



Absicherung elektrischer Systeme mit Capital Analysis

Holger Keller, Oliver Neumann

Ihre Referenten im Webinar



Holger Keller

Portfolio Development IES / Köln

Fokus: Digitale E/E Systementwicklung mit
Capital/VeSys

25+ Jahre EDA Erfahrung

19 Jahre Mentor Graphics



Oliver Neumann

Pre-Sales Team Leader IES / Hannover

Fokus: Digitale E/E Systementwicklung mit
Capital/VeSys in Europa

25+ Jahre EDA Erfahrung

8 Jahre im Bereich Capital

Produktentwicklung wandelt sich industriübergreifend

Maserati Rückruf: Kurzschlussgefahr

11.06.2019 - 10:41

Rückrufe für Audi e-tron und Jaguar I-Pace

[Audi](#) [BEV](#) [Deutschland](#) [E-SUV](#) [e-tron](#) [e-tron quattro](#) [I-Pace](#) [Jaguar](#) [USA](#)



Wegen der Gefahr eines Batteriebrands und einer potenziell fehlerhaften Software des regenerativen Bremssystems müssen der Audi e-tron und der Jaguar I-Pace in die Werkstätten. Insgesamt sind über 10.000 Fahrzeuge betroffen – teilweise auch in Deutschland.

++ Dieser Beitrag wurde aktualisiert. Sie finden die neuen Infos ganz unten. ++

Bei dem e-tron könne wegen eines Fehlers im Kabelbaum Feuchtigkeit über die Ladebuchse in einzelne Batteriezellen eindringen, was zu einem Brand führen

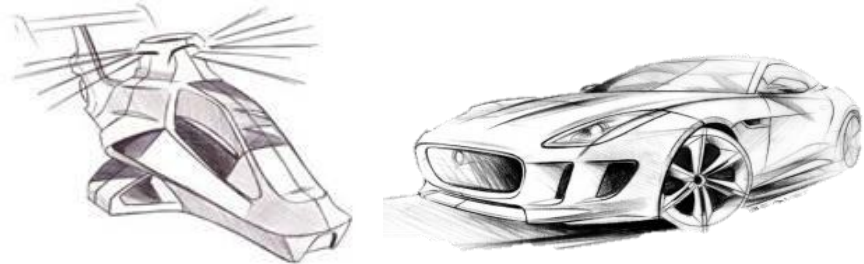
kann. Bisher seien keine Brände gemeldet worden, es soll jedoch in fünf Fällen die Warnleuchte für Batteriefehler wegen der Feuchtigkeitsansammlung ausgelöst worden sein.

[Marcel Sommer](#) • 10.05.2019

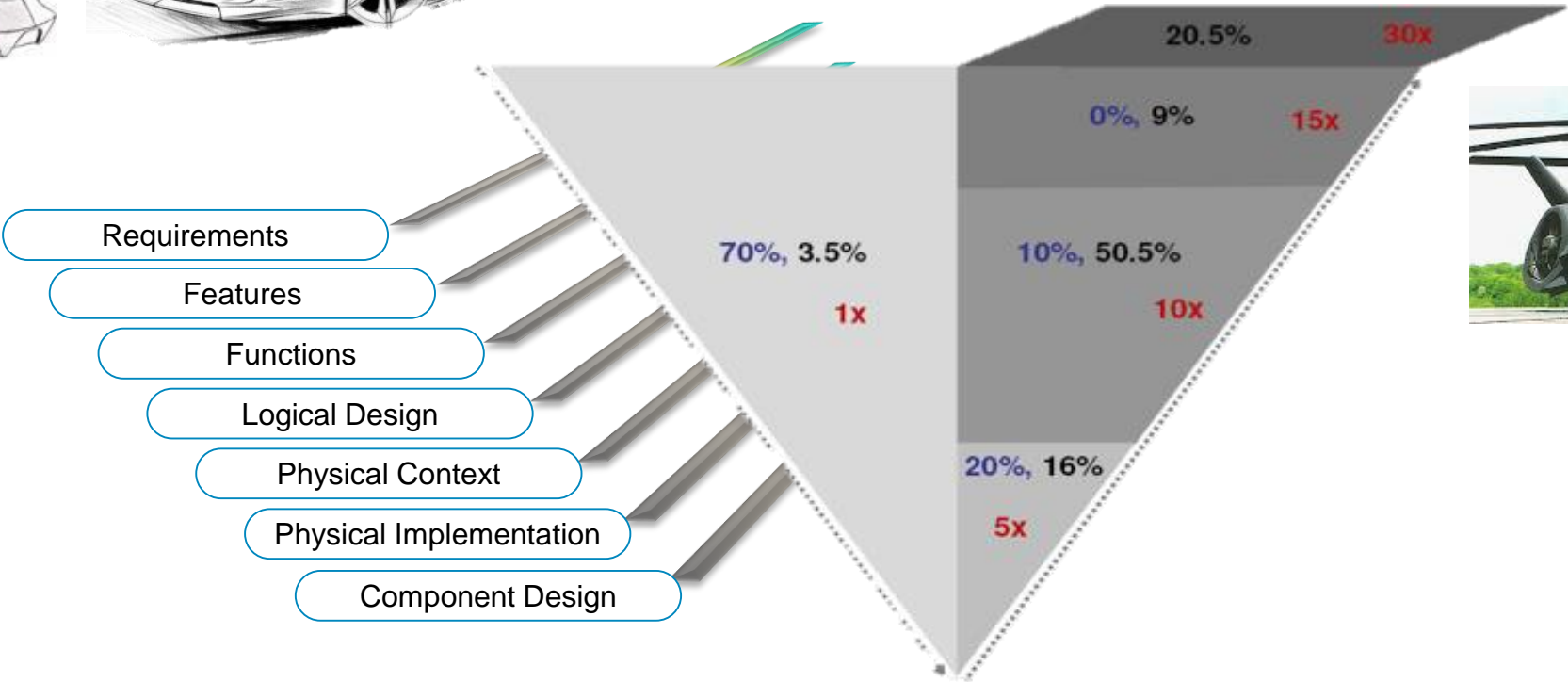
Kabelbäume von hochkomplexen Fahrzeugen sind fehleranfällig

