CRITICAL SOFTWARE

DEPENDABLE TECHNOLOGIES FOR CRITICAL SYSTEMS

# NAVIGATION AVIONICS CERTIFICATION SUPPORT

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## CHALLENGES

GNSS receivers are crucial to today's increasingly demanding operational airborne scenarios. One of the biggest challenges faced by GNSS manufacturers is to adhere to the stringent requirements set by regulatory bodies.

CRITICAL Software supports manufacturers throughout the GNSS certification cycle, using highly specialised teams and custom-built test frameworks to successfully achieve certification as painlessly and cost-effectively as possible.

## CERTIFYING AVIONICS SOFTWARE

Certifying software, such as that found in GNSS receivers, demands strict adherence to specified processes and practices in order to conform to industry regulatory standards. CRITICAL Software combines a highly-specialised and experienced team with custom-built test frameworks to conduct the necessary analysis and activities required to achieve the software compliance.
CRITICAL Software offers a twofold service to GNSS Manufacturers: Verification & Validation (V&V) and Certification Support.

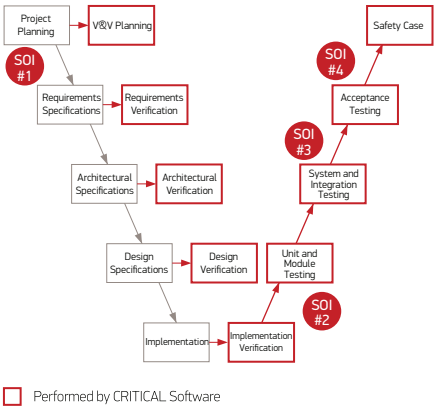


Figure 1: V life cycle interaction with V&V and certification review.

## VERIFICATION & VALIDATION

CRITICAL Software offers V&V support throughout the product lifecycle, including quality assurance and configuration management. The company has the experience to develop V&V plans for each phase of the development lifecycle and to actively suggest the most efficient strategies for dealing with requirements and deadlines (including methodologies, tools, risk assessment and management).

## CERTIFICATION SUPPORT

As part of the certification process, the Certification Authority (CA) will review the GNSS Manufacturer's software lifecycle processes and project data to assess their compliance with applicable standards. In practice, these reviews take place at four major "Stages of Involvement" (SOI) reviews in the software project lifecycle. CRITICAL Software supports OEMs at every step of SOI preparation, collecting and reviewing all the evidence needed to successfully achieve the four certification milestones: SOI#1 - Planning; SOI#2 - Development; SOI#3 - Verification and SOI#4 - Certification. This success comes from the ability to interface with a Designated Engineering Representative (DER) to ensure cost-effective acceptance of project deliverables and the experience to interface with development and product assurance teams.

CRITICAL Software's support covers the entire project cycle, ranging from planning the right activities to a final review process in which a safety case is completed and delivered by the DER to the certifying authorities.

## APPLICABLE STANDARDS

The system, including software, must be produced according to EASA/FAA (E)TSO-145c or 146c standard order (depending on the purpose of the device). In both cases, compliance with RTCA's DO-178C, DO-254 and DO-229D MOPS (for GPS/SBAS equipment) standards is mandatory.

### CUSTOM-BUILT GNSS TEST FRAMEWORK

CRITICAL Software has developed a GNSS testing framework to verify and validate the common requirements of GNSS software. This proven framework complies with the most common GNSS software designs and can be extended to support specific receivers. This testing framework reduces the time, cost and risks of certifying GNSS receiver software while improving quality.

### BENEFITS

One of the key aspects to successfully achieving system certification is domain knowledge. Domain knowledge affords testers the means to properly understand the system functionalities and its operational scenarios in real use. Using this knowledge, CRITICAL Software's engineers have developed a framework that can be tailored to specific requirements and used to achieve certification credit. With this, certification costs can be reduced by up to 30% through taking advantage of CRITICAL Software's:

- Expertise in GNSS systems and certification;
- Existing custom-built GNSS test framework;
- Highly-specialised team dealing with the V&V of safety-critical systems.

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We are **CMMI® Maturity Level 5** rated.
For a list of our certifications & standards visit our website.