



Certification of RadICS platform as per US NRC requirements

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Agenda

- RadICS LLC Introduction
- US NRC Licensing Strategy
- 10 CFR 50 Appendix B Quality Management System
- RadICS Topical Report Overview
- Conclusions



RadICS LLC Introduction

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- RadICS LLC is 100% private (Limited Liability Company)
- Dedicated business unit of Radiy to promote RadICS platform internationally
- Company's business focus is digital I&C systems for Nuclear Power Plants
- The Company has 30 qualified employees. Potential for the rapid expansion
- Applicant for US NRC Certification for RadICS Platform

RadICS LLC Vision and Mission

➤ Vision

RadICS LLC is a leading provider of advanced **digital instrumentation and control systems** and **services** for **nuclear industry** at the **global market**

➤ Mission

RadICS LLC team is **committed** to provide advantageous **digital instrumentation and control solutions** to our **customers**, ensuring **safety performance** of nuclear facilities

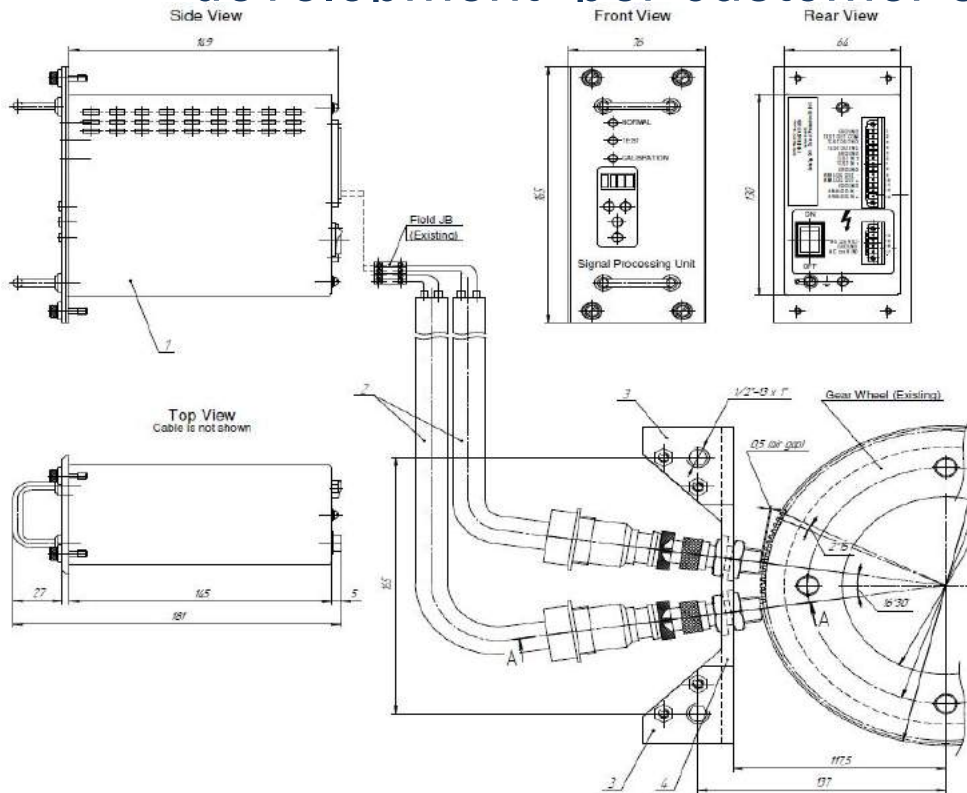
Core Value Proposition (Products) (1)

- FPGA-based I&C applications based on RadICS Platform



Core Value Proposition (Products) (2)

- Custom built FPGA-based I&C applications (Product development per customer specification)



Core Value Proposition (Products) (3)

- Reverse engineering applications (Fit, Form and Function reproduction of existing equipment)



Core Value Proposition (Services)

- Independent Verification of FPGA-based I&C Systems\Components
- Independent Validation of FPGA-based I&C Systems\Components
- Commercial Grade Dedication of components for FPGA-based I&C Systems

Core Value Proposition (Business Models)