Motivation für Capital Analysis

Fehler frühzeitig finden



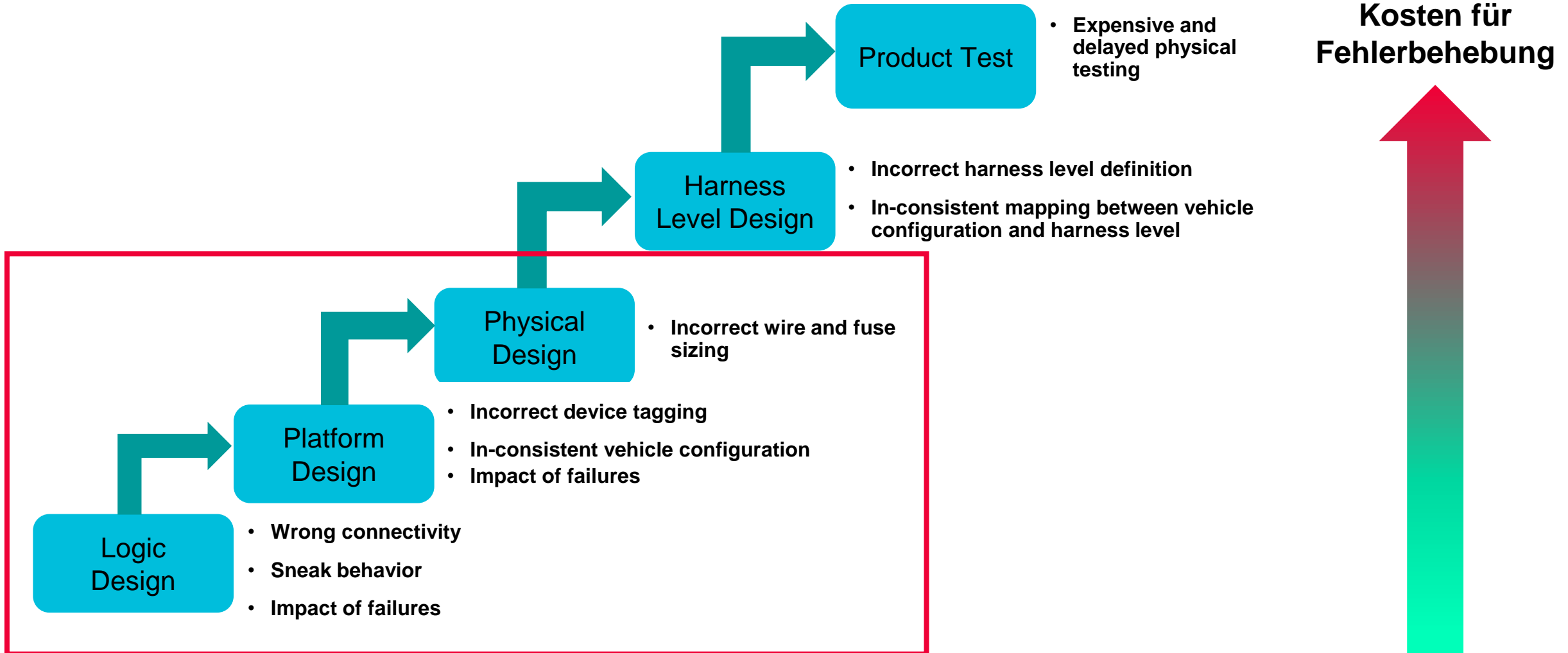
Where faults are introduced
Where faults are found
The estimated nominal cost for fault removal



