ETAS VECU-BUILDER V1.5

Release Notes

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1. Introduction

1.1. Definitions and Abbreviations

Term/Abbreviation	Definition
API	**A**pplication **P**rogramming **I**nterface
ASIL	**A**utomotive **S**afety **I**ntegrity **L**evel
CAN	**C**ontroller **A**rea **N**etwork
CDD	**C**omplex **D**evice **D**river
CPU	**C**entral **P**rocessing **U**nit
DLL	**D**ynamic **L**ink **L**ibrary
ECU	**E**lectronic **C**ontrol **U**nit
EEPROM	**E**lectrically **E**rasable **P**rogrammable **R**ead-**O**nly **M**emory
EHI	**E**TAS **H**elpdesk **I**nternational
FMI	**F**unctional **M**ock-Up **I**nterface
FMU	**F**unctional **M**ock-Up **U**nit
KIR	**K**nown **I**ssue **R**eport
MCAL	**M**icro**c**ontroller **A**bstraction **L**ayer
NVRAM	**n**on-**v**olatile **R**andom-**A**ccess **M**emory
OS	**O**perating **S**ystem
PR	**P**roblem **R**eport
SiL	**S**oftware-**i**n-the-**L**oop
SuT	**S**ystem **u**nder **T**est
SW	**S**oft**w**are
V&V	**V**erification and **V**alidation
vCDD	**V**irtual CDD
vECU	**V**irtual ECU
vMCAL	**V**irtual MCAL
WSL	**W**indows **S**ubsystem for **L**inux
XCP	Universal Measurement and **C**alibration **P**rotocol

1.2. User Documentation

The VECU-BUILDER user documentation in PDF format can be found as part of the download archive.

2. Product Definition

2.1. Functions at a glance

VECU-BUILDER is a tool that builds a virtual ECU (vECU) for V&V of automotive ECU software via Software-in-the-Loop (SIL) simulations. The inputs can either be Classic AUTOSAR sources, non-AUTOSAR C/C++ sources, or compiled binaries including symbol information. The tool uses a text file in YAML format for configuring all vECU properties such as inputs, outputs, parameters, tasks, or the XCP slave. VECU-BUILDER wraps the binaries of the vECU into an FMU. It can be used to build vECUs of types 1, 2, and 3.

VECU-BUILDER utilizes CMake and the GNU compilers or Microsoft Visual C/C++ compiler for compiling the vECU. It includes its own and supports user provided MinGW installations. The resulting FMU adheres to the standard FMI for Co-Simulation 2.0.

2.2. General Description

2.2.1. System Prerequisites

The following minimum system prerequisites must be met:

Hardware	2,0 GHz PC
	8 GiB RAM
Operating System	Windows® 10 or Ubuntu Linux 20.04 LTS
Free Disk Space	5 GiB (not including the size for application data)

The following system prerequisites are recommended:

Hardware	3,0 GHz PC
	32 GiB RAM
Operating System	Windows® 10 or Ubuntu Linux 20.04 LTS
Free Disk Space	>100,0 GiB

2.2.2. Software Prerequisites

The following 3rd-party software installations are mandatory:

- CMake 3.15 or higher

The following 3rd-party software installations are recommended:

- Notepad++

The following 3rd-party software installations are optional:

- Microsoft Visual Studio 2015, 2017, 2019, 2022
- Visual Studio Code

2.2.3. Release Test Configuration

ETAS VECU-BUILDER has been tested with the following software test setup (other versions will work as well):

- Microsoft Windows Server 2019, Windows 10, and Ubuntu Linux 20.04 LTS
- Compilers: MinGW, Microsoft Visual Studio 2019, GCC 9.4.0
- XCP Connection with ETAS INCA V7.3 and V7.4

2.2.4. Restrictions

Here is a list of known limitations of the VECU-BUILDER:

