

# Avionics

Enea is a proven leader in safety critical avionics systems..

For over 35 years, we have been one of the fastest growing real-time embedded consulting companies, and avionics has been a mainstay of that growth. Today, our avionics capability in system engineering, requirements, architecture, design, code, verification, certification, DO-178B/DO-254 processes/training, and DER approval makes us one of the largest such companies in the world.

Our DO-178B compliant processes and engineering teams have worked with various avionics suppliers worldwide. If it pertains to avionics systems, software, or complex electronic hardware, chances are Enea has already done it or is readily equipped to do it.

Specific Avionics capabilities include:

- FMEA and FHA, safety analysis/assessments
- Requirements definition
- Architectural analysis/definition
- Systems/Software Design, Code & Test (functional and structural)
- Certification, Qualification, and Certifiability; custom or COTS components
- Military to Commercial transitions, and vice versa
- Project RoadMaps, defining all your worksteps, risks/mitigation, strategies, and detailed process/tool/schedules for all phases of the avionics lifecycle
- DO-178B/DO-254 Training
- DER review/approvals with our in-house DERs, and corresponding ACO coordination (see related links in our website)

Specific avionics systems that successfully used Enea expertise include:

- Flight management and navigation systems
- Electrical power & distribution systems
- Proximity sensing systems
- Satellite and radio communication systems
- Ground proximity and TCAS systems
- Cabin entertainment systems
- Antivibration systems
- Cargo systems
- Over 50 other specific systems

## System/Software Verification

**Enea performs rigorous testing, verification and validation of real-time software, hardware and systems.**

The same successful techniques we use in-house on Enea-developed software are also applied to clients' software/hardware projects. Many clients choose Enea to independently verify their software, hardware, or systems. They have found that this independent verification increases objectivity and productivity.

The degree of testing required depends upon the application, criticality, and development processes used. Enea's activities include a combination of testing coupled with the latest V&V techniques. Enea's in-house test processes and training yield the highest productivity for cost-effective solutions.

**Key aspects of Enea's testing capabilities include:**

- Requirements-to-test traceability
- Requirements testability analysis
- Unit/Module testing
- Requirements validation
- Structural coverage testing(including MCDC)
- Test automation
- Simulation
- Software integration testing
- Software/hardware/systems testing
- FMEA
- Software failure analysis
- Custom and off-the-shelf automated test environments
- Test tools and repeatable testing
- Test plans, procedures, and reports, including automated analysis

*Enea's testing activities ensure that the target systems perform as expected.*

Our proven techniques have helped many of the leading names in industry deliver correct systems on schedule.

**DER Services**

Enea is one of the largest independent high-reliability software companies performing Federal Aviation Administration (FAA) certification. Our full-time engineering and consulting employees comprise over 2000 person years in avionics alone. Avionics comprises 50% of Eneas business base. Accordingly, Enea understands the need for expert, in-house full-time FAA Designated Engineering Representatives (DERs).

Most avionics or FAA related software/systems require oversight and approval by registered DERs. Enea's in-house DERs have extensive experience in all phases of the avionics life-cycle including:

- Level A through E Systems, Software and Complex Electronic Hardware DERs
- Certification Strategy/RoadMap = DO-178B and DO-254 Interpretation/Application
- Development Process Reviews = Conformity Reviews
- Evaluation of certification level and PSAC/PHAC preparation, approval, and ACO submissions
- Applying DO-178B/DO-254 to Military programs, medical, and automotive worldwide
- FAA presentations & representation
- Application of DO-178B/DO-254 to all project phases
- Re-use of Enea's DO-178B/Do-254 compliant processes to your application
- Certification and certifiability of commercial off-the-shelf (COTS) software, systems, & components
- Cost effective process and development improvements to ensure FAA compliance/approval

- DO-178B/DO-254 Training; Public or Private session. Basic to Advanced.
- Advisory consulting to ensure your project meets FAA requirements and is expediently approved

Enea's DERs provide professional, reliable certification services for our clients' aviation related products. Our DERs provide timely, advance assistance to ensure your products are certified expediently and with minimal rework. With proven success and close relationships with national and local FAA offices, our certification and DER activity is of the highest quality.

