

Technical Part 2: RadICS Digital I&C Platform Topical Report

RadICS Development Processes

(Closed Session)

July 14, 2015, Rockville, Maryland



Agenda

- RadICS Development Processes
 - System Level
 - Hardware Level
 - Electronic Design Level
 - Project Specific
- System Requirements Analysis
- Electronic Design Verification & Validation
- Configuration Management



RadICS Development Processes (1/5)

RadICS Platform Lifecycle Model



RadICS Development Processes (2/5)

High-level design documents for RadICS platform and projects



RadICS Development Processes (3/5)

RadICS Module Electronic Design and Implementation



RadICS Development Processes (4/5)

RadICS Electronic Design Phases Activity Descriptions



RadICS Development Processes (5/5)

RadICS Electronic Design Phases Activity Descriptions



System Requirements Analysis (1/4)

High Level RadICS Requirements



System Requirements Analysis (2/4)

- The allocation of RadICS requirements has up to three dimensions:
 - Modules to which they are application (MA = module allocation)
 - Means of meeting the requirement (IA = implementation allocation)
 - Means of V&V (by testing) (TA = test allocation)
- Module allocations used for RadICS are:

System Requirements Analysis (3/4)

Implementation allocations used for RadICS are:



System Requirements Analysis (4/4)

• Testing allocations used for RadICS are:



Electronic Design Verification & Validation (1/3)

Verification tasks are performed at each stage of design

Document Verification



Electronic Design Verification & Validation (2/3)

Verification tasks are performed at each stage of design

- Electronic Design Verification
- Hardware Design Verification

Validation testing is performed at designated stages of design

Fault Insertion Test Plan

Electronic Design Verification & Validation (3/3)

Validation testing is performed at designated stages of design

Integration Test Plan

- Validation Test Plan
 - Testing of the entire product to system requirements
- Function Block Library Component Test Plans

Configuration Management (1/3)

RadICS Configuration Items



Configuration Management (2/3)

RadICS Configuration Management Activities



Configuration Management (3/3)

 RadICS Change Management Process





Thank you for your attention!

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Technical Part 3: RadICS Digital I&C Platform Topical Report

RadICS Quality Management System

(Closed Session)

July 14, 2015, Rockville, Maryland



Agenda

- Radiy Quality Management System
- International Certification Activities
- RadICS Organization and Work Flow
- RadICS Document Hierarchy and QMS Procedures

Radiy Quality Management System (QMS)

- Between 1994 and 2003, Radiy developed and implemented a QMS that conformed to the requirements of ISO 9000 series standards
- In February 2004, Radiy passed the certification audit by the Ukrainian State Agency "State Regulatory Center of Delivery and Service Quality" of quality certification system "SERTATOM"
 - Certified compliance with requirements of national standard DSTU ISO 9001-2001
- In 2009, Radiy introduced an updated QMS that aligned with 10 CFR Part 50, Appendix B, and ASME NQA-1-2008 to prepare for a broader international presence



International Certification Activities

- In January 2005, the QMS was certified in the International Certification System by TÜV Rheinland InterCert for compliance with requirements of international standard ISO 9001:2008 (updated in 2013)
- Candu and Paks accepted Radiy QMS in 2014
- In 2015, Radiy started work with ISO Ingenierie to align Radiy's platform and applications against regulatory requirements in France
 - Review of Radiy's FPGA-based platform
 - Review Radiy's platform, applications, and processes for compliance with IEC standards
 - Discussion of approach for requirements gap analysis and safety case implementation
 - Develop road map for qualification of Radiy's in France



RadICS Organization and Work Flow (1/3)

- Established in July 2012
- Company is 100% private (Limited) Liability Company, LLC)
- Company's business focus is I&C systems for Nuclear Power Plants
- Company has 18 qualified • employees, including design engineers.



Developing and maintaining a positive company image, earned by proven products and services, etc.

US market

To become a leading provider

of FPGA-based I&C systems for



To take the actions to continuously improve company performance and to implement technical

To comply with the LLC RadICS goals requirements of NRC





regulations and standards

> To establish a firm position in the domestic and foreign narkets

To meet Customers

requirements and

expectations

Company motto - Safety, Reliability, and Quality for our customers



RadICS Organization and Work Flow (2/3)



RadICS Organization and Work Flow (3/3)

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RadICS NQA Implementation Efforts (1/2)

- In 2015, Radiy started work with (Global Quality Assurance, Inc. (GQA)) to fully align RadICS QMS, implementing procedures, and training with 10 CFR Part 50, Appendix B, and ASME NQA-1-2008/NQA-1a-2009 in preparation for submittal of RadICS Topical Report to NRC
 - QA Program document
 - Implementing quality procedures for 18 criteria from Appendix B
 - Training program for RadICS personnel on QA Program document and implementing procedures
 - Lead auditor and inspector qualification and training
 - Support activities for commercial grade dedication work supporting RadICS
 Topical Report



RadICS NQA Implementation Efforts (2/2)

- RadICS staff has been certified on the following topics:
 - Internal/External Auditing topics and techniques.
 - Organization Safety Culture, Root Cause determination and Problem Solving techniques
 - Means to identify and deal with Counterfeit,
 Fraudulent, Suspect Items (CFSI)
 - Commercial Grade Item (CGI) Dedication







RadICS QA Document Hieracrchy



RadICS QMS Procedures (1/4)





RadICS QMS Procedures (2/4)

Requirements from NQA-1-2008 and Appendix B	Quality Procedures											
Criterion IV Procurement Document Control												
Criterion V Instructions, Procedures, and Drawing												
Criterion VI Document Control												
Criterion VII Control of Purchased Material, Equipment, and Services												
Criterion VIII Identification and Control of Materials, Parts, and Components												

RadICS QMS Procedures (3/4)

Requirements from NQA-1-2008 and Appendix B	Quality Procedures								
Criterion IX Control of Special									
Processes									
Criterion X Inspection									
Criterion XI Test Control									
Criterion XII Control of									
Measuring and Test Equipment									
Criterion XIII Handling, Storage									
Criterion XIV Inspection Test									
and Operating Status									
Criterion XV Nonconforming									
Materials, Parts, or									
Components									

RadICS QMS Procedures (4/4)





Thank you for your attention!

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