Source: Managing Complexity in Aero Systems; AIAA 2010

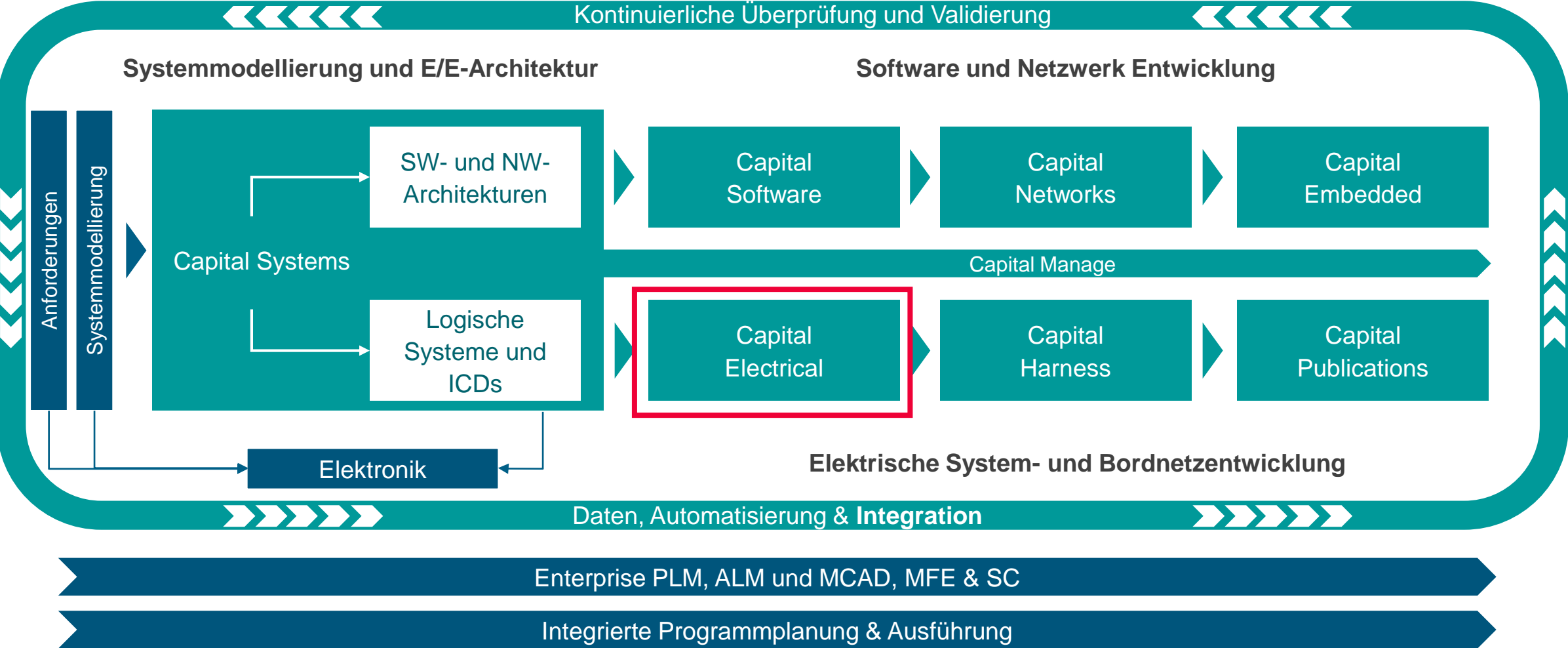
Elektrische Absicherung von Kabelbäumen

Fehler früh erkennen und beheben



Capital E/E System Entwicklungsplattform

E/E Architektur, Software und Bordnetz



Basis Technologien – Capital Analysis

Kabelbaum Analyse-, Verifikations- und Validierungswerkzeug

Functional requirement-based analysis

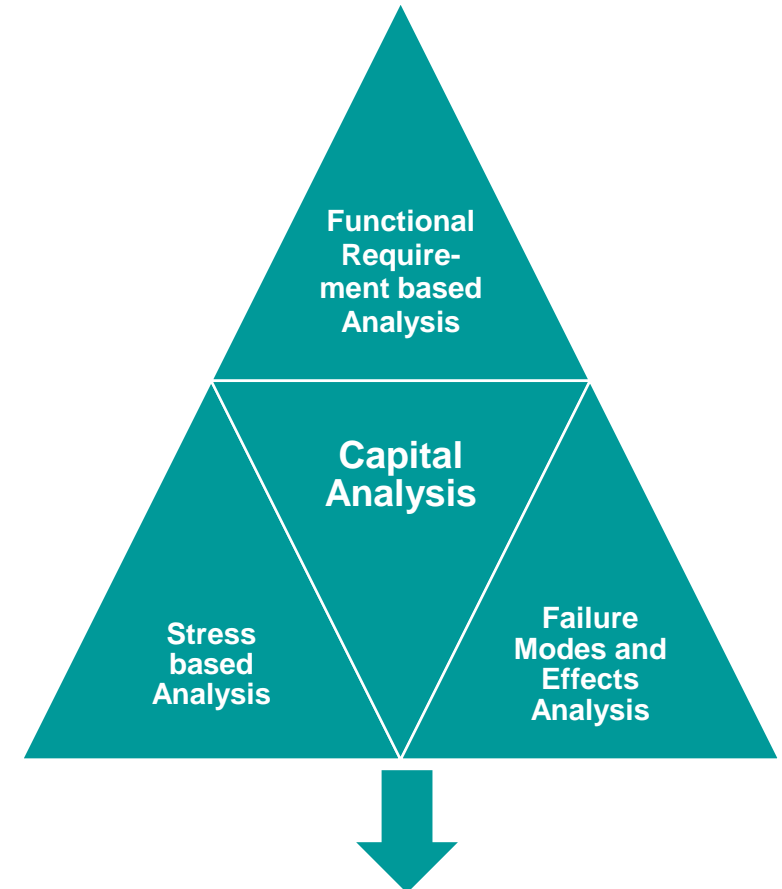
- Verify the correctness of the **connectivity** between input and output devices
- Sneak Circuit Analysis (SCA)

Stress based analysis

- EDS component validation and selection assistance (fuse/wire sizing, voltage drop)

Failure/effect-based analysis (FMEA)

- Assess the effects of an injected component failure
- Rank the risk of the effect on the system



Enable the “on time” verification/validation:
verify/validate the design while creating the design

Capital Analysis

Demo

Virtual connectivity testing

- Validated connectivity
- Sneak free
- Correct connectivity requirement
- Validate design while creating the design

Automation of connectivity testing

- Automated exhausted connectivity validation
- Get possible failure highlighted to shorten failure location

Harness component sizing verification

- Validation of wire/fuse size
- Validation of voltage drop requirements
- Validate design while creating the design

Automated component sizing

- Automated, rule driven components sizing
- Back annotation of calculate values

Failure Modes and Effects Analysis

- User driven failure injection and scenarios
- Risk Priority Number (RPN) calculation for judging failure effects
- Result table output with RPN and link to failure simulation

Capital Analysis

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Virtual connectivity testing

- **Saves recall money** by detecting connectivity errors early in the design process
- **Reduced errors & validation time** via validation design while creating