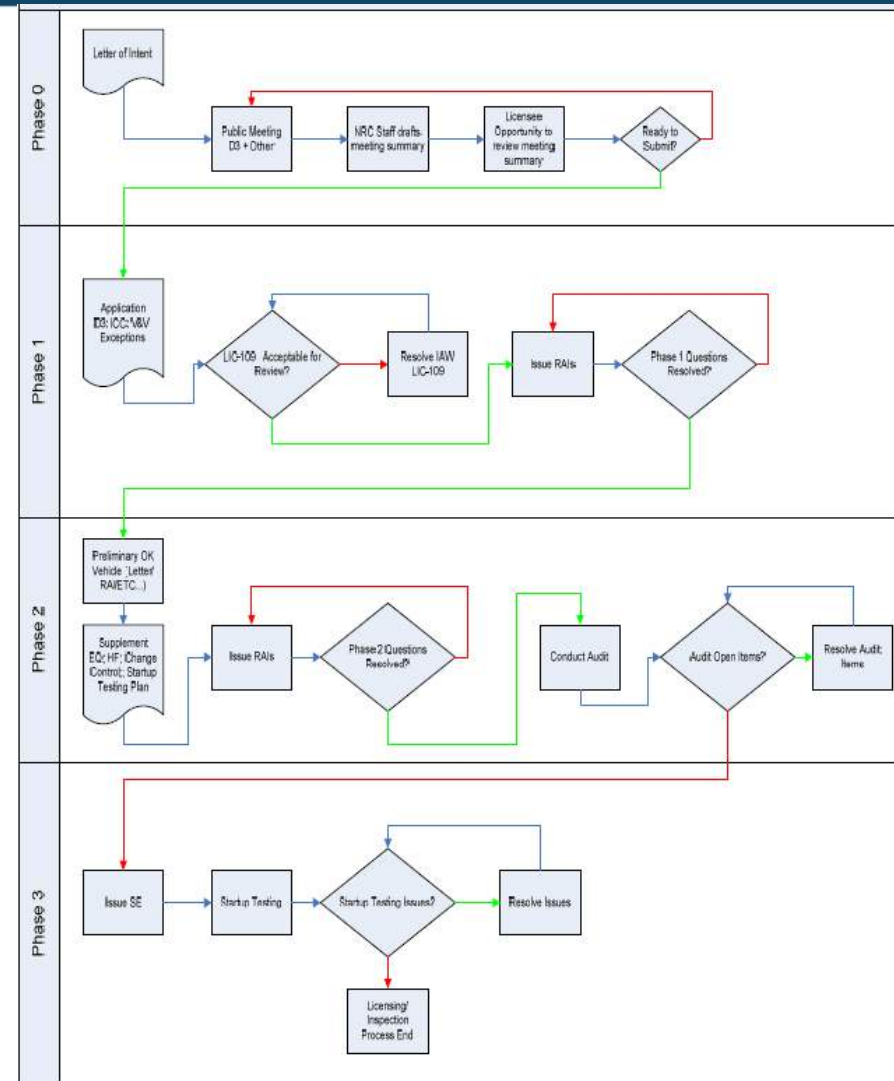
- Turn key implementation of I&C project
- Supply of Hardware, Engineering Tools and application design process (application design is performed by the end-user or system integrator)
- Any combination of above models



US NRC Licensing Strategy

Licensing Strategy

- Licensing strategy is based on Digital I&C-ISG-06
- Consist of
 - Phase 0
 - Phase 1
 - Phase 2
 - Phase 3



Licensing Strategy (1)

- Pre-Application Activities (Phase 0) - Goal is to reach general agreement with NRC that:
 - RadICS conceptual design is acceptable
 - Equipment qualification plans are appropriate
 - Commercial grade dedication strategy is acceptable
 - Document submittal plans are understood
 - Overall RadICS project schedule is reasonable
- RadICS Phase 0 Activities
 - Topical Report preparation
 - Equipment qualification plan development
 - Commercial grade dedication plan development
 - 10 CFR Part 50 Appendix B QA Plan certification and implementation

Licensing Strategy (2)

- RadICS Topical Report Submittal (Phase 1) - Goal is to have application accepted for review and get early feedback on acceptability of EQ Plan:
 - RadICS Topical Report
 - RadICS Equipment Qualification Plan
 - RadICS Commercial Grade Dedication Plan
 - DI&C-ISG-06 Phase 1 Submittals
- RadICS Phase 1 Activities
 - Topical Report review support
 - Equipment qualification plan implementation
 - Commercial grade dedication plan implementation
 - Respond to NRC Round 1 requests for additional information
 - Prepare Phase 2 Documents for submittal

Licensing Strategy (3)