- vECU Calibration:
  - The DCM parser supports VALUEs, CURVEs, and MAPs only.
  - Reading A2L files is unsupported on Ubuntu Linux.
  - The DCM parser supports COMPU_TAB and COMPU_VTAB only. Conversion table COMPU_VTAB_RANGE is not supported.
  - The DCM and the A2L parsers support UTF-8 encoding only.
- XCP Slave / A2L:
  - The XCP slave and the A2L parser support the measurement and calibration use cases only.
  - Only the characteristics of type VALUE, CURVE, and MAP in the A2L file are patched.
  - The XCP slave and the A2L parser support only STATIC DAQ_CONFIG_TYPE. The support of DYNAMIC DAQ_CONFIG_TYPE is experimental.
  - XCPplus is not supported.
  - The support of 3rd-party MCD tools is experimental.
- ETAS license activation on WSL does not work.
- vECU FMUs may not unload properly on Windows.
- VECU-BUILDER V1.5 supports FMI 2.0 only despite FMI 3.0 being part of the YAML file and its appearing in the User Guide.
- The EEPROM output file may contain many zero bytes (0x00). They do not impact the functionality of the EEPROM feature.

2.3. Delivery

The software is delivered with an installer via download as a zip archive.

2.3.1. Used 3rd Party Software

VECU-BUILDER uses the following 3rd-party software components internally:

- Visu-IT ASAP2 parser NG
- Open-Source Software. See separate OSS Attribution Document.

2.4. Installation

You can start the installation on Windows by executing the VECU-BUILDER_installer_1.5.0.exe. On Ubuntu Linux you can use one of the package managers to install from the package VECU-BUILDER_installer_1.5.0.deb.

An installation of the 3rd-party product CMake is required. The installer gives a hint where to download this tool. However, the installer does not enforce the installation. Please ensure that CMake has been installed, before using ETAS VECU-BUILDER.

We recommend installing the open-source software Notepad++.

2.5. Licensing

The use of ETAS VECU-BUILDER is protected by electronic licensing. Valid licenses are necessary to install ETAS VECU-BUILDER and its add-ons. The use of unlicensed ETAS software is prohibited. The required licenses are not included in this delivery. When you purchase ETAS VECU-BUILDER licenses, you receive a separate entitlement certificate which contains an activation ID needed to acquire the license. It is necessary to distinguish the used technology:

Machine based licenses:

Install your ETAS Software and start ETAS License Manager

In Windows Start menu go to: ETAS -> ETAS License Manager

In the ETAS License Manager, you can acquire your license either online or offline.

For further details see the License manager help chapter "Machine-Based License with FlexNet Embedded".

Floating, server-based licenses:

You activate the license using the self-service portal on the ETAS website.

(http://www.etas.com/support/licensing). During the activation process, you create a license file for download that you add to the license server. To generate the license file, you need the server ID. Additional information is available in the license administration guide.

For assistance, please consult the manual available under "help" on the start page of the self-service portal or see the ETAS licensing FAQ: https://www.etas.com/en/downloadcenter/37717.php .

2.6. 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: www.etas.com/kir

3. Changes

3.1. Changes in VECU-BUILDER V1.5

This chapter describes changes with respect to the previous version of VECU-BUILDER.

3.1.1. What's New

The following changes have been applied since the previous version:

- Support of DCM files and A2L COMPU_METHODs for initial data
- Improved MCD use case through the generation of .hex-file
- Support of Bitfields
- Replacement of fmuChecker by FMPy
- Additional Compile Flags for C and C++

3.1.2. Compatibility to Earlier Releases

VECU-BUILDER V1.5 is largely compatible with VECU-BUILDER V1.4. For adaptations needed when migrating workspace created with previous versions, please refer to the User Guide. Please contact ETAS Technical Support if you need any assistance when migrating your workspace to the latest version of VECU-BUILDER.

3.1.3. Fixed Problems

Since the last release of VECU-BUILDER we have fixed the following problems:

Problem Number	Title
717061	DCM values differ after 7th decimal digit
719549	DCM data lost after 6 decimal places.
739677	Union Type variables have wrong data and address

3.1.4. Known Issues

The following problems are known issues in this release of VECU-BUILDER.

Problem Number	Title
742275	Issue with SymbolDetails.txt
746135	Unsupported encoding in DCM files
746774	HEX File not created when DCM file contains 1.7976931348623158e308 as a value
748253	VECU-BUILDER sets Integer variable's variability to "continuous"

3.2. Changes in VECU-BUILDER V1.4

This chapter describes changes with respect to the previous version of VECU-BUILDER.