Automation of connectivity testing

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Automated component sizing

Failure Modes and Effects Analysis

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Capital Analysis Demo

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- **Reduced errors & validation time against interactive connectivity** by automation
- **Prevents recalls** by exhausted testing

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Harness component sizing verification

- **Increase the reputation of your product** by eliminating component sizing errors.
- **Minimize prototype testing costs** by doing parts in digital product data.
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Failure Modes and Effects Analysis

- Helps to take actions to **eliminate or reduce failures**, starting with the highest-priority ones
- Documents current knowledge and actions about the risks of **failures** for **preventing** these.

Summary

What does Capital provide:

- Interactive start of Analysis within the Design environment
- Enable early validation of designed content
- No testbenches needed
- Automated approach speeds up evaluation time and exhausted pattern covers all corner cases
- Underlying models could be used by the whole community of EDS designer without manipulation

Jetzt sind Sie gefragt ...

Maserati Rückruf: Kurzschlussgefahr durch fehlerhaften Kabel

01.08.2017 | Der Sport insgesamt Isolierung verursacht

Allein in D
176.530 Fahrzeuge betroffen

BMW ruft über 200.000 Autos in der Steckverbindung der Fahrzeugelektrik und der Fahrzeuge der Baureihen 1er, 3er, M:

11.06.2019 Rück

Audi BE



kann. Bist Feuchtigkeit



guar I-Pace

guar USA

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... vermeiden Sie teure Rückrufe,
sichern Sie Ihre Designs frühzeitig mit
Capital Analysis ab!



Sprechen Sie uns an:



Holger Keller

Portfolio Development IES / Köln

Email:

holger.keller@siemens.com

Mobil: +49 172 260 60 56