- Pre-Application Activities (Phase 2) - Goal is to provide timely responses and have successful audits :
 - RadICS Equipment Qualification Summary Report
 - RadICS Commercial Grade Dedication Summary Report
 - DI&C-ISG-06 Phase 2 Submittals
- Radiy Phase 2 Activities
 - Topical Report review support
 - Support NRC audits, as necessary
 - Respond to NRC Round 2 requests for additional information
 - Prepare Final Topical Report Update
 - Review draft safety evaluation report for proprietary information

Licensing Strategy (4)

- Pre-Application Activities (Phase 3) - Goal is to provide timely issuance of approved RadICS Topical Report:
 - RadICS Topical Report (–A Versions)
- Radiy Phase 3 Activities
 - None, project complete



10 CFR 50 Appendix B Quality Management System

QMS overview

- Hybrid QA Manual with 10 CFR 50 App. B\NQA-1 and ISO 9001:2015 requirements incorporated
- More than 51 mandatory references (IEEE, EPRI, IEC)
- QA Manual determines control over 14 main processes (design, procurement, testing, training, modification, installation, etc)
- Quality Procedures – 42
- Work Instructions – 47

On-site Audit of QMS

- Performed by the US based company (GQA)
February 9-13, 2016
- The Scope - verification of the adequacy and implementation of the RadICS, LLC Quality Management System for U. S. Nuclear Safety Related Services incorporated
- Nuclear Procurement Issues Committee Audit Checklist (NUPIC Checklist); Design, Commercial Grade Dedication and Software

Desktop Audit of QMS

- Performed by GQA, July – August, 2016
- Scope - RadICS Quality Manual (QAPD-001), forty-two (42) Quality Procedures, plus three (3) significant Work Instructions
- Audit target – to assess the adequacy of RadICS LLC Quality Assurance Program documents for meeting 10CFR50 Appendix B, 10CFR21, ASME NQA-1-1994, NQA-1-2008, and NQA-1a-2009, as committed in Quality Manual.

Desktop Audit Results

Main conclusion: Thorough evaluation of the Quality Assurance Program documentation revealed that RadICS has developed a comprehensive network of policies, procedures, instructions....

This Evaluation concludes that the RadICS Quality Assurance Program is comprehensively documented and compliant with stated commitments.





RadICS Topical Report Overview

Topical Report Highlight

- 350 pages
- 120 supporting documents submitted\ available for audit
- Reuse of product design description information
- Mapping of process requirements to RGs\IEEE standards
- **Submitted on Sep 21, 2016.**

PROPRIETARY



RPC «RadICS» LLC

RadICS Topical Report

Revision 0

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APPROVED BY:	 A. ANDRASHOV RADICS DIRECTOR	DATE: September 19, 2016

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Certification Scope

RadICS DIGITAL I&C PLATFORM

1. *PRODUCT HIGHLIGHTS*

- ▶ FPGA-based
- ▶ IEC 61508:2010 SIL 3 architecture (in one chassis)
- ▶ Specially for Safety and Safety-Related I&C Systems
- ▶ High reliability, functional safety and cyber-security
- ▶ Comprehensive, tried-and-tested range of I/Os
- ▶ Flexible redundancy management
- ▶ Comprehensive on-line diagnostics
- ▶ Fast response time (5 ms)
- ▶ Hot-swapping of modules (if it's needed)
- ▶ High resistance to external impacts

Topical Report Structure (1)

- Chapter 1 – Introduction
- Chapter 2 - Development and Operational History
- Chapter 3 - Regulatory Design Criteria
- Chapter 4 - Description of the RadICS Platform
- Chapter 5 - Development Process for RadICS Platform Hardware
- **Chapter 6 - Software Development Process for Programmable Logic**
- Chapter 7 - Equipment Qualification
- Chapter 8 - Diversity and Defense in Depth
- **Chapter 9 - Compliance with Standards and Interim Staff Guidance**
- Chapter 10 - Secure Development and Operational Environment

Topical Report Structure (2)

- Appendix A - RadICS Platform Application Guide
- Appendix B - DI&C-ISG-04 Compliance Matrix
- Appendix C - RadICS Electronic Design Documents



Conclusions

Conclusion

- RadICS LLC is an engineering company providing FPGA-based NPP I&C solutions for international market
- RadICS LLC established NQA-1 compliant quality program audited by the 3rd Party
- RadICS LLC submitted Topical Report for RadICS Digital I&C Platform to the US NRC



Thank You for Your Attention!

RadICS LLC

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