

**FERCHAU Aviation Group**

The Glue that Holds Complex Development Projects Together

Today, technical systems consisting of hardware and software need to meet ever-increasing requirements. The steep rise in connectivity is leading to a non-linear increase in the level of complexity. To meet this challenge, systems engineering has developed interdisciplinary methods and processes which support the development of complex systems. This generic tool set has been tried and tested across industries. The FERCHAU Aviation Group leverages the benefits of systems engineering in complex model development to support our customers in minimising costs, accelerating time-to-market and improving specifications as well as quality.



Nowadays, new product development is often driven by the end customer's request for "smart" solutions. This leads to more intensely networked and complex systems, a trend which is pushed even further by the Internet of Things (IoT). Classic requirements specification and verification approaches struggle to keep up with the demand for consistency and traceability when facing later changes or evolutions, especially during agile development. Thus, adapted processes and new methods are essential for achieving the shortest possible time to market (TTM) for advanced technology systems. This poses an everyday challenge to many companies.

Historically, most processes are derived following a requirements-based approach (RBE), which is inherently a rather sequential process. However, in order to reduce TTM for innovative complex systems, a non-sequential method is needed. Here, model-based systems engineering (MBSE) provides a novel solution. This approach strives to develop a digital model of the (entire or sub-) system, enabling multi-directional validation of constraints between the system's environment and its components. The ultimate result is a digital twin which enables early virtual simulation and testing. It thereby provides valuable

possibilities to reduce prototyping and physical testing which belong to the major cost drivers during development. The FERCHAU Aviation Group uses its profound expertise and experience to help customers to leverage the advantages of systems engineering during complex development projects. Our portfolio includes project and interface management, system development, RAMS, as well as testing and verification, hence providing reliable support during each process step.

The key to success

- More than 100 specialised engineers
- Broad expertise in navigating complex systems of systems containing electrical, electronic, and mechanical hardware and software elements
- Highest quality according to ISO 15288/ISO 12207 (systems engineering), ISO 61508 (safety) and industry standards
- State-of-the-art knowledge thanks to INCOSE/GfSE-certified team members
- One-stop shop: systems engineering methods and process analysis, improvement and deployment from a single source

Project and Interface Management



The development of a complex system must be carefully managed, ranging from project planning to monitoring and controlling to managing all risks, stakeholders and interfaces.

Interaction with the environment and other systems plays an important role. Also, requirements for the human-to-system interface must be considered and implemented. Overall, in a complex system, several factors may change simultaneously, therefore making

configuration management a crucial aspect. Finally, requirement model validity must be assured, work scopes be clearly defined and assigned and stakeholders and partners be systematically managed. And all of this whilst maintaining the highest level of consistency and continuity throughout each process step. **Our experts cover all aspects of project and interface management, thus creating a secure framework for the successful development of complex projects.**

At a glance: our competences

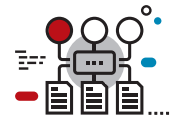
- Project management (including agile, SAFE, Scrum)
- Product lifecycle management (PLM)
- Project portfolio management
- Logistics support
- Environmental analysis, disposal topics
- Human systems integration and human machine interface (HSI/HMI)
- Risk management
- Configuration and change management

At a glance: our competences

- Use cases/operational needs assessment
- Concepts/feasibility studies
- Architecture definition
- Modelling
- System design and specification
- Requirements validation and improvement
- Systems integration and customisation
- Qualification and certification

System development is managed traditionally using RBE, modern MBSE methods or a mixture of both. It includes all planning, analysis, design, implementation and testing activities necessary for creating a new system or changing an existing one. The separation of specifications (user perspective: what a system should do) and design (professional perspective: how requirements are met) is an important aspect of system development. System

design links system architecture to the implementation of technological system elements, i.e. the system's physical architecture. Interfaces are a critical point in system design, both in terms of requirements and integration. Classical methods are increasingly replaced by model-based processes in system development. **The FERCHAU Aviation Group has experience in applying both and is therefore able to tailor its approach individually to customers' needs.**



RAMS



The acronym RAMS is commonly used to describe product or system abilities:

Reliability – ability to perform a specific function

Availability – ability to stay in an operational state

Maintainability – ability to be timely and easily maintained

Safety – ability not to harm people, the environment, or any assets

RAMS analysis methodology is used along the entire lifecycle – from requirements definition to maintenance – to meet customer expectations of high safety standards with increased operational performance and low maintenance costs. **Our systematic approach enables early assessment of potential risks, leading to considerable cost advantages for our customers.**

At a glance: our competences

- Reliability in prediction and assessment
- Operability performance analysis
- Design maturity assessment
- System safety assessment and FMEA/FMECA
- Fault tree analysis (FTA)
- Predictive maintenance
- In-service data analysis

At a glance: our competences

- Test and evaluation strategies, plans and procedures
- Verification
- Test specification
- Test automation
- Model-based testing (MBT)

In order to ensure that a developed system meets the defined requirements, its functionality must be verified and documented. Besides manual test methods, test automation ensures repeatability with reasonable expenditure. Model-based testing offers additional advantages: many test requirements are directly available because test models are derived from system models. Automated validation tools, test case generation and

execution allow for maximum efficiency and accuracy. Cost optimisation is further promoted as model-based testing produces the minimum number of test cases to validate the flawlessness of the system under test. **Our experts are skilled in manual testing methods as well as test automation and model-based testing, hence being able to test and verify a system under consideration of the optimum cost-efficiency ratio.**



Testing and Verification

More information about our expertise

ferchau.com/go/aviation

**Connecting People and Technologies
for the Next Level**

Member of the
FERCHAU Aviation Group