UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

itee PhD information technology electrical engineering

DIETI UNINA

PhD student Giuseppe Guida

Embedded Hypervisor and the railway domain

Tutor: Alessandro Cilardo

Cycle: XXXV

Year: Second

itee PhD information technology electrical engineering

My background

- MSc degree: Computer Engineering
- PhD start date: 01/11/2019
- No scolarship
- V&V Signalling Engineer for Hitachi Rail STS

Research field of interest

- My research field revolves around virtualization technologies and hypervisors, especially for embedded and industrial devices.
- During my second year of PhD, I carried on my studies on the above mentioned topics trying to align them with the innovation needs that the ETCS/ERTMS railway signaling system requires.
- In few words, why virtualization may be good for “train business” and where to apply it.

Summary of study activities

My activities:

Ad hoc PhD courses / schools:

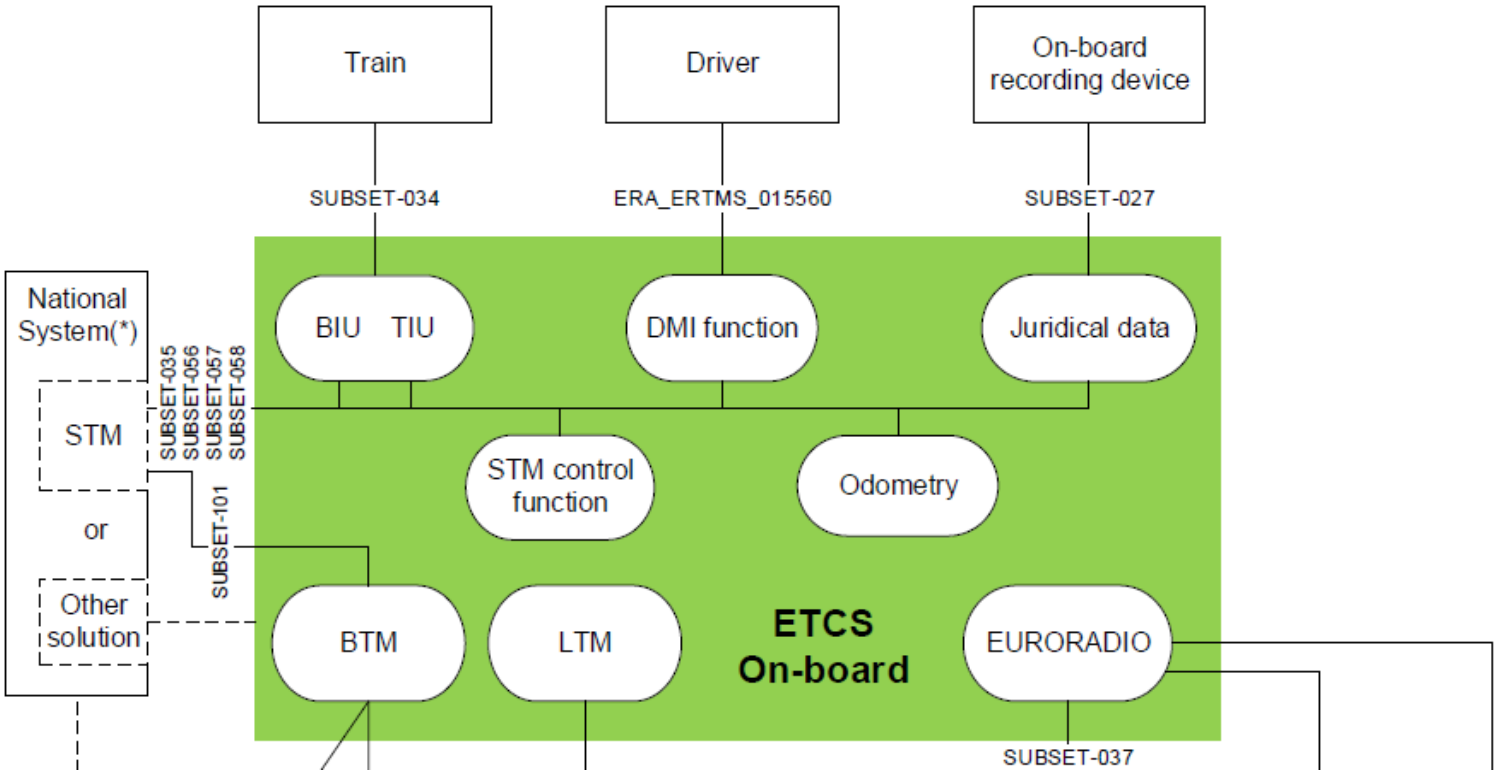
Statistical data analysis for science and engineering research, prof. Roberto Pietrantuono

