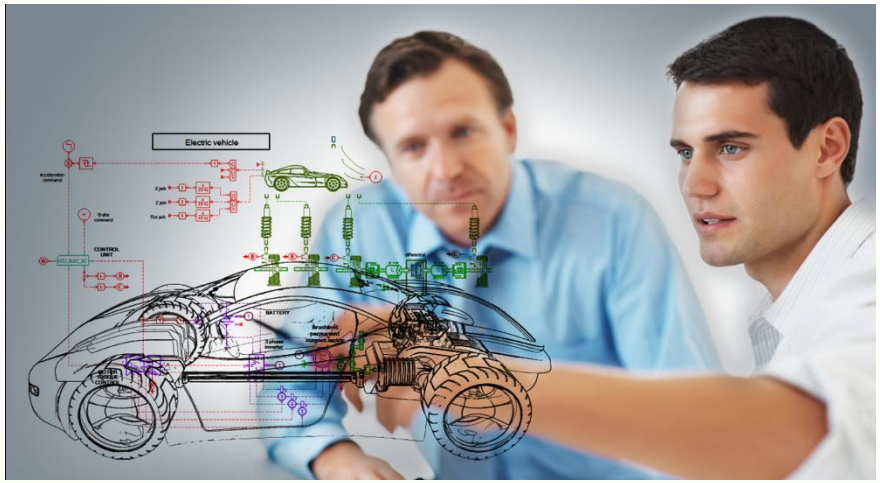
시스템 기반의 제품설계
- (SLM&TDM)



