

## ASCET V7

### Tools for Developing Safe and Efficient Software



#### A Safer Way to C

ETAS ASCET is a tool for model-based development of application software for embedded systems. ASCET has been specifically designed to address the software development challenges of the automotive industry, where products must be manufactured in high volumes, at low cost, to industry standards and with zero defects.

ASCET enables software engineers to build high-performance, low-overhead, easily maintainable, safe, and secure embedded software.

ASCET automatically generates MISRA-C: 2004 compliant C code that can be used in development processes that must comply with IEC 61508, ISO 26262 and other related standards. ASCET code generation technology has been used for over 20 years in series production projects and over 450 million ECUs. Generated C code can be compiled with a standard C compiler and is free from many security, vulnerability, and portability problems.

#### Major Tool Features

##### Automatic Defensive Code Generation

ASCET automatically adds defensive coding checks to prevent potential errors that cannot be detected by static analysis. ASCET systematically adds checks everywhere they are required. But ASCET only adds the checks when necessary so that runtime and memory is not wasted. C code generated by ASCET from ESDL is, by construction, free from division by zero, underflow, overflow and indexing outside of array bounds.

ASCET's code generator is certified according to IEC 61508 and ISO 26262. ASCET has been user for the development of software for safety-related systems.

ASCET generated C code satisfies the MISRA-C: 2004 guidelines.

##### Eclipse-based IDE

ASCET includes an Eclipse-based IDE (Integrated Development Environment). Modeling is made easy by numerous intuitive editing and visualization aids thanks to content as-

#### At a Glance

Model-based development with integrated graphical and textual notations

On-the-fly model error detection and analysis for major classes of programming problems

Full MISRA-C: 2004 compliance

Automatic generation of highly efficient and safe code suitable for in IEC 61508 and ISO 26262 development processes

Eclipse-based Integrated Development Environment (IDE)

sist, auto completion, diff and merge, out-lines, declaration and reference searching, and so on. The IDE leverages the power of ASCET, tightly integrating language validations to provide immediate feedback at editing time.

### “On-the-fly” Static Analysis

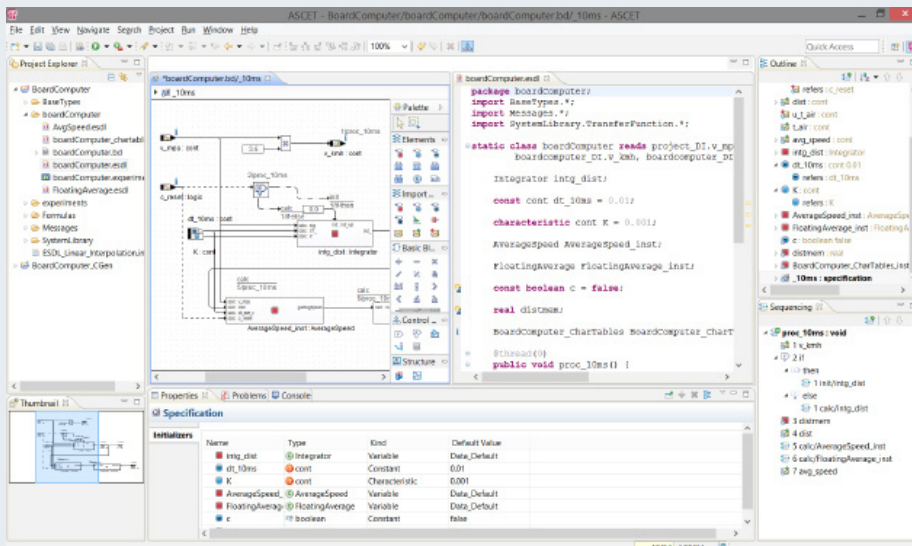
The expressive power of ASCET models means that programs can be statically checked for certain error classes at editing time.

ASCET provides automatic checks for correct method argument usage, reachability of states in state machines and freedom from side-effects in expression evaluation. ASCET’s analysis helps avoid nasty surprises when a C tool chain is changed. It ensures that expressions like  $F(X)+G(X)$  will calculate the same result even if the compiler re-orders the evaluations of  $F(X)$  and  $G(X)$ .

### A Safe Language by Design

ASCET’s Embedded Software Development Language (ESDL) has key design choices that address the aspects of C that make it difficult to use in environments in which safety and security are critical:

- Safer syntax: to close the “loopholes” in C that cause many programming errors and removes the C features that are easy to misuse or that make code fragile.
- Safer typing: range-bound numerical types, optimal C storage type selection, native support for arbitrary precision fixed-point types, units of measurement and automatic conversion.
- Safer abstractions: associative arrays (array indices of any discrete scalar type), state machines for state-based control, curves and maps for continuous control.
- Safer structure: namespace mechanisms, safe static object creation, product-line variant handling.



### ASCET IDE (Intergrated Development Environment)

For complete ordering information and accessories for ASCET, please refer to [www.etas.com/ASCET](http://www.etas.com/ASCET).

For more information, please contact your local ETAS representative.

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Gothenburg

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Bangkok

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