RadICS Platform

IEC 61508 SIL 3 Certification

Radiy is proud to present the RadICS Digital I&C Platform that was certified by exida as an IEC 61508:2010 SIL 3 capable digital I&C platform intended for nuclear safety applications! RadICS achieved the SIL 3 rating in a single channel configuration. The redundancy typical of nuclear safety systems provides an additional level of risk reduction.

The RadICS Platform is robust, flexible, and scalable. It provides state-of-the-art functions, services, and safeguards for both safety and non-safety applications in the nuclear industry. The RadICS Platform components are designed to the latest IEC standards for safety-related service and the highest classified nuclear systems. The RadICS Platform consists of a Logic Module, basic input/output modules, and specialty modules all housed in a seismically qualified chassis.

SIL 3 Compliant Platforms Contain Four Critical Elements:

- Functional Safety Control
- Effective Process Execution
- High Product Reliability
- Proper Organizational Factors

Benefits of a SIL 3 Compliant System:

- High levels of resistance to random hardware and "systematic" design failures.
- Verified rigorous process for hardware and software design, as well as, the manufacturing and quality control processes.
- Assurance that RadICS safety-related systems will offer the necessary reliability required for the safety functions performed by the I&C equipment.

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20 Years of Innovation for the Global Nuclear Industry

For more than 20 years Radiy has provided advanced instrumentation and control (I&C) solutions for nuclear power plant modernization and new build projects in the global market. Radiy's main I&C product, the RadICS I&C Platform, was developed specifically for use in nuclear power plants. It is the only FPGA-based I&C platform with a SIL 3 certification in a single channel configuration. Radics, a wholly owned LLC, provides delivery services for the RadICS I&C Platform for international markets to meet local regulatory requirements. Radiy also offers industrial control systems, electrical equipment, and reverse engineering services.

v.05.0 (June 2019)

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Basics of IEC 61508 Certification

The IEC 61508 standard provides means of certifying systems based on predefined Safety Integrity Levels (SIL), which are order of magnitude levels of risk reduction. The IEC 61508 establishes three modes of operation:

- Low Demand Mode: where the safety function is only performed on demand with ≤ one per year
- High Demand Mode: where the safety function is only performed on demand, with frequency of demand is > one per year;
- Continuous Demand Mode: where the safety function is a part of normal operation.

The SIL certification process requires that products be developed under a Functional Safety Management Plan that is audited in stages by the independent certification agency. Certification specifically addresses:

- Management of functional safety (project organization and responsibilities, personnel competence, development lifecycle, tools and documentation)
- Avoidance of systematic failures (design of system architecture, hardware and software modules including techniques and measures)
- Control of operational failures (techniques and measures for control of random hardware, environmental or operational failures)

Product design subject to a failure modes, effects, and diagnostic analysis to calculate the Safe Failure Fraction and Probability of Failure on Demand. This analysis often identifies requirements for the software to provide increased diagnostic coverage.

Certificate / Certificat

Zertifikat / 合格証

RAD 1406037 C001

exida hereby confirms that the:

FPGA-Based Safety Controller (FSC) RadICS

RPC Radiy

29 Geroyiv Stalingrada Street

Kirovograd, Ukraine

Has been assessed per the relevant requirements of:

IEC 61508 : 2010 Parts 1-7

and meets requirements providing a level of integrity to:

Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type B Element

SIL 3 @ HFT=0; Route 1_H

PFD_{AVG}, PFH and Architecture Constraints must be verified for each application

Safety Function:

The FSC will read input signals, perform user-defined application layer logic and write results to the output signals within the stated response time.

Application Restrictions:

The unit must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.

Evaluating Assessor

Certifying Assessor

The manufacturer may use the mark:

Revision 3.0 January 31, 2019
Surveillance Audit Due
February 1 , 2022

ISO/IEC 17065
PRODUCT CERTIFICATION BODY
#1004

Certificate / Certificat / Zertifikat / 合格証

RAD 1406037 C001

Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type B Element

SIL 3 @ HFT=0; Route 1_H

PFD_{AVG}, PFH and Architecture Constraints must be verified for each application

FPGA-Based Safety Controller (FSC) RadICS

Systematic Capability:

The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.

A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than stated.

Random Capability:

The SIL limit imposed by the Architectural Constraints must be met for each element.

For failure rates, see the Safety Manual.

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFH/PFD_{avg} considering redundant architectures, proof test interval, proof test effectiveness, any automatic diagnostics, average repair time and the specific failure rates of all products included in the SIF. Each element must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

The following documents are a mandatory part of certification:

Assessment Report: RAD 14-06-037 R002 V3R0 61508 Assessment - FSC

Safety Manual: Radiy FSC Product Safety Manual

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