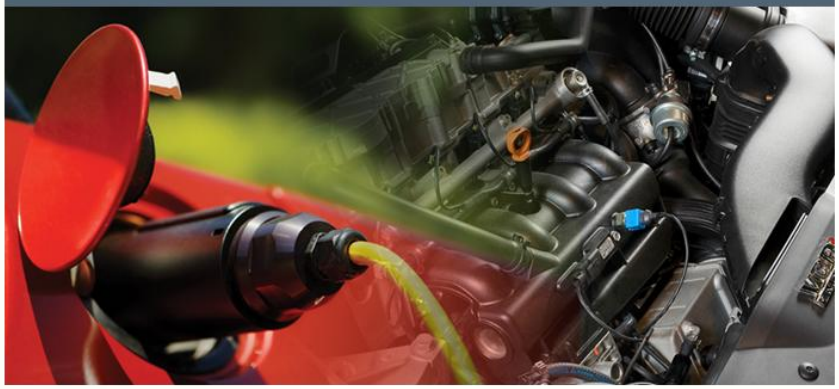
* SIEMENS

* 이승구 전문

Contents

Automotive 업계의 과제 - 시장요구

Eco-Driven Powertrain Concepts

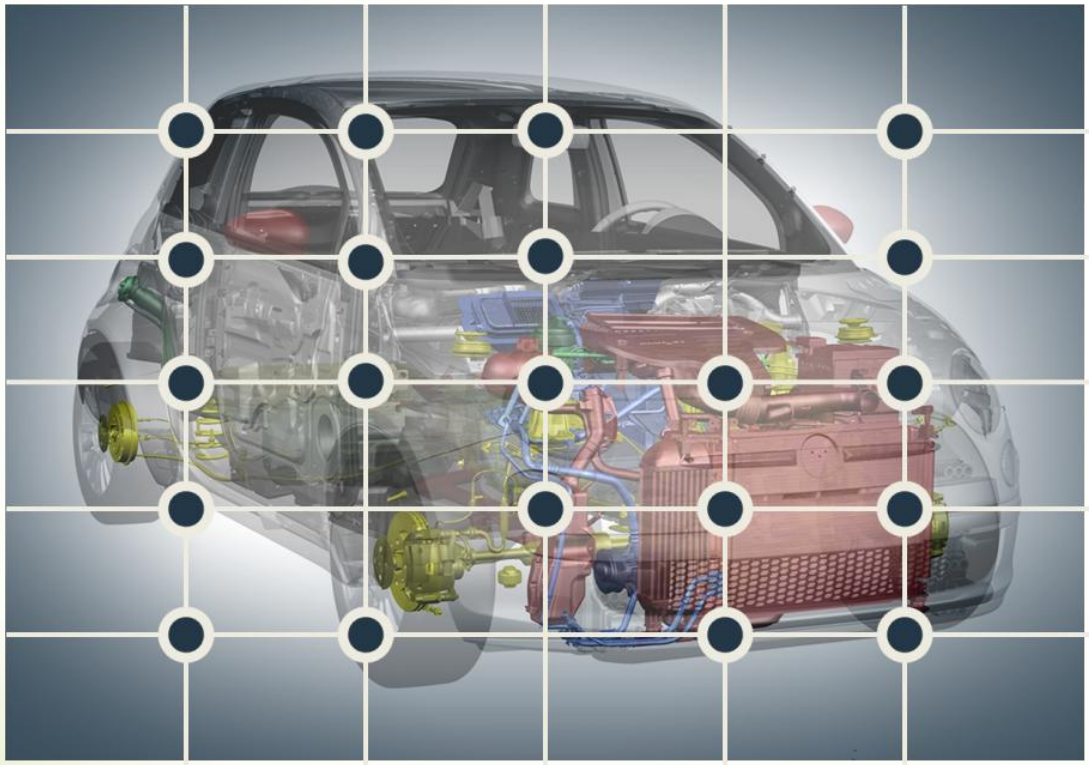


Innovative and Lightweight Design

Creating Brand Value through Performance

Creating Brand Value through Systems

Automotive 업계의 과제 - 복잡성



Chassis and Suspension | Body | Powertrain | E&E | Full Vehicle

Structure and Durability

NVH and Acoustics

Thermal and Energy

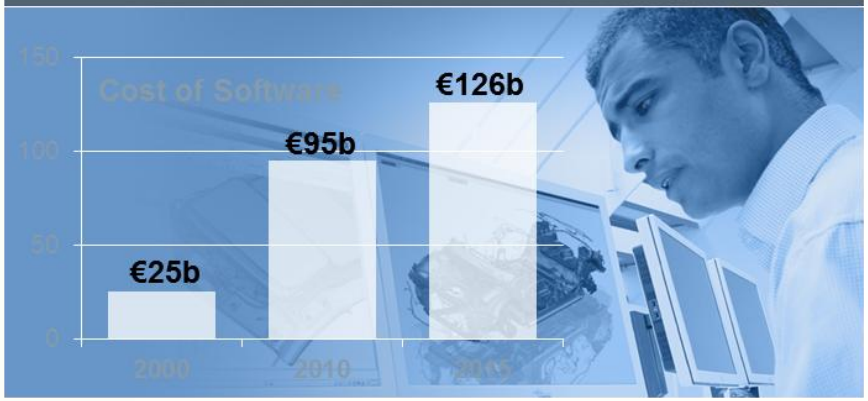
Safety

Driving Dynamics

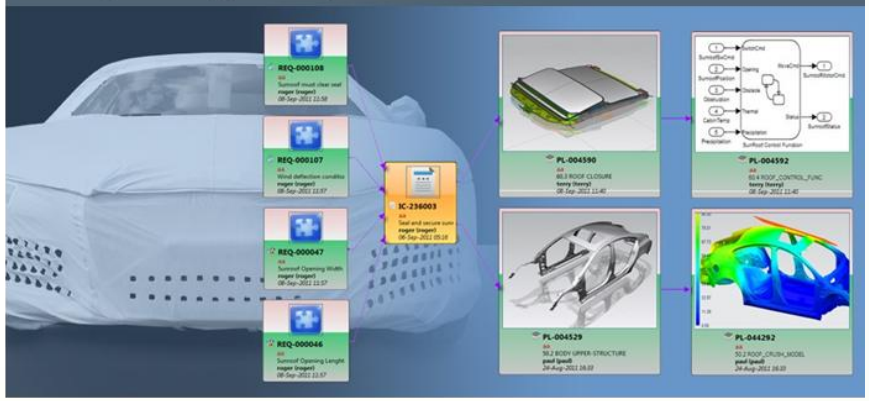
Multi-attribute balancing
Vehicle integration

