

CYIENT

SAFETY-CRITICAL ENGINEERING SOLUTIONS FOR TRANSPORTATION APPLICATIONS

Embedded software and electronic hardware
validation and verification



Cyient provides services for projects using both EN 50128 Software and EN 50129 Electrical Engineering Standards for railway control and protection systems. Our validation and verification (V&V) services are executed under a business model that promotes efficiency and accountability. The model is designed to accurately scope, properly plan, effectively manage, and successfully execute safety-critical rail transportation projects.

The Cyient Advantage

Cyient's V&V solutions are essential to the development and delivery of a quality product that is both safe and reliable. Our engineers have extensive experience and use a powerful proprietary toolset designed to perform V&V test activities for requirements-based design projects. In Cyient's model, V&V efforts begin at inception and encompass the entire product development lifecycle. This saves our customers both time and money.

Cyient specializes in validation activities with a focus on "good" requirements to meet all safety-critical design assurance objectives. We have developed solutions with an understanding that both schedule and budget are at risk during the product development lifecycle. Our organization consists of dedicated project managers and engineering staff with direct experience in:

- Safety-Critical System Engineering EN 50126
- Safety-Critical Software Development EN 50128
- Safety-Critical Electronic Hardware Development EN 50129

Services Overview

- Model-based development
- Verification and validation automation
- Project governance
- Phase transition expertise
- Design assurance assessment
- Validation and verification assurance assessment

- Configuration management and problem reporting
- Quality assurance assessment
- Stage transition assessment and support

Verification and Validation Guidelines

Cyient's aerospace certification expertise enables us to offer the same level of commitment to the transportation industry; aligning the respective regulatory guidelines and standards.

Aerospace	Rail Transportation
RTCA DO-178/ DO-254 Design Assurance Level	EN 50126, 50128, and 50129 Safety Integrity Levels
A - Catastrophic	4 - Very High
B - Hazardous/Severe	3 - High
C - Major	2 - Medium
D - Minor	1 - Low
E - No effect	0 - Non-safety

Certified Processor Architectures

- PowerPC
- 68HC11
- dsPIC
- Devices DSPs
- ARM
- PSOC

Cyient Certification Tools

COTS Software/Hardware Development:

- Freescale CodeWarrior IDE
- Microsoft Visual Studio
- LabWINDOWS
- Greenhills MULTI IDE INTEGRITY RTOS
- National Instruments LabVIEW

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- Cantata
- ModelSIM DE
- Cadence OrCAD
PSPICE
- Texas Instruments Code Composer Studio
- Actel Libero
- ATMEL AVR Studio
- GE Fanuc BusTools

Verification Tools:

- VectorCAST
- IBM-Rational
- LDRA Testbed
- Freescale CodeTEST

COTS Configuration Management Tools:

- IBM-Rational RequisitePro
ClearCase
ClearQuest
- Telelogic DOORS
- Perforce
- SERENA PVCS

Cyient Tools:

- CertSAFE™
- DeCoder
- CertBENCH™ LRU
- CertBENCH™ PLD

Current Cyient Transportation Experience

On-Board Display Unit	High-Level Data Link Control User Interface	Remote Control Locomotive System	Rail Integrity Product
<p>Wrote and executed qualification tests for:</p> <ul style="list-style-type: none"> • Data logging and storage • Display and layout • OBC Communication • ODU alarm • Self-test • Train operator inputs 	<p>Developed HDLC User Interface Tool</p> <ul style="list-style-type: none"> • Parsed data bits and converted them to human readable code • Identified and labeled all data fields for clear interpretation of train health • Systems Safety Hazard Analysis 	<p>Multiple Systems Safety Hazard Analysis</p> <ul style="list-style-type: none"> • Identified communication failure rates • Analyzed dual processor module and locomotive computer 	<p>Functional Hazard Analysis</p> <ul style="list-style-type: none"> • Identified hazardous events that affect system functionality

Transportation Industry Standards

- **EN 50126:** Often referred to as the “RAMS standard,” as it deals with Reliability, Availability, Maintainability, and Safety (RAMS) for the entire railway system
- **EN 50128:** Applies to (safety-related) software for railway control and protection systems
- **EN 50129:** Applies to safety-related electronic control and protection systems

About Cyient

Cyient (Estd: 1991, NSE: CYIENT) provides engineering, manufacturing, geospatial, networks, and operations management services to global industry leaders. We leverage the power of digital technology and advanced analytics capabilities, along with domain knowledge and technical expertise, to solve complex business problems. As a Design, Build, and Maintain partner, we take solution ownership across the value chain to help our clients focus on their core, innovate, and stay ahead of the curve.

Relationships lie at the heart of how we work. With more than 15,000 employees in 22 countries, we partner with clients to operate as part of their extended team, in ways that best suit their organization's culture and requirements. Our industry focus spans aerospace and defense, medical, telecommunications, rail transportation, semiconductor, utilities, industrial, energy and natural resources.

For more information, please visit www.cyient.com

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