

# EHOOKS

## Tool for software hook insertion




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### At a glance

- Add hooks directly in the HEX and A2L files in just seconds
  - Flexible solution supporting many use cases throughout the software development cycle
  - Support for hook-based bypass and service-based bypass
  - Integration with ASCET or Simulink® for on-target bypass
  - Compatible to all ETAS software and hardware tools as well as the corresponding ECU interfaces
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### Working with EHOOKS

ETAS EHOOKS is an easy to use software tool that enables the rapid insertion of hooks directly into the ECU software. The EHOOKS user can place bypass hooks directly into the HEX and

A2L files without knowledge of software details – there is no need for access to either ECU source code or ECU software build environment. The number of hooks is only limited by the ECU resources.

With EHOOKS, changes can be quickly introduced directly into the ECU software to support the assembly of prototypes, development, testing, and calibration. This allows work to progress while waiting for formal software deliveries from the ECU software supplier, helping to save weeks or even months in the overall project timescale.

### What can EHOOKS do?

The scalability of EHOOKS allows for a variety of different hook types.

**Constant value:** Replace an ECU variable with a constant, static value.



**Calibration:** Replace an ECU variable with calibration parameters that can be varied at run-time.

**External bypass:** Replace an ECU variable with the calculation from a new function running on prototyping hardware.

**On-target bypass:** Replace an ECU variable with the calculation from a new function which EHOOKS will run directly on the ECU – whether C-code, ASCET models or Simulink® models.

## Too many ideas – too little time? EHOOKS changes the rules

### EHOOKS benefits

#### Reliable and Accurate Results

With its advanced hook insertion technology, EHOOKS provides a reliable and accurate way to modify the ECU software.

EHOOKS was developed in close cooperation with ECU suppliers. The patent-pending EHOOKS technology allows in-depth knowledge of the ECU software, which improves the hook quality while protecting ECU software suppliers' intellectual property.

EHOOKS performs an instruction set simulation of the ECU software to determine exactly how and where the ECU image should be modified. This advanced proprietary technology results in high hook quality and reliability.

#### Improved efficiency

EHOOKS is very easy to use (figure 1). Simply select the ECU variables to be calibrated or bypassed from a list in the EHOOKS configuration environment and then click the "build" button. Within seconds the modified ECU HEX and A2L are available to work with. Compare this with waiting weeks for the ECU software supplier to provide the changes, and the benefit of using EHOOKS becomes obvious!

#### Reduced costs

EHOOKS' ability to make software changes almost immediately will reduce downtime, cut the required number of ECU software deliveries and get software ready for production faster to save development costs.

### Higher quality ECU Software

With EHOOKS it is much easier to test and calibrate during software development, which positively impacts software quality.

### Comprehensive system integration

EHOOKS integrates seamlessly with all members of the ETAS software and hardware family as well as with third-party tools to provide end-to-end support for many different use cases throughout the software development cycle (figure 2).

#### ASCET integration

EHOOKS allows integration with ASCET to support on-target bypass experiments. The key features are:

- Support for ASCET-SE targets
- Uses ASCET physical or implementation models with ECU target quantization
- Full support for measurement and calibration of ASCET models
- Unchanged usage of ASCET models for on-target bypass
- "One-click build" from ASCET and automatic integration of model code into ECU

#### Simulink® integration

EHOOKS introduces a Simulink Integration Package that makes it easy to configure EHOOKS and integrate Simulink® models for on-target bypass. The Simulink Integration Package adds new Simulink® blocks and system targets that allow the entire EHOOKS configuration and build process to be managed directly within Simulink® in a natural, intuitive and efficient manner. The key features are:

- Support of Real-Time Workshop (RTW) and Real-Time Workshop Embedded Coder allows users to exploit Embedded Coder's code efficiency
- Full support for measurement and calibration of Simulink® models
- Reuse of existing calibration parameters within Simulink® models
- Automatic conversion of ECU data to and from physical data types
- Complete automated and seamless integration from configuration to building of new ECU HEX files, all directly from within Simulink®

