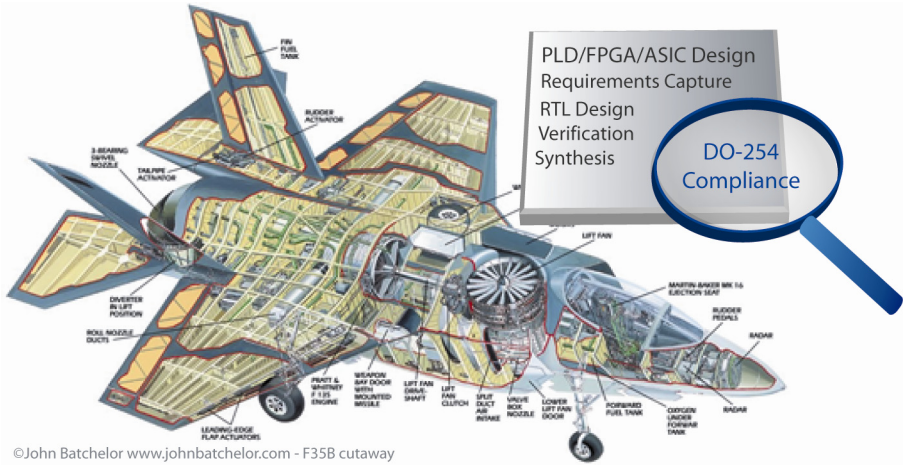
DO-254 Solution

Solutions for Requirements-Based FPGA Design Flows

Safety Critical Design

D A T A S H E E T



Mentor Graphics solutions deliver a best-practice methodology for requirements-based design, to help you meet both your DO-254 and quality objectives while improving the productivity of your flows and valuable resources.

Features

- 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
- Configuration management, artifact generation, audit support
- Project support through training and on-site consulting

DO-254 Overview

RTCA/DO-254 "Design Assurance Guidance for Airborne Electronic Hardware" is a standard that is currently being enforced by the Federal Aviation Administration (FAA) and other worldwide aviation certification agencies. The purpose of DO-254 is to ensure the safety of in-flight hardware.

All FPGA (or ASIC) devices that go in systems that fly must now adhere to the DO-254 standard. The stringency of the process is dictated by the design assurance level (DAL, or safety rating) of the end system levels A (highest) through E (lowest). Designing to DO-254 level A/B compliance standards can be a very costly venture. Leveraging training, expertise, and the right tools can help defray much of this added cost.

Requirements-Based Electronic Hardware Development

As with other safety-critical flows, DO-254 mandates a requirements-based design approach. This means that the design flow centers around capturing and validating requirements, designing to the requirements, and performing requirements-based verification of the design implementation. Mentor offers not only a single-vendor solution for the entire FPGA design flow, but also unique capabilities supporting the requirements-based design aspects of these flows.

Requirements Tracking

Requirements are handed down to the component from the system level, and must be traced to the corresponding design and verification data. Mentor's solution for requirements traceability helps automate DO-254 compliance by performing a top-down and bottom up tracing of these requirements to their respective design and verification data.

Design Creation

A key part of any design flow, Mentor's design creation solution includes a comprehensive editing environment and additionally supports DO-254 compliance with its support of RTL code checking, reuse assurance, configuration management, design artifacts generation and web-based design review and audit sites.

Advanced Verification

Verifying that the device performs its intended function (and does not do anything unintended) is a crucial part of DO-254 flows. Mentor's industry-leading advanced verification solution supports even the most complex designs, including automating requirements based test, verification management and a unified coverage database to meet both your DO-254 compliance and business goals.

Safer Synthesis

Synthesis is a transformation of the design, and ensuring this process is done as safely as possible is a high priority for safety-critical and DO-254 flows. Mentor offers a vendor-independent FPGA synthesis solution that takes safety seriously, providing numerous features for added assurance and repeatability of the synthesis process.

