

University of Stuttgart Institute of Aircraft Systems



The Ada programming language

The requirements for software in safety-critical areas such as aviation are higher than in other areas. The Ada programming language was developed to meet these requirements. Ada relies on strong typing, very good readability and explicitness. In addition, programmers are alerted to possible errors such as missing variable instantiation at an early stage. With SPARK, there is also a subset of Ada that can be formally checked and can therefore guarantee freedom from errors at runtime. For these reasons, this programming language is very popular in the entire field of aviation systems, including the ILS.

https://learn.adacore.com/

AS OF NOW

MBSE-Tooling with Ada

Model-based system development (MBSE) is about developing systems and configurations with the help of abstract models. There are a large number of tools for this, but they cannot be used in a safety-critical environment without further ado. This is why the ILS is developing the DOMAINES tool, the core of which was implemented with Ada. Models can be stored and interacted with within the core. The Essential Object Query (EOQ) model interaction language was developed for model interaction and implemented using the Python programming language. There is now also an Ada version that can interact with the DOMAINES core.

This implementation is to be brought closer to the Python version. The current performance is not yet sufficient for widespread use of the toolchain from AdaEOQ and the DOMAINES core. This is to be improved on the basis of benchmarks through a clever choice of more efficient algorithms. In addition, the possibility of implementation with SPARK is to be investigated and implemented.

This HiWi position offers the opportunity to gain experience with a slightly different programming language and learn a lot about the secure implementation of software. The workload and hours are freely selectable.

Your tasks

- Familiarization with the Ada programming language
- Familiarization with the implementation of the Essential Object Query (EOQ) and the DOMAINES core
- Carrying out performance analyses and code improvements
- Extension of AdaEOQ
- Familiarization with the formal checker SPARK and application of SPARK to the Ada implementations

Your profile

• Programming skills in at least one common programming language such as Python or C

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- Willingness to familiarize yourself with a new programming language
- Bonus: Basic understanding of model-based system development

Contact

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