Automotive 업계의 과제 - 개발환경

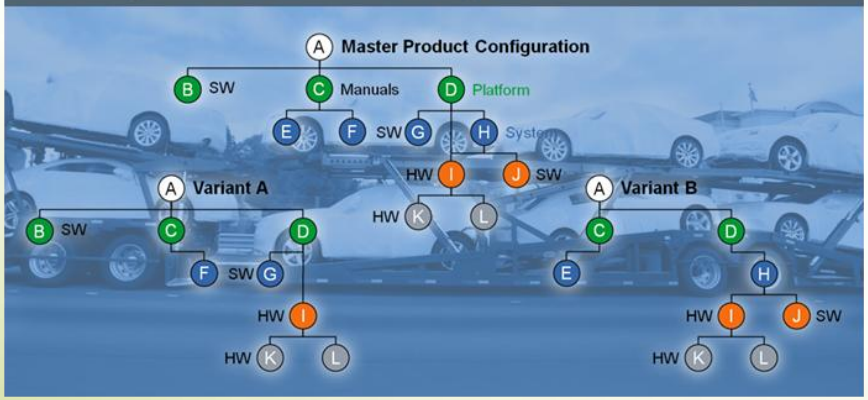
Dramatic Growth of Electronics Systems



Exploding Requirements and Test Cases



Multiple Variants and System Architectures



Multiple Sites, Multiple Participants

Automotive 업계의 과제 - 개발방법

SIEMENS의 Vision

더 많은 사람들이
기본적으로 이해하게

정확한 정보를 얻을

복합적인 결정을 내

있도록…

제때에 정확한 결정을

내릴 수 있도록…

SIEMENS의 Vision

모두에게 직관적
이고
투명환 환경

여러 시스템에서
추출된 정보들

제품개발 전체를
검증해 볼 수 있는
시스템

필요로 하는 정보
만을 정확히 제공
하는 시스템

Putting every decision in context

SIEMENS의 Vision-중요한 개발 방향

정보접근성

Extract value from large volumes of complex data
to provide users only the information required to make accurate decisions.

증명된 아키텍처

Preserve your investment in our solutions, minimize your total cost of owner- ship and help you take advantage of change.

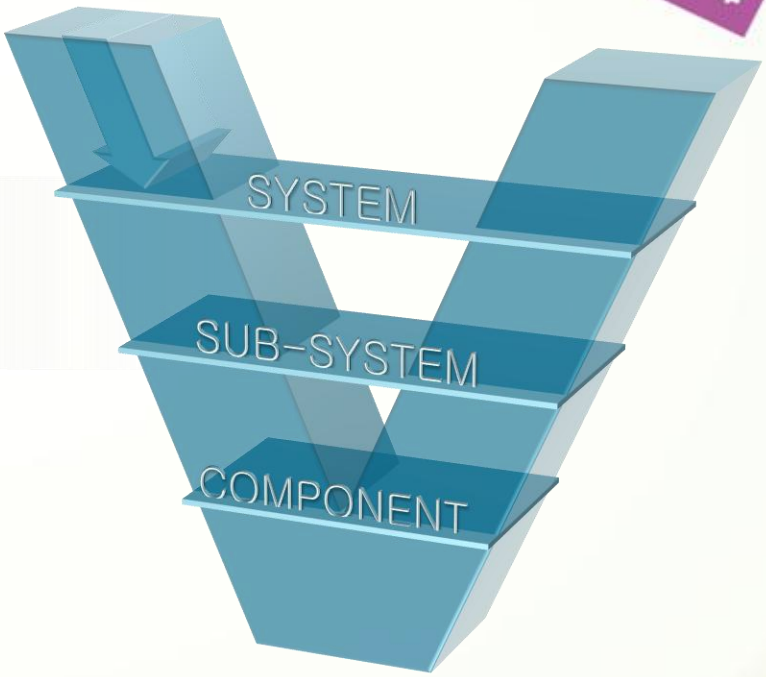
손쉽고 뛰어난 UI

Ensure everyone in your process gets information in a form best suited to their job, in the simplest and fastest way possible.

HD PLM은 올바른 정보를 바탕으로
제품개발 사이클에서 빠르고 정확한
결정을 함으로써 여러분에게 더욱
뛰어난 제품을 만들도록 도와 드립니다.

