

Platform Thinking in Embedded Systems

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Abstract. Modern embedded systems are built from microprocessors, domain-specific hardware blocks, communication means, application-specific sensor/actuators and as simple as possible user interface, which hides the embedded complexity. The design of embedded systems is typically done in an integrated way with strong dependencies between these building block elements and between different parts of the system. This talk focuses on how platform thinking and engineering can be applied to increasingly complex embedded systems and what impacts that will have on the design and architectures. Platform engineering in embedded systems may sound contradictory, but in practice will introduce modularity and stable interfaces. New system-level architectures for hardware, middleware architectures, and certifiable operating system micro-kernels are needed to raise the abstraction level and productivity of design. As an example I will go through the definitions of some modules in a mobile device and the requirements for their interfaces. I will describe the additional design steps, new formal methods and system-level tasks that are needed in the platform approach. Finally, I will review the Advanced Research and Technology for Embedded and Intelligent Systems (ARTEMIS) technology platform in EU 7th Framework Program, which is bringing together industrial and academic groups to create coherent and integrated European research in the domain of embedded systems.