For commercial systems, Enea's certification can also be applied to maximize:

- Quality & Reliability
- Approval
- Schedule Attainment
- Cost-Effectiveness

## Enea Processes For DO-178B

The most rigorously developed software in the world is avionics. With lives at stake, only the highest quality software is used in avionics. Enea has based its internal processes on the Federal Aviation Administration recognized standard RTCA DO-178B.

Enea's DO-178B Processes (if you licensed them) are meant to provide the templates/framework for customization to meet the software process objectives of DO-178B. *There is no single software process that is perfect for all organizations and projects!* Each project will vary somewhat in how it chooses to define, implement, or augment the Enea processes. Factors to consider include project complexity, expertise of staff, development methodology, tools/environment, and technology.

The Enea processes provide the basic elements of an avionics project compliant with DO-178B, and a typical Enea client tailors (or hires Enea to tailor) these processes by five to ten percent to meet their own project needs.

The three basic DO-178B software lifecycle processes are:

1. Software Planning Processes
2. Software Development Processes
3. Correctness, Confidence and Control Processes

The Enea DO-178B Processes encompass these three areas.

View a list of Enea's process [documents](#) or [checklists](#) available for license.

## Enea Hardware Processes For DO-254

The most rigorously developed systems. Enea's DO-254 Processes (if you licensed them) are meant to provide the templates/framework for customization to meet the hardware process objectives of DO-254. *There is no single hardware process that is perfect for all organizations and projects!* Each project will vary somewhat in how it chooses to define, implement, or augment the Enea processes. Factors to consider include project complexity, expertise of staff, development methodology, tools/environment, and technology.

The Enea processes provide the basic elements of an avionics project compliant with DO-254, and a typical Enea client tailors (or hires Enea to tailor) these processes by five to ten percent to meet their own project needs.

The three basic DO-254 hardware lifecycle processes are:

1. Hardware Planning Processes
2. Hardware Development Processes
3. Correctness, Confidence and Control Processes

The Enea DO-254 Processes encompass the above three areas.

View a list of Enea's process [documents](#) or [checklists](#) available for license.

## Reverse Engineering Solution for your DO-178B Projects

Reverse engineering and design recovery is necessary for many reasons, for instance, in the context of systems where the correspondence between code and design can no longer be identified, or in the case where a design does not exist.

Does your product or Prototype:

- Already exists with none or little documentation?
- Exists but after years of maintenance, it has become too fragile to upgrade or fix?
- Works, but not sure why or how?
- Is developed to one standard (e.g. -2167) and need to upgrade baseline to another standard (e.g. DO-178B)?

If your answer to any of the above questions is yes, then Enea is here to help. With many years of experience, Enea offers complete avionics lifecycle development, including Safety, Requirements, Design, Code, Test, and Certification engineering services.

You can benefit from Enea's engineering resources, including processes and checklists, custom tools, scripts and techniques already developed to make sure correctness, reliability, and performance are built into your software while expediting time-to-market of your "re-born" product.

In the area of software reuse, Enea reverse engineering methods can be used to support construction of software libraries that can be used for new software development.

Do not reinvent the wheels; use Enea best practices to get you where you are going with safety and quality:

- Methods for software design recovery from an existing system.
- System definition and requirements analysis.
- In-House libraries and proprietary processes.
- Unit/Module Testing, Robustness, and Regression Testing.
- Rigorous well defined process in place (Plans, Templates, Tools, etc.)
- Multidiscipline team all with strong cognitive ability.
- Access to the experts (averaging 10+ years of experience)
- One of the best working knowledge of DO-17B.
- DER support for successful certification of safety-critical applications.