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CONFERENCE & EXHIBITION

Industrial Invited speaker:

Name: **Calin Nemes**

Job position: **Senior Hardware Design Engineer**

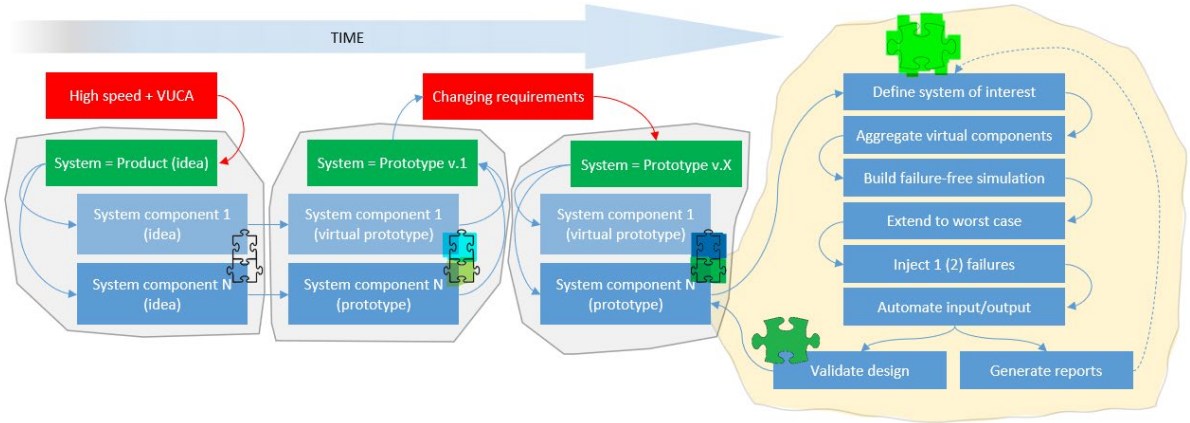
Company: **Continental Automotive Systems Sibiu**

Presentation: Virtual Prototyping Using Preliminary Data

Abstract:

This presentation will cover a virtual prototyping process. First, we must define the need for such a process: as the end-user expects new products every year, development cycle times have been decreasing, while product complexity is increasing. This was always the case in some measure, but is now exacerbated by "Volatile, Uncertain, Complex and Ambiguous" (VUCA) and high-speed environments. Today's preferred solution to quickly design products is parallel development, with sub-systems made from multi-disciplinary components, all complex, making it likely that only a general idea of what the end-product should be is given at the start. System engineering helps define use-cases and behaviors, but the specific system component solutions are far in the future. Therefore, it is likely that (some) specifications are missing at the start of the system and system component design process. This leads to starting with incomplete or unclear requirements – the above-mentioned preliminary data. While input data matures, it may lead to inconsistent requirement changes, lack of global overview, limited stakeholder involvement, misaligned design decisions and difficulty in validation and verification.

The proposed solution is a structured systematic and systemic extrapolation process, applied to EE interfaces (any piece of circuit and software that connects one system component to another). We will discuss the definition of a system of interest and data gathering. Then cover aggregation of the virtual components to build either a full system or just a functional slice of interest. We will cover running a worst-case normal operation simulation, then a single failure one, then maybe add further failure injection, if applicable. All will lead to possible solution generation (the virtual prototype) and a pre-validation of customer requirements, scenarios, and use cases. The proposed virtual prototype is not yet a digital twin, but a prediction based on known facts, previous experience, and intuition. And finally, report generation allowing focused communication with supporting data will be discussed. To support the process, the foundation blocks are Spice models and simulations, tool integration and automation, and industry expertise.



At the end, besides obtaining a virtual prototype (and maybe a real one) the proposed process can also facilitate the analysis, implementation, and validation of the mature/final requirements when they are available. This allows data and result-based decision making, while pushing product development forward.

Bio:

With a B.Sc. in Applied Electronics and an M.Sc. in Embedded Systems, Calin Nemes has 14 years of design experience with sensor and communication interfaces for automotive safety systems. Combine this with lean design and organizational approaches, an active background in teaching and training and an interest in modeling analog and digital circuitry. His research interests include design and integration of hardware and software through electrical and behavioral modelling and simulation, over worst-case and failure conditions.