Real-Time Embedded systems for I4.0 and IIoT, Prof. Marcello Cinque and prof. Alessandro Cilardo

Courses borrowed from MSc curricula:

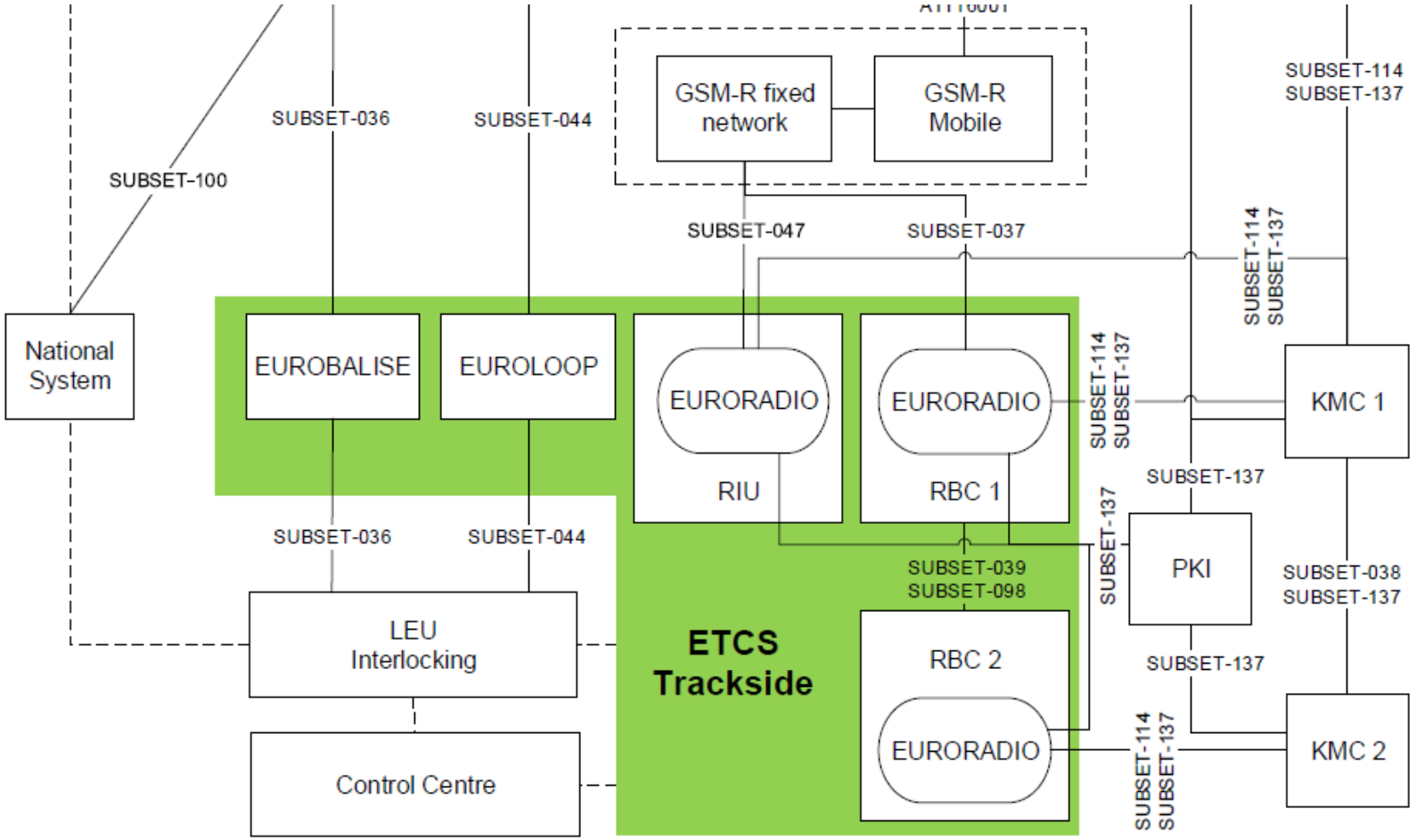
Data management, prof. Flora Amato

ETCS in brief- on-board



ETR1000 on-board

ETCS in brief Trackside



Research activity: Overview

Problem

Is it possible/safe to leverage on virtualization technology and hypervisor to improve the ETCS/ERTMS signalling system? If so, where? If there's room for them, how can they be «SIL-ified»?

Objective

Answer to all three of the above question. Producing as output a complete, robust and innovative validation strategy for hypervisor software.

Methodology

Using the state-of-the-art of testing techniques both static and dynamic.

Applying FMEA/FMECA analysis to foresee fault chains.

Using Field Failure Data Analysis methods in order to model the realistic «bad» behavior of the software.