Enabling Safe, Secure, Smarter Cars
...from Silicon to Software

Jeff Hutton
Synopsys Automotive Business Development
Automotive

Key IC Design Differences

- Fully Documented Design
- Traceability from Specification
- Addition of Safety Mechanisms and Fault Testing
- In-System Test
- Cybersecurity for Cyber-Physical Vehicle Systems
Enabling Safe, Secure, Smarter Cars
...from Silicon to Software

- Software cybersecurity & quality
- Verify functional safety (ISO 26262)
- Automotive-certified IP (ISO 26262)
- High-reliability IC design
- ISO 26262-certified Test
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Software cybersecurity & quality

Verify functional safety (ISO 26262)

Automotive-certified IP

High-reliability IC design

ISO 26262-certified Test
Automotive Software Signoff Platform

Covurity
Static Analysis

- Critical defects and vulnerabilities in code
- Standards compliance (MISRA, ISO26262)
- OWASP Top 10 and CWE Top 25
- Quality, security, and safety

Defensics
Security Testing

- Fuzzing for automotive protocols
- Find vulnerabilities before hackers
- Ethernet, WiFi, CAN, Bluetooth, SMS, DHCP
- Security and safety

Protecode
Supply Chain Management

- Supply chain total health with SW BoM
- Find known vulnerabilities in 3rd and OSS
- Secure integration of connected systems
- Security, safety, and liability

*Synopsys leads SAE Cybersecurity testing task force
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Synopsys Verification Continuum
Consistent Across all Verification Engines

Unified Compile and Debug
ISO 26262
Functional Safety Qualification
Virtual Prototyping for Automotive
Hybrid Prototyping & Emulation
Requirements Linking, Tracking & Documentation
Unified Functional & Safety Verification

Verification Requirements

Safety Requirements

Functional Qualification

Fault Injection & Simulation

Verification Plan

Safety Plan

Safety-Focused IP, VIP & TB

Simulation

Static/Formal

Emulation

Tapeout

FMEDA Report
Synopsys Functional Safety Verification Solution

- Requirements Management
- Traceable Verification with Verdi
- Automotive Protocols & Memory VIP
- Fault modeling, injection & simulation for safety verification and compliance
- Customized Safety Reports / Doc

- Chip Reqmts
- Safety Goals
- Verif Plan
- Safety Plan
- TB, HDL, IP, VIP
- IP Safety Certification
- Simulation, Static/Formal, Emulation*
- VCS, SpyGlass, Certitude, Z01X, ZeBu
- Tapeout, FMEDA Report

Synopsys Extends VIP Portfolio for Automotive Applications
Native SystemVerilog VIP & Source Code Test Suites for CAN 2.0/FD/TT, LIN, FlexRay & Ethernet AVB
Apr 5, 2016

Synopsys Extends Lead in Functional Safety & Security Verification with Addition of Key Technology for ISO 26262 Compliance
Acquires Leader in Fault Simulation - WinterLogic
Mar 2, 2016

Synopsys Verification Solution Certified for Most Stringent Level of Automotive Safety Measures Defined by ISO 26262
Certified for Highest Tool Confidence Level (TCL1)
May 10, 2016

* Future
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# Synopsys Automotive-Certified IP

## ISO 26262 Automotive Safety Package

<table>
<thead>
<tr>
<th>Interface IP</th>
<th>Processors</th>
<th>Sensor &amp; Control Subsystem</th>
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<tr>
<td>Ethernet</td>
<td>ARC</td>
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<td>USB</td>
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<td>DDR</td>
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<td>MIPI</td>
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<td>HDMI</td>
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### Security
- Encryption
- Decryption
- Content Protection

### Analog IP & NVM
- Data Converters
- Non-Volatile Memory

### Embedded Memories & Logic Libraries

## Key Features
- **Broadest Silicon-proven IP Portfolio**
- **40, 28 & 16/14nm, multiple foundries**
- **ASIL B-D Functional Safety Certification**
- **AEC-Q100 tested, TS 16949 compliant**
Introducing the DesignWare® EV6x Embedded Vision Processor Family

- Most highly integrated vision processor
  - Unified scalar, vector DSP and convolutional neural network (CNN) architecture
  - Supports 1080p - 4K vision streams
  - 100x higher performance than EV5x family

- User scalable for optimum performance
  - 1 to 4 Vision CPU cores
  - Programmable CNN engine (option)

- State-of-the-art performance-efficiency

- High productivity toolset
  - OpenCV, OpenVX, OpenCL C, MetaWare

General Availability: Oct 2016
Synopsys: Enabling Safe, Secure, Smarter Cars
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Software cybersecurity & quality

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ISO 26262-certified Test
Robust & Reliable Automotive IC Design
Digital & Custom IC Design

High Quality IC Implementation

Extended Electrical Rule Checking

Electromigration Analysis

Custom Routing

Power Grid Integrity

Low DPPM Test Automation

Implementation for Robust and Reliable Automotive IC Designs
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Synopsys Automotive Test Solution

Certified for ISO 26262 functional safety

Advanced Fault Models
- TetraMAX®
- Automotive ATPG

Built-In Self-Test
- DFTMAX™ LogicBIST
- STAR Memory System®

Pin-Limited Compression
- DFTMAX Ultra

SoC Test Integration
- STAR Hierarchical System

Higher Quality & Safety…with Lower Cost & Faster TAT
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Auto Documentable Development Flows

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LYNX Design Flow AutoDoc
Automatically Generate Complete HTML Hyperlinked Flow Documentation

Flow Step Summary: tf_default

• Easy documentation of flow customizations
• Useful for ISO 26262 requirements

Top Level Flow Summary

Task Info: sf_synode_elaborate_expansion

Details

Flow Full Script Details

• Simple documentation of flow customizations
• Useful for ISO 26262 requirements
...to learn more

Enabling Safe, Secure, Smarter Cars – from Silicon to Software

Customers across the automotive supply chain use Synopsys’ Silicon to Software solutions to develop ICs and software for next-generation infotainment, ADAS, V2X, and autonomous driving.

Synopsys’ portfolio of automotive-specific IC design tools, IP and software accelerate time to market and reduce risk.

- Build-in automotive software cybersecurity & quality
- Verify functional safety with ISO 26262 assurance
- Accelerate IC design & significantly reduce risk with automotive-certified IP
- Implement highly reliable, automotive-grade ICs
- Accelerate functional safety qualification with ISO 26262 ASIL D certified test solutions
- Design with confidence using Synopsys’ test solution that is certified up to the most stringent ASIL D standards for safety-critical automotive ICs.
- Model & simulate physical systems with Saber; design smarter automotive illumination systems with LucidShape
Thank You