3.2.1. What's New

The following changes have been applied since the previous version:

- A plugin mechanism for vECU with a C/C++ API
- Addition of task triggers for early initialization
- Addition of licensing mechanism to Linux vECUs
- Performance improvement of A2L label mappings

3.2.2. Compatibility to Earlier Releases

VECU-BUILDER V1.4 is largely compatible with the VECU-BUILDER V1.3. For adaptations needed when migrating workspace created with VECU-BUILDER V1.3 please refer to the User Guide.

Please contact ETAS Technical Support if you need any assistance when migrating your workspace to VECU-BUILDER V1.4.

3.2.3. Fixed Problems

This section describes the set of fixed problems of the released version of VECU-BUILDER V1.4.

Problem Number	Title
732528	Return status incorrect when disk is full
731757	Reinstallation issue with different folder name
735644	additional_scripts executing twice
738234	Improved FMI compliance when no signals exist
734018	Symbol name error with MinGW
713944	Can't run additional script with arguments
713295	Problem with selection of DAQ list

3.2.4. Known Issues

This section describes the set of known problems of the released version of VECU-BUILDER V1.4.

Problem Number	Title
719549	DCM data lost after 6 decimal places
742275	Issue with SymbolDetails.txt

3.3. Changes in VECU-BUILDER V1.3

This chapter describes changes with respect to the previous version of VECU-BUILDER.

3.3.1. What's New

The following changes have been applied since the previous version:

- Simple File Modifications
- Example on how to add characteristics as parameters to a given YAML file
- Many bugfixes and improvements

3.3.2. Compatibility to Earlier Releases

VECU-BUILDER V1.3 is largely compatible with the VECU-BUILDER V1.2. For adaptations needed when migrating workspace created with VECU-BUILDER V1.2 please refer to the User Guide.

Please contact ETAS Technical Support if you need any assistance when migrating your workspace to VECU-BUILDER V1.3.

3.3.3. Fixed Problems

This section describes the set of fixed problems of the released version of VECU-BUILDER V1.3.

Problem Number	Title
722829	Sporadic Issue with renaming the resources folder
712894	Support all types of characteristics when patching A2L files
720072	Patched A2L had wrong address for array type variables
711731	License Manager popup blocks automated CI environment

3.3.4. Known Issues

This section describes the set of known problems of the released version of VECU-BUILDER V1.3.

Problem Number	Title
713944	Can't run additional script with arguments
719549	DCM data lost after 6 decimal places
713295	Problem with selection of DAQ list

3.4. Changes in VECU-BUILDER V1.2

This chapter describes changes with respect to the previous version of VECU-BUILDER.

3.4.1. What's New

The following changes have been applied since the previous version:

- Full support for Ubuntu 20.04 LTS Linux
- Many bugfixes and improvements

3.4.2. Compatibility to Earlier Releases

VECU-BUILDER V1.2 is largely compatible with the VECU-BUILDER V1.1. For adaptations needed when migrating workspace created with VECU-BUILDER V1.1 please refer to the User Guide.

Please contact ETAS Technical Support if you need any assistance when migrating your workspace to VECU-BUILDER V1.2.

3.4.3. Fixed Problems

This section describes the set of fixed problems of the released version of VECU-BUILDER V1.2.

Problem Number	Title
696454	A2L patch lost variable information
698175	FMU creation fails at step 2/5 without any usable message
702849	2_Build.cmd does not work with the arguments --no-dialogs in CLI
703309	Building FMU archives fails with error "not enough values to unpack"
704091	Fix launch.json
706255	A2L Patch delete 2 type of data object <COMPU_VTAB_RANGE> and <RECORD_LAYOUT>
706565	Notepad++ 32bit registry key not considered
709255	Invalid timestamp for "generationDateAndTime" in modelDescription.xml
709442	DCM parser swaps x and y axis
715279	Missing static variables in symbol details
716524	Array data in FMU by VECU-BUILDER does not correctly show in COSYM

3.4.4. Known Issues

This section describes the set of known problems of the released version of VECU-BUILDER V1.2.

Problem Number	Title
713944	Can't run additional script with arguments
719549	DCM data lost after 6 decimal places

3.5. Changes in VECU-BUILDER V1.1

This chapter describes changes with respect to the previous version of VECU-BUILDER.

