



## Kolloquium zur Masterarbeit

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### **“From the Cloud to the Clouds: Taking Integrated Modular Avionics on a New Level with Cloud-Native Technologies“**

The number of performed flights by global airline industries increased from 23.8 million flights (2004) to 38.9 million flights (2019). This growing number of performed flights puts an enormous pressure on the global aviation industry as a whole. The permanent price pressure lead to demands of cheaper, lighter and smaller flight components. Less weight and space consumption of components mean more weight and space for payload, such like paying customers in civil aviation or cargo. One way to solve this demand is the increasing digitalization of components and system architectures. Modern avionic system architectures are providing a secure and well-tested way to centralize software within flight cabinets and virtual machines. Instead of running dedicated hardware platforms for single-purpose workloads, these workloads are running isolated via virtual machines in one or more flight cabinets.

Virtual machines lead to a decrease of total cost of ownership, reduced energy consumption due to better system utilization and less hardware requirements. However, there is still room for improvement. Virtual machines come with a high overhead due to the virtualization stack and they are difficult to work with.

The goal of this scientific work is to examine the potential use of containers in the avionic industry. Research has been done as follows: First, the status quo in the aviation industry has been analyzed. Second, this thesis introduced modern technologies from the cloud computing industry and the Cloud-Native movement has potential solution. Third, both industries have been compared with a high focus on containers, their deployment, orchestration and delivery. The main problem has been to identify the requirements that are important for the aviation industry and finding working solutions for satisfying these requirements. Finally, this thesis provides modern solutions for separation kernels and their fault, space and time isolation and offers an intensive literature research, providing the necessary guidance for future research in this area.

**Mittwoch, 23.03.2022, 11.00 Uhr**

**Videokonferenz: BBB <https://webconf.tu-clausthal.de/b/umu-2ey-ekt>**