools should be established.
- If an exception occurs or the connection between MATLAB and ETAS SCODE-ANALYZER is lost, both the tools need to be restarted.
- MATLAB block is updated upon 'Save' operation on `*.scode` files.
- Before uninstalling ETAS SCODE-ANALYZER all connections to MATLAB versions must be removed in the MATLAB/Simulink section of `Windows/Preferences´ in order to be able to reestablish connections with a newer release of the product.
- Struct of Enumeration code is not supported for MATLAB.
- Manual editing of unit delay blocks in MATLAB is not supported as they are generated from ETAS SCODE-ANALYZER.

5 Contact, Support and Problem Reporting

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:

ETAS subsidiaries	Internet:	www.etas.com/en/contact.php
ETAS technical support	Internet:	www.etas.com/en/hotlines.php