시스템 기반 제품개발

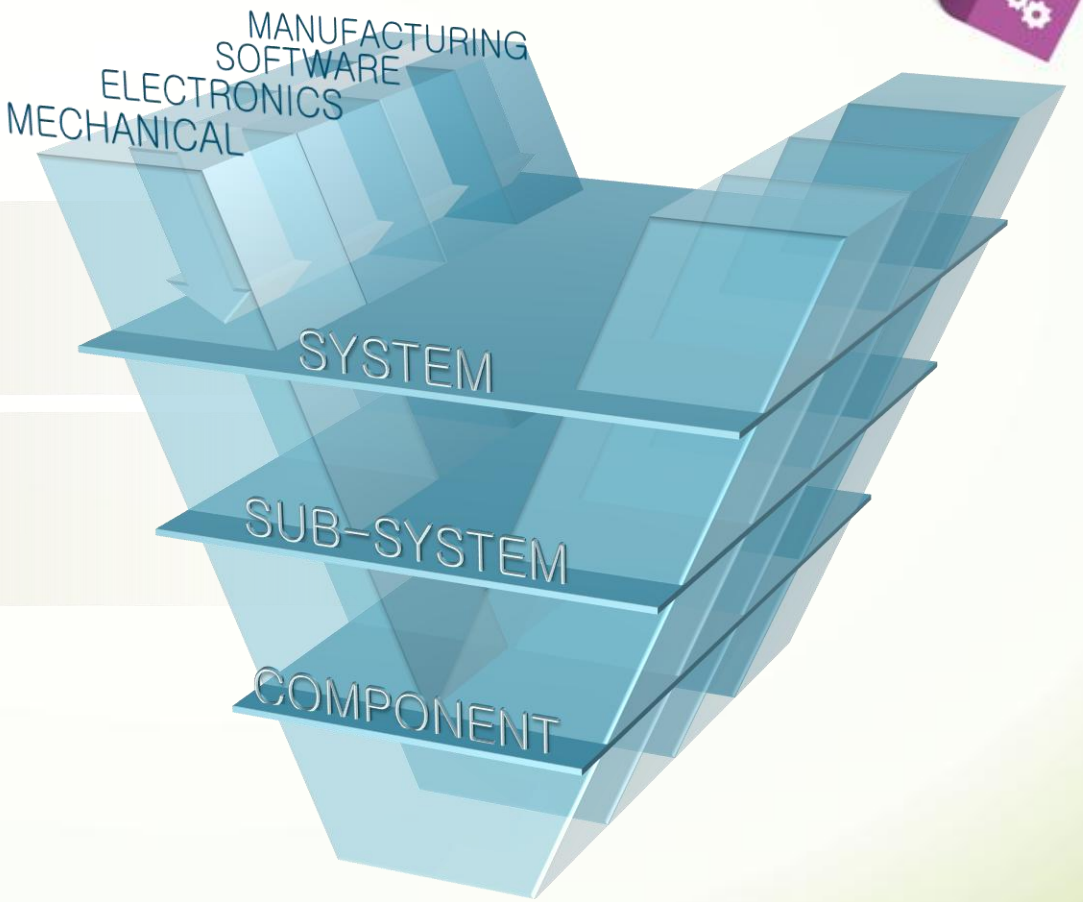
모델기반
시스템 프레임…



시스템 기반 제품개발

모델기반
시스템 프레임…

종합적인 연결
검증…