Benefits

- Continuous requirements tracking throughout design and verification
- Efficient and compliant electronic hardware development and verification
- Repeatable design development flow for consistent quality process
- Extensive management and reporting for project management
- Comprehensive documentation for projects and certification support
- First project support, training, and consulting

Mentor Graphics offers a complete set of industry-leading solutions to address the DO-254 compliance and safety-critical design assurance needs of all levels of complexity, including:

ReqTracer

The ability to completely trace and manage design requirements from specification through implementation is beneficial to all projects and mandatory for DO-254 compliance. ReqTracer™ is an efficient solution that links, manages and tracks hardware requirements from multiple sources throughout the design process, provides easy documentation and reports at any stage, and manages the impact of requirement changes.

HDL Designer

Having an environment to manage the design data is an important aspect of a DO-254 flow. With its features for RTL editing, code checking, and reuse assurance, its ability to produce design artifacts and web-based review/audit sites, along with its links to configuration management tools and other design tools in the flow, HDL Designer™ can provide a productive framework for DO-254 and other requirements-based design projects.

Precision Synthesis

For FPGA designers, Precision Synthesis® offers "safer" vendor-independent synthesis. Precision ensure safe design operation with safe FSM encoding and radiation-hardened device support, while additionally meeting aggressive performance and area goals with advanced optimization and award-winning analysis and debug. With Precision, you can efficiently re-use your design for any FPGA device using a single, state-of-the-art synthesis tool.

ModelSim

As the industry proven simulator used in military and aerospace companies, ModelSim® is a simulation-based test environment that also supports various code coverage metrics as required for Level A/B designs.

Questa

For more complex devices, Questa® wraps advanced verification methodologies around ModelSim's core simulation engine, offering broad language support (VHDL, Verilog, C, SystemVerilog), assertion-based design and debugging (including assertion libraries), testbench automation, transaction level modeling, a unified coverage database (UCDB), verification management coupled with requirements traceability, and supporting the industry's only Open Verification Methodology (OVM) for testbenches.

0-In Formal Verification

Complimenting simulation, 0-In FV™ can exhaustively prove safety-critical requirements to ensure your design contains no unintended behaviors.

0-In CDC

For designs with multiple, asynchronous clocks, 0-In CDC™ performs a comprehensive analysis of the design to ensure it is free of metastability errors.

FormalPro

For assurance any time your design transforms through synthesis or routing, the logical equivalency checking of FormalPro™ (which works in conjunction with Precision) compares two design versions to ensure they are functionally equivalent .

SystemVision

For additional and early system-level verification of FPGA components, SystemVision™ provides a virtual lab for design and analysis of distributed mechatronic systems.

Consulting

Mentor Consulting has extensive experience helping companies achieve DO-254 compliance with hands-on services to accelerate success and reduce risk, especially in the areas of new verification methods and testbench creation.

Partnering For A Complete Solution

At Mentor Graphics, we recognize that our customers' DO-254 success depends on more than just industry-leading tools and design expertise. It also requires DO-254 training, process analysis, certification expertise, and perhaps even onsite consulting. This is why Mentor Graphics has teamed up with other reputable industry leaders to provide a complete DO-254 offering. Visit www.mentor.com/go/do-254/partners to learn more.

To learn more about Mentor Graphics' DO-254 solution, visit our website at www.mentor.com/go/do-254

Copyright © 2008 Mentor Graphics Corporation. Mentor products and processes are trademarks of Mentor Graphics Corporation. All other trademarks mentioned in this document are trademarks of their respective owners.

Corporate Headquarters
Mentor Graphics Corporation
8005 SW Boeckman Road
Wilsonville, OR 97070-7777
Phone: 503.685.7000
Fax: 503.685.1204

Silicon Valley
Mentor Graphics Corporation
1001 Ridder Park Drive
San Jose, California 95131 USA
Phone: 408.436.1500
Fax: 408.436.1501

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

Pacific Rim
Mentor Graphics (Taiwan)
Room 1001, 10F
International Trade Building
No. 333, Section 1, Keelung Road
Taipei, Taiwan, ROC
Phone: 886.2.87252000
Fax: 886.2.27576027

Japan
Mentor Graphics Japan Co., Ltd.
Gotenyama Hills
7-35, Kita-Shinagawa 4-chome
Shinagawa-Ku, Tokyo 140
Japan
Phone: 81.3.5488.3033
Fax: 81.3.5488.3004

Sales and Product Information
Phone: 800.547.3000

North American Support Center
Phone: 800.547.4303

ML 03/08