

Northrop Grumman Italia Teams With Mentor Graphics To Achieve DO-254 Compliance



When Northrop Grumman Italia was faced with the challenge of DO-254 compliance they engaged Mentor Graphics expert verification consultants to enhance their verification process.

ACHIEVING CERTIFICATION FOR THE DO254 STANDARD

Compliance Mandated...

When Northrop Grumman Italia's (NGI) customer mandated DO-254 for the complex hardware of the future versions of their navigation systems, they instigated a program to bring their proven development process into alignment with DO-254 category level A. Although they were able to put systems in place to achieve traceability of requirements through design, verification and validation, they felt that it would be prudent to get a second opinion from industry experts.

So they turned to Mentor Graphics. Through Mentor's involvement in the DO-254 community and partnerships with certification experts, Northrop Grumman Italia quickly got the advice they needed to be confident that their process met DO-254 compliance. However, they felt that their verification process could be improved further, so they engaged with Mentor's verification consulting team for their first pass through the process.

Verification Challenges

In previous projects, NGI had verified their complex hardware using VHDL test benches and then completed system

validation in the lab. However, NGI's Mission Assurance department recommended improvement of the verification process via an RCCA (Root Cause Corrective Action). The NGI team knew they not only needed to have a DO-254 compliant process, but also one that thoroughly verified their designs as early as possible to avoid cost and schedule problems in future programs.

Advanced Verification Methods

Verification experts from Mentor's Consulting Division were brought on site to analyze the situation and to recommend the best fit verification methodology. The process was improved through the use of SystemVerilog covergroups and assertions coupled with an integrated test plan that could be traced against requirements using Mentor's Questa verification platform and its ReqTracer requirements traceability tool.

A DO-254 Success Story

DO-254 GROWING IN ADOPTION

RTCA/DO-254 "Design Assurance Guidance for Airborne Electronic Hardware" is a standard that is currently being enforced by the Federal Aviation Administration (FAA), European Aviation Safety Agency (EASA), and other worldwide aviation certification agencies. DO-254 is quickly becoming a best practice requirement even beyond aviation, in many contracts where the FPGA or ASIC components are part of a safety- or mission-critical system.

SOLUTIONS FOR COMPLIANCE

- Requirements traceability throughout design and verification
- RTL design, reuse, and code checking
- Verification – from basic to the most advanced techniques, supporting level A/B requirements
- Vendor-independent "safer" synthesis
- Project support through training and on-site consulting

A Requirements-Driven Flow

DO-254 mandates a requirements-driven flow. Requirements specify a design's intent and therefore requirements must be linked to all design and verification activities. The Mentor Graphics ReqTracer tool was chosen to automate traceability to meet the stringent requirements of DO-254. NGI are very enthusiastic about the power of the integrated Questa/ReqTracer solution, and will use this approach on future programs.



Northrop Grumman Italia Drives To DO-254 Compliance Success With Mentor Consulting

**Mentor
Consulting**

Partnering Early Brings Unexpected Benefits

Mark Peryer, Verification Practice Manager, was team lead on this engagement. Mark is based in Newbury, UK.



A CASE STUDY

Partnering from the Start

Northrop Grumman Italia (NGI) recently engaged Mentor Graphics Consulting in a project requiring both DO-254 compliance and verification methodology improvements. The objective of the engagement was to enable NGI to demonstrate a DO-254 compliant verification process for the complex hardware in the navigation products that they supply to a number of military/aerospace manufacturers.

Knowledge Transfer

Starting in April 2009, Mentor Consulting worked with NGI to verify three FPGAs using a DO-254 compliant verification process. The structured program started with knowledge transfer on advanced verification techniques using one of the FPGAs as a working example; to deliver verification consulting to verify the most complex FPGA and to

support NGI as they verified the third FPGA themselves. The project had to be complete by the end of May 2009 to be ready for an audit by the customer.

Advanced Verification Success

The engagement was completed on schedule to the complete satisfaction of NGI staff and management. All three devices were verified with 100% code and functional coverage and complete traceability of requirements through a verification procedure to simulation results. The NGI staff members were shown how to develop test benches using SystemVerilog covergroups and assertions. The simulation coverage data was merged with a test plan, which gave proof of requirement verification so that the verification results could be linked back to the design requirements.

COMPLIANCE & PRODUCTIVITY

Unexpected Side-Effects

The traceability of design requirements through to proof of coverage via a simulation database was key to achieving DO-254 compliance. However, the side effect of using the methodology was the verification took less time to implement, that more bugs were found early, and issues were easier to debug.

The NGI team will be using the process implemented by Mentor Consulting for future projects not only because it meets DO-254, but because of its productivity.

KNOWLEDGE TRANSFER

Mentor Consulting's Verification Practice offers solution-driven consultants who will dramatically reduce your verification process times while improving quality.

Unlike other EDA consulting services or third party consultants, Mentor Consulting's highly experienced Verification Services team use a structured Knowledge Transfer process. This process is geared to enabling clients to learn 'on the job' so that they can fully understand and adopt the methodology and tools which are a best fit solution to their needs.

For more information, go to
www.mentor.com/consulting
www.mentor.com/go/do-254

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Corporate Headquarters
Mentor Graphics Corporation
8005 S.W. Boeckman Road
Wilsonville, Oregon 97070 USA

No. Amer. Consulting Dir.
Phone: 503-685-1358

Europe Headquarters
Mentor Graphics Corporation
Deutschland GmbH
Arnulfstrasse 201
80634 Munich, Germany
Phone: +49.89.57096.0
Fax: +49.89.57096.400

Pacific Rim Headquarters
Mentor Graphics (Taiwan)
Room. 1001, 10th Floor, No. 333
International Trade Bldg.
Sec. 1, Keelung Road
Taipei, Taiwan, R.O.C.
Phone: 886-2-8725-2000
Fax: 886-2-2757-6027

Japan Headquarters
Mentor Graphics (Japan) Co., Ltd.
Gotenyama Garden (19 & 20F)
7-35, Kita Shinagawa 4-chome
Shinagawa-Ku, Tokyo 140-0001
Japan
Phone: 81.3.5488.3033
Fax: 81.3.5488.3021

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