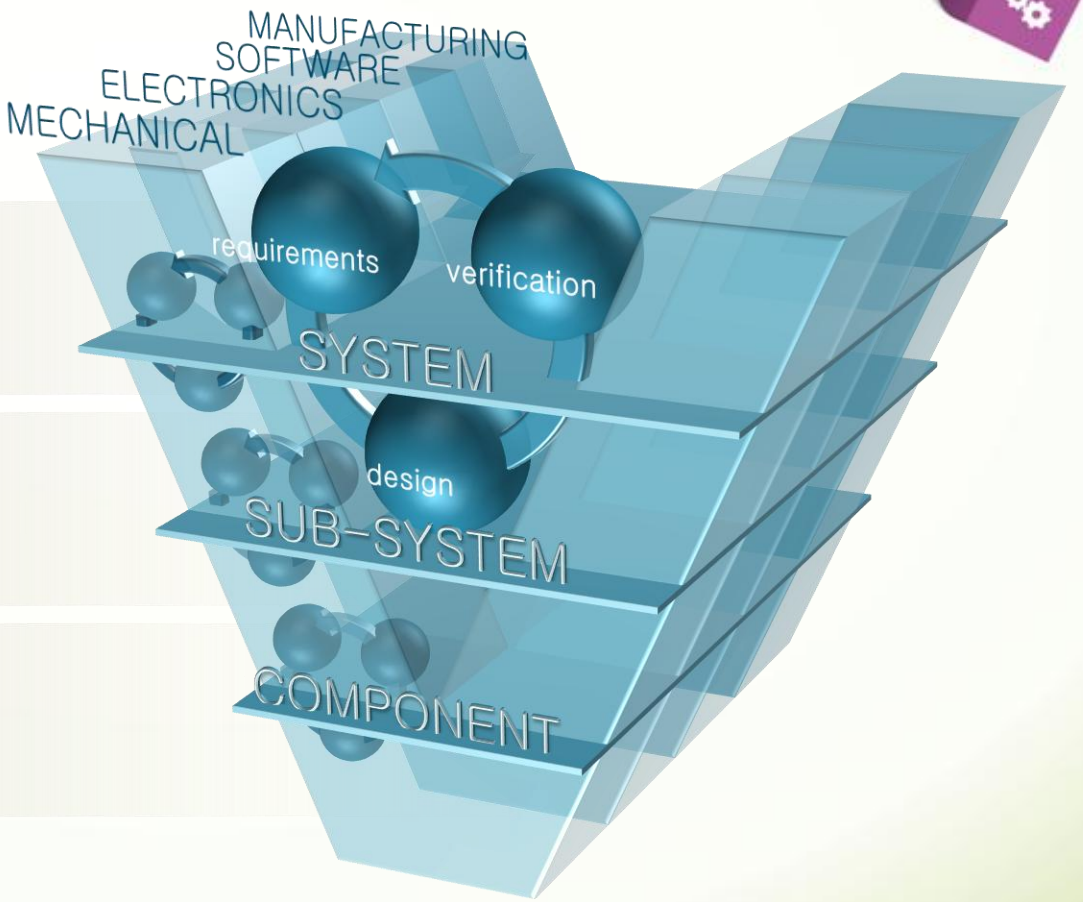


시스템 기반 제품개발

모델기반
시스템 프레임…

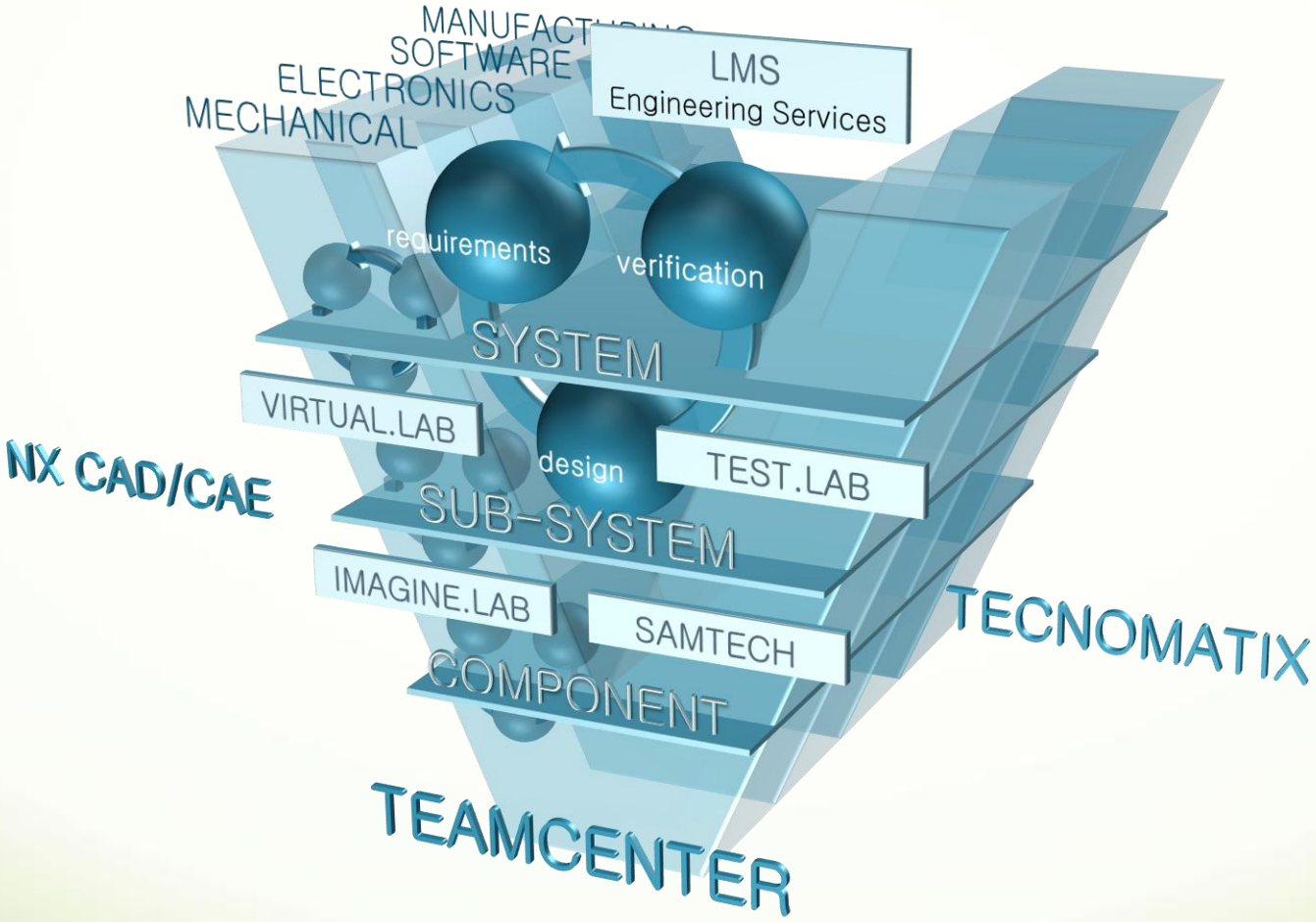
종합적인 연결
검증…

순환검증 시스템
(closed-loop)