3.5.1. What's New

The following changes have been applied since the previous version:

- Advanced Build Flags can be defined in the YAML file
- Aliases for FMI Variables can be defined in the YAML file
- Mapping between symbols and A2L labels can be defined in the YAML file
- vECU can be built directly in Visual Studio or VS Code
- vECU built with MinGW can be debugged using VS Code
- Debug Hook can be configured in the YAML file

3.5.2. Compatibility to Earlier Releases

VECU-BUILDER V1.1 is largely compatible with the VECU-BUILDER V1.0. For adaptations needed when migrating workspace created with VECU-BUILDER V1.0 please refer to the User Guide. Please contact ETAS Technical Support if you need any assistance when migrating your workspace to VECU-BUILDER V1.1.

3.5.3. Fixed Problems

This section describes the set of fixed problems of the released version of VECU-BUILDER V1.1.

Problem Number	Title
686446	FMU with GO License not executable on PC without LIMA
687970	Crashes when simulation starts with active XCP configuration
688347	Does not patch AXIS_PTS segments of A2L file
688673	EEPROM variable cannot be written if defined as const
688713	COMPU_METHODs removed by the patching process
689088	No .die file created
690021	In A2L comment name contain 0x…..causes address modified error during patch
691013	CLI not working
692104	Cannot debug a vECU built by gcc

3.5.4. Known Issues

This section describes the set of known problems of the released version of VECU-BUILDER V1.1.

Problem Number	Title
691641	INCA crashes when experiment is open with XCP Sim
696454	A2L patch lost variable information
698175	FMU creation fails at step 2/5 without message

3.6. Changes in VECU-BUILDER V1.0

This chapter describes changes with respect to the previous version of VECU-BUILDER V1.0.

3.6.1. What's New

This is the initial release of ETAS VECU-BUILDER as a product. The following changes have been applied since the last pre-release version vEcuBuild 0.7.3:

- A mandatory keyword "version" has been added to the YAML file
- An optional keyword "sync" has been added to the eeprom section of the YAML file
- The keyword "patch_a2l_files" has been renamed to "patch_a2l_file". Only a single file can be specified.
- Stability of symbol parser has been improved.
- Behavior of task scheduler has been improved.

3.6.2. Compatibility to Earlier Releases

This is the first release as a product. All older versions of vEcuBuild are deprecated and no longer supported. VECU-BUILDER V1.0 is largely compatible with the pre-released versions of vEcuBuild; manual adaptations when upgrading might be needed, though. Please contact ETAS Technical Support if you need any assistance when upgrading to VECU-BUILDER V1.0.

3.6.3. Fixed Problems

This section describes the set of fixed problems of the released version of VECU-BUILDER V1.0.

Problem Number	Title
676011	Failed to parse the large *.die files
676651	VECU crashes when calling fmi2FreeInstance
676674	Invalid ModelDescription.xml caused by Enumeration
682813	Does not patch AXIS_PTS segments of A2L file
685992	VECU not buildable without useful error message and massive resource usage
684579	Error encrypting message after stop simulation
684845	XCP Transport layer configuration failed in INCA when vECU is created with VECU-BUILDER-XCP license
684582	Created 3d_RemoveGoLicense.bat in workspace fails

3.6.4. Known Issues

This section describes the set of known problems of the released version of VECU-BUILDER V1.0.

Problem Number	Title

687970	Crashes when simulation starts with active XCP configuration
688347	Does not patch AXIS_PTS segments of A2L file
686446	FMU with GO License not executable on PC without LIMA
688673	EEPROM variable cannot be written if defined as const
688713	COMPU_METHODs removed by the patching process
689088	No .die file created
690021	In A2L comment name contain 0x.....causes address modified error during patch

4. Hints

4.1. Windows Defender blocks CMake configuration

The 3rd-party program CMake generates temporary executables during the configuration phase. When using certain versions of CMake, in particular 3.23.1, the Windows Defender warns about the Trojan "Win32/Tiggre!pz" in these executables. This is a *false positive* and causes no harm. Nevertheless, Windows Defender blocks their execution and the CMake configuration process fails.

If you experience a similar behavior, ETAS recommends you the installation of a recent version of CMake. Please contact ETAS Technical Support if you require further assistance.
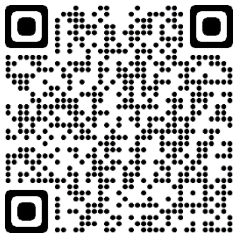
5. Hotfix Information

Not applicable.

6. Contact Information

6.1. 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 website: www.etas.com/hotlines

6.2. ETAS Headquarters

ETAS GmbH

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