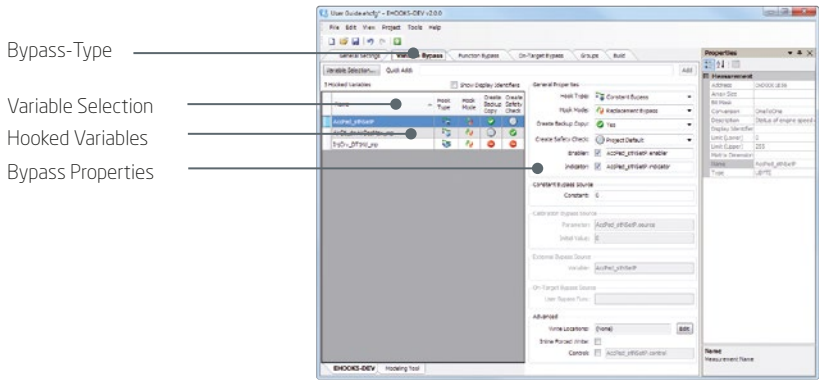


Figure 1: The clearly arranged user interface of EHOOKS allows easy to work with.

EHOOKS integration with ASCET

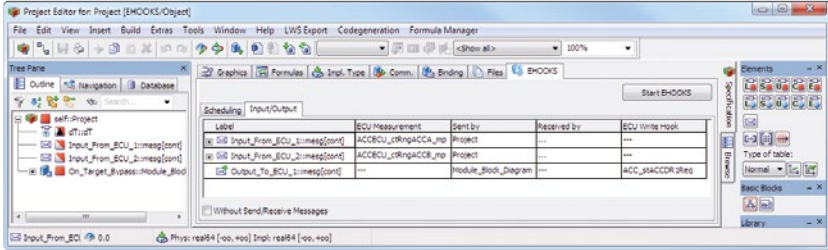


Figure 2: EHOOKS integrates with ASCET and Simulink®.

EHOOKS read/write blocksets within Simulink® user interface

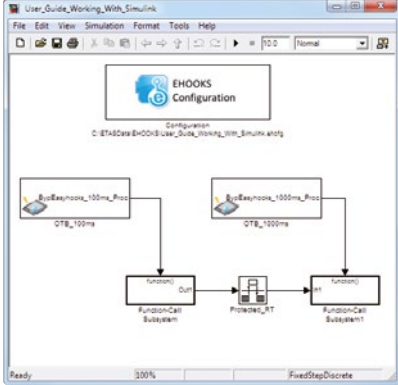
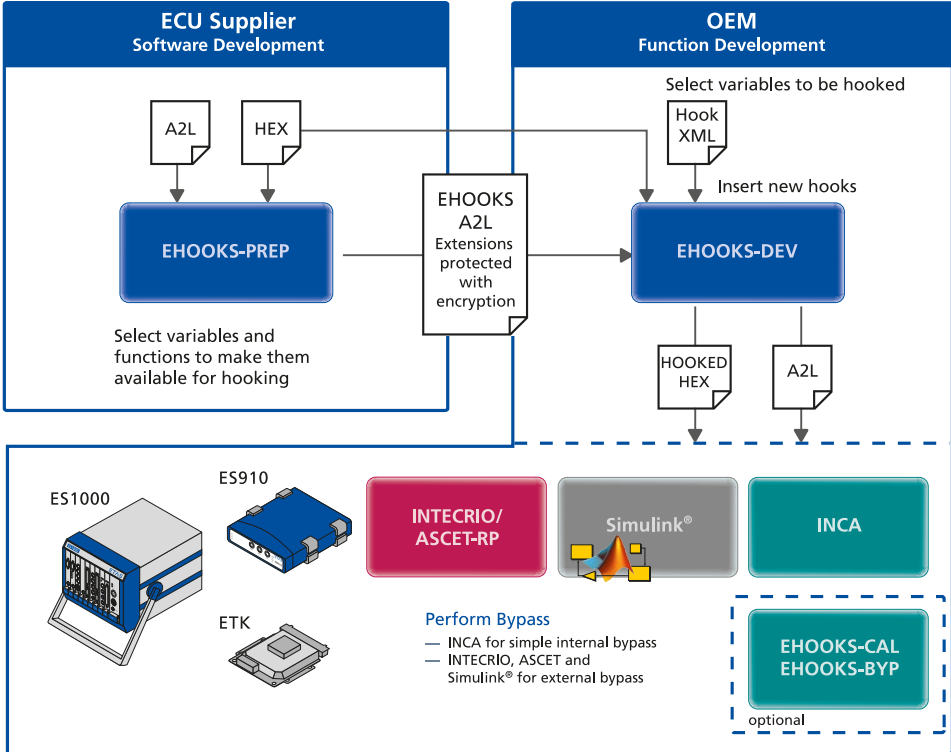