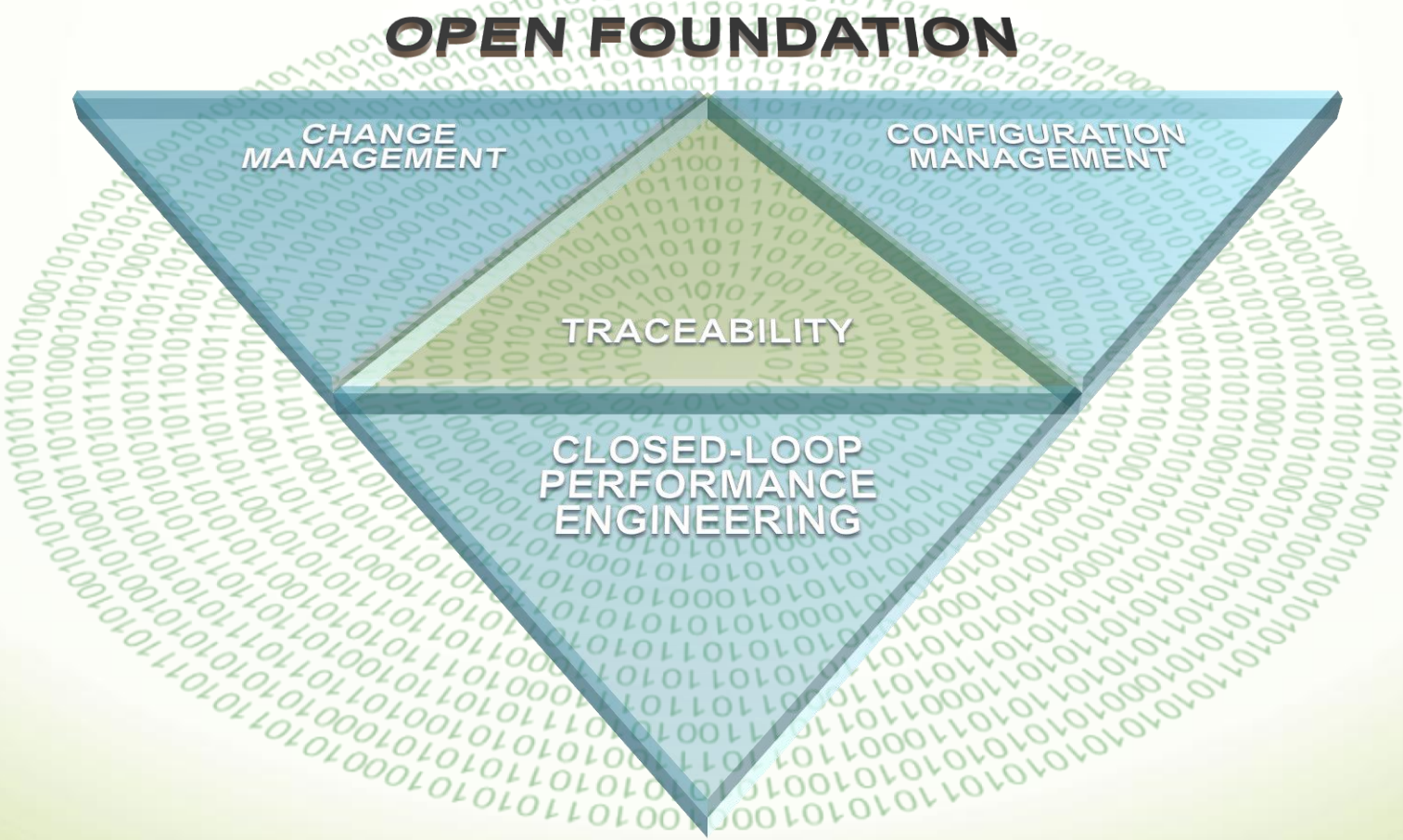

End-to-End
프로세스를 위한
PLM

시스템 기반 제품개발


MANUFACT
SOFTWARE
ELECTRONICS
MECHANICAL
LMS
Engineering Services
requirements
verification
SYSTEM
VIRTUAL.LAB
design
TEST.LAB
SUB-SYSTEM
IMAGINE.LAB
SAMTECH
COMPONENT
NX CAD/CAE
TECNOMATIX
TEAMCENTER


