TU Clausthal

Einladung zum Informatik-Kolloquium

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Reconfiguration of Cyber-Physical Systems in Aviation

Cyber-Physical Systems (CPS) are systems that are in continuous interaction between "cyber" aspects, such as information processing and computer communication, and physical aspects, such as movement of the system in space. Due to the latter aspect and the associated environment, CPS are very often regarded as safety-critical systems, for example in the case of an aircraft. Currently, there is a trend towards more complex CPS, driven in particular by the goal of full automation. Flying autonomous taxis are no longer a fiction, but their integration into existing airspaces is actively promoted. As the degree of autonomy increases and therefore the risk of a failure increases as well, new safety concepts must be developed to prevent harm to people in the worst case. A possible first step is to switch from fail-safe systems to fail-operational systems. With the former, a failure is detected and the system is switched to a restricted but safe "fail-safe" state. With the latter, it is ensured that the system changes in such a way that it can continue the operation without special limitations. One approach for a fail-operational system is to facilitate the ability to reconfigure the system at runtime.

In this talk this ability, the reconfiguration of the system at runtime, is explicitly motivated in the context of unmanned aerial vehicles. Current approaches will be presented and their applicability and open questions for their use in aviation will be considered. Finally, some required abstract components for reconfiguration are summarized.

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