

## The Teachers

**Francesco Pingitore** has 14 years of experience in safety critical railway system and software validation. Senior safety assessor of software applications in the railway domain, teacher and consultant of CENELEC EN 50126-50128-50129. IEC 61508 Functional Safety Engineer certified by TÜV Rheinland. Safety assessor of software applications in the railway domain for CENELEC norm.



**Daniela Viva** has 14 years of experience in safety critical systems in railway, automotive and avionic domain. Senior safety assessor of software applications in the railway domain, teacher of CENELEC EN 50128-50129 and consultant with gained experience in safety assessment process analyses: system and subsystem Hazard Analysis, FTA, FMEA, according to CENELEC EN50126, EN50128, EN50129, EN50159-1, EN50159-2, IEC 61508, ISO 26262, SAE ARP4754.



## The Company

Since 1974, INTECS has been operating at the forefront of the software market, where safety, reliability, innovation, and quality are essential for success. INTECS provides leading-edge software technologies to support the major European and Italian organisations in the design and implementation of advanced electronic systems for Defence, Space, and Civilian markets.

Intecs is ISO-9000 certified since 1994. Currently it holds **ISO 9001:2008** quality certification for software development in Defense, Space, and Civilian domains. Intecs is **SEI Partner**. Moreover its Defence and ATC Divisions were certified **CMMI® Maturity Level 3**.

## General Information

### Location

Upon request, the course may be held at Customer premises.

### Contact

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## EN 50129 Safety related electronic systems for signalling

*One-day course  
(including another optional day)*



## The CENELEC 50129 Standard

This European Standard is the first defining requirements for the acceptance and approval of safety-related electronic systems in the railway signalling field. Safety-related electronic systems for signalling include hardware and software aspects. To install complete safety-related systems, both parts within the whole life-cycle of the system have to be taken into account. The standard consists of the main part which defines the requirements and in annexes A,B,C (normative) D, E (informative).

### The Course

A comprehensive one-day course provides participants with all the major features of the standard, together with an overview of proposed implementation techniques both effective and efficient.

The second optional day aims to introduce the most common safety analysis techniques: FTA and FMEA.

### Intended audience

Software Engineers (Development and Verification), Quality Engineers, Configuration Managers, Test Engineers, Safety Engineers and Project Managers.

### Methods and Media

Classroom presentations with Power Point slides and actual examples from INTECS experiences.

## Course Outline

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### Day 1

**Introduction and Normative References**

**Structure of EN 50129**

**Evidence of quality Management**

**Evidence of Safety Management**

**Safety Integrity Definition**

**Evidence of functional and technical safety**

**Safety acceptance and approval definition**

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### Day 2 (Optional)

**Overview of two Safety Analyses techniques:**

**Fault Tree Analysis (FTA) and examples**

**Failure Mode and Effect Analysis (FMEA) and examples**