End-to-End
프로세스를 위한
PLM

시스템 기반 제품개발


OPEN FOUNDATION
CHANGE MANAGEMENT
CONFIGURATION MANAGEMENT
TRACEABILITY
CLOSED-LOOP PERFORMANCE ENGINEERING

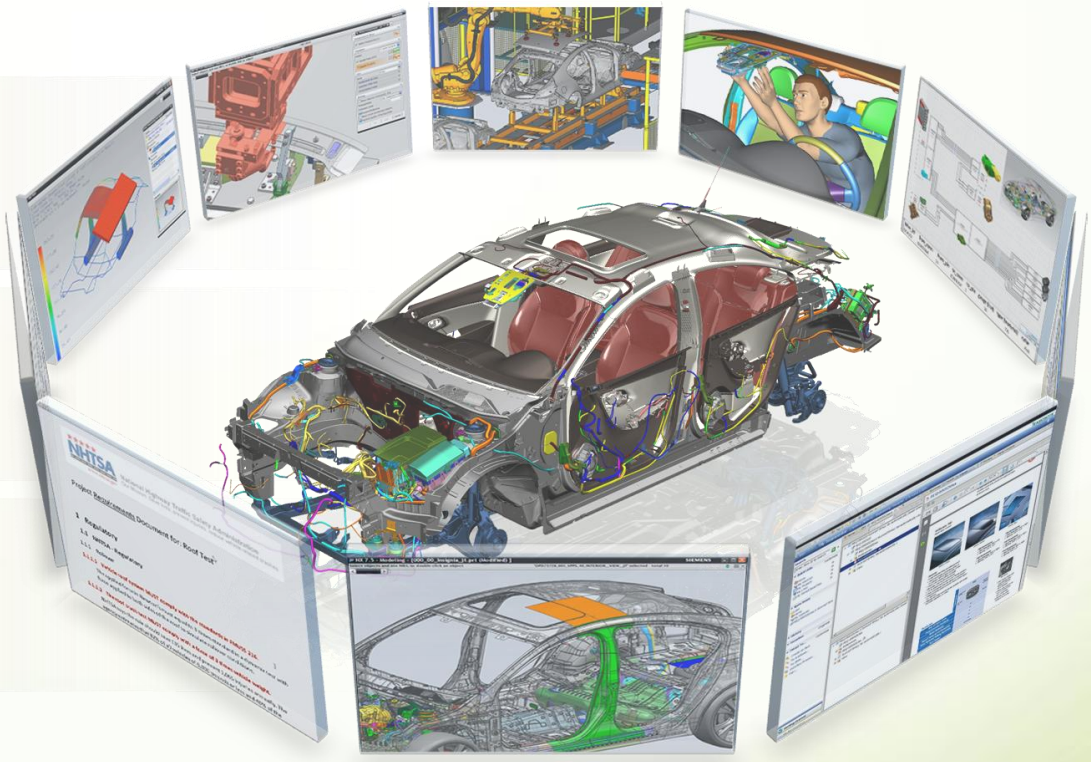