Figure 3: Usage of EHOOKS products.



### Selected use cases

The flexible technology of EHOOKS for inserting bypass hooks into the ECU software supports a wide range of use cases across the entire software development cycle (figure 4).

In function development, EHOOKS can be used to add external bypass hooks and service points to the ECU software to allow efficient development and testing of new control strategies using behavior modeling tools and rapid prototyping systems. Using EHOOKS there is no need to define all potential bypass variables up-front just in case they are needed later. EHOOKS enables a custom ECU software version to be created with only the hooks necessary for the requirements of each specific bypass experiment. This results in an ECU software image that is smaller and closer to the ECU production code for each bypass experiment.

In software development, EHOOKS can help with ECU integration by allowing new algorithm implementations to be added directly into the ECU software itself to allow for on-target prototyping and testing of the implementation.

In testing, EHOOKS can provide an efficient method for injecting test data into the ECU software via calibration bypass hooks allowing direct control over software signals or overrides for diagnostic state machines.

In calibration, EHOOKS can provide a mechanism to work around minor software bugs or to enhance the efficiency of the calibration process by gaining direct control over the input variables to calibration parameters. This capability enables the calibration engineer to continue working in parallel with the development.

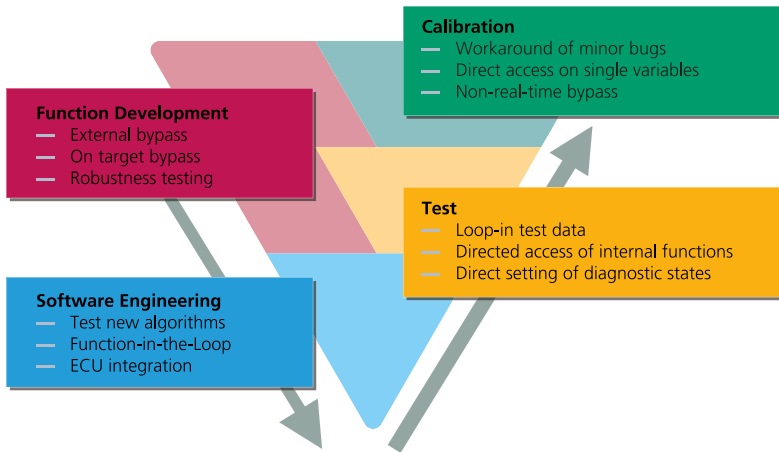


Figure 4: EHOOKS solution flexibility provides support for many use cases across the development cycle.

### Technical data

<b>Supported ECUs</b>	Bosch MEDC17 and MDG1 families, Continental CTCEMS and AURIX MULTICORE families, Denso SH2, Z4 and Z7 families, Melco SH2 and RH850 families, General Motors VICM family, Chrysler Power PC family, Delphi DCM6, DCM7 and ETC3 families, Magneti Marelli 11GV family*
<b>Compatible Software</b>	ASCET-RP, INTECRIO, INCA, INCA-EIP
<b>Compatible Hardware</b>	Rapid prototyping systems ES910, ECU interfaces ETK-T, ETK-S, and XETK

\* Please contact ETAS sales for latest information on supported ECU platforms. Support for new ECUs continuously being added. New ports are available upon request.

**Info** For more information about EHOOKS, please refer to [www.etas.com/ehooks](http://www.etas.com/ehooks).  
If you require further information, don't hesitate to contact your local ETAS representative.