



Software erosion protection for safety-critical embedded software according to IEC 61508 in measuring technology

ATiCS, the world's safest and most compact all-in-one changeover and monitoring device for safety-related and medical applications, is protected against software erosion with the Axivion Bauhaus Suite.

THE CHALLENGE ++ Power supplies for medical applications have to meet stringent requirements with respect to reliability based on the IEC 60364-7-710 and DIN VDE 0100-710 standards. The new, integrated changeover and monitoring devices of the ATiCS710 series from Bender are the ideal solution for this task. For the first time, it has been possible to accommodate both the switching elements and the electronics in an extremely flat, compact enclosure. The modules feature a new safety concept and are SIL2-rated (functional safety according to IEC 61508). Consequently, the software of the ATiCS710 series has to meet very high quality requirements that impose various demands, including approval from the TÜV German Technical Inspection Agency. The specifications of IEC 61508 include a variety of requirements relating to the internal software quality. Among other things, it is imperative from the outset to

create a well-structured software architecture and to check its conformity again and again during the development phase. Due to the complexity of the requirements, it would not be practical to rely on continuous manual checking as part of the usual code reviews for reasons of time and cost.

THE SOLUTION ++ Mandatory coding guidelines were created based on the various quality requirements. The software architecture was created and documented as early as the prototyping phase with the aid of tools. During implementation, the Axivion Bauhaus Suite performed in-process checks to ensure conformity to the coding guidelines and the architecture throughout the entire time. As part of its services, Axivion extended the Axivion Bauhaus Suite to include the coding guidelines from Bender. Axivion Bauhaus Suite's erosion protection has since become an integral part

of the development process in the ATiCS project.

The reports generated can be used as part of the documentation submitted to the TÜV German Technical Inspection Agency as evidence of the systematic design of the software.

"In my opinion, it would not be practical to undertake a project of this size under the given quality requirements without using the Axivion Bauhaus Suite."

Hartmut Kerger, Software Developer for ATiCS Software, Dipl.-Ing. W. Bender GmbH & Co. KG



“We place very high demands on the safety and quality of our products. The Axivion Bauhaus Suite continually supports us in achieving our goals.”

Joachim Wagner, Area Manager,
Dipl.-Ing. W. Bender GmbH & Co. KG

THE SUCCESS ++ Now they are automated, the checks are fast and cost-effective, and the quality of the results is consistently high. At the same time, far less effort is required to update the architectural documentation, meaning that documentation reflecting the current development status is readily available at all times. As a result, architectural violations are corrected promptly, thereby eliminating hidden dependencies and minimising risk factors.

The notifications generated by the Axivion Bauhaus Suite early on during the development phase drastically reduce the duration of potential error sources, such as architecture violations, dead functions or unused variables.

It is no longer necessary to undertake any extra work at the end of the project to achieve the quality objectives. Instead, the Axivion Bauhaus Suite monitors the achievement of these objectives throughout the entire development process and makes sure they are met.

The reports generated with the Axivion Bauhaus Suite make it easier to create the documentation required for product certification by the TÜV German Technical Inspection Agency.

ABOUT BENDER ++ For over 60 years, Bender has been committed to making electricity safer. With a wide range of innovative measuring, protection and monitoring systems, the company provides devices and systems for controlling safety in electrical energy applications in machinery and equipment and for reporting critical operating states before they

can cause expensive material damage, business interruption or danger to persons.

Their products are used in a wide variety of applications, from building services engineering, all kinds of industrial sectors, and power generation and distribution right through to traffic technology and healthcare services. Coupled with an extensive range of services, the main business objective is to work closely with customers to devise, develop and produce solutions that meet the requirements of today and tomorrow. Solutions that consistently provide customers with high productivity, optimum efficiency and a high degree of electrical safety.

With its headquarters in Grünberg and over 500 employees and 56 branches worldwide, Bender is a market leader in electrical safety monitoring systems.

ABOUT AXIVION ++ Axivion, Stuttgart, Germany is a provider for complete solutions for protection from software erosion. The solutions include the development of innovative software tools – amongst others for static code analysis, architecture verification and clone management – as well as the development of methods, training concepts, and service and consulting for the implementation of measures.

The core product of the company is the Axivion Bauhaus Suite, a tool suite for improvement of software quality and maintainability of software systems implemented in the programming languages Ada, C, C++, C#, and Java. Axivion's customers are developers of technical

software across different industries, e.g. in the field of automotive, railway, electronics, information and telecommunication, medical, avionics, mechanical engineering, and industrial automation. Axivion's MISRA checker covers 100 % of all automatically testable MISRA rules for the standards MISRA C:2004, MISRA C:2012, and MISRA C++:2008. Since its foundation in 2006, Axivion maintains close research links to the University of Stuttgart, Germany, and to the University of Bremen, Germany to keep up with the newest trends in programming and code analysis research.

More information is available at www.axivion.com

Sources of images: Bender GmbH