시스템 기반 제품개발-설계변경

경쟁 이점의 강화방안 Teamcenter 중심의 변경관리

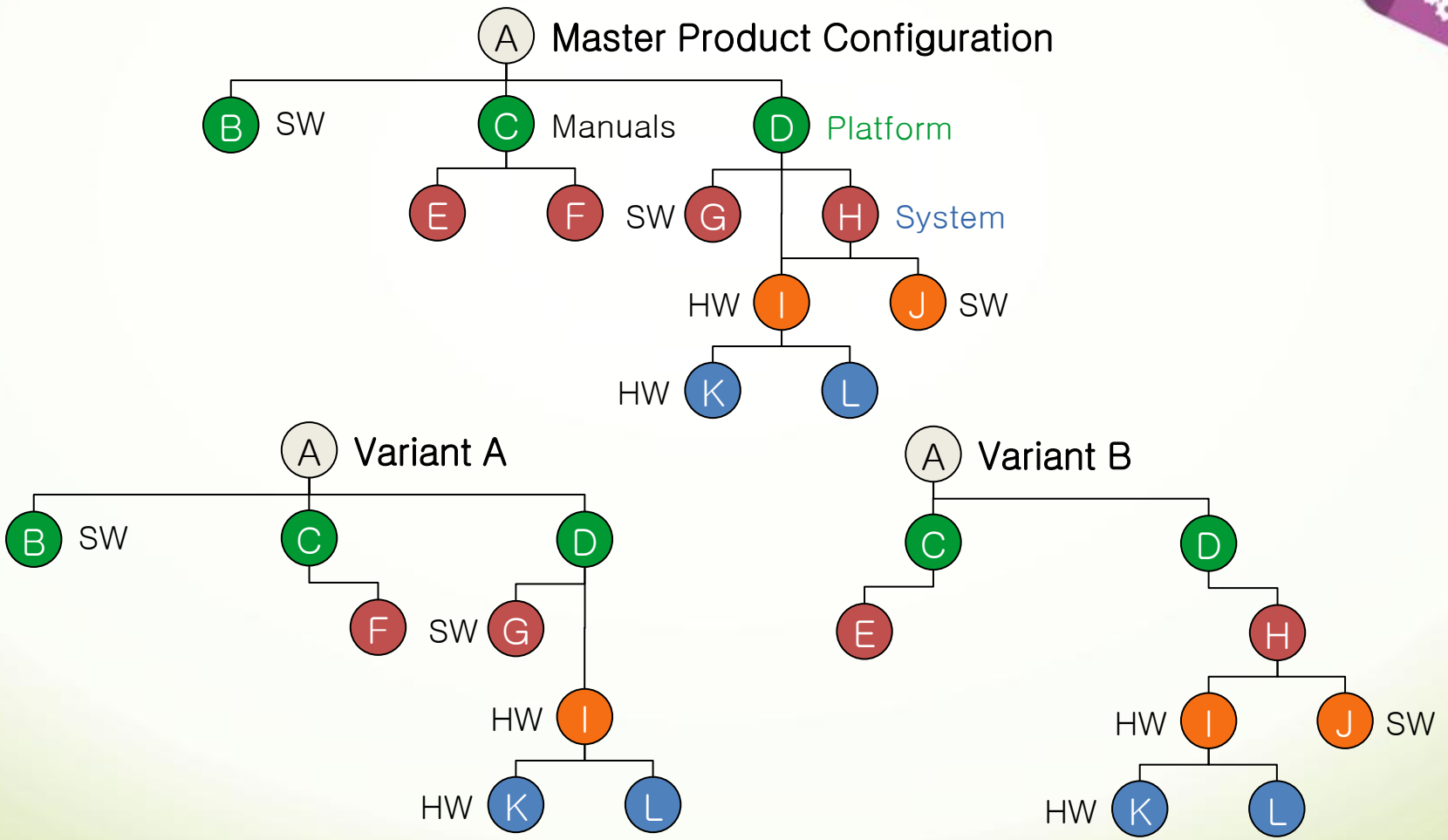
변경에 따른 최신 데이터를 모든 개발자가 공유하게 하는 것

기능과 기능의 전달 의존관계를 관리하는 것

여러 영역에 걸쳐있는 영향을 시뮬레이션 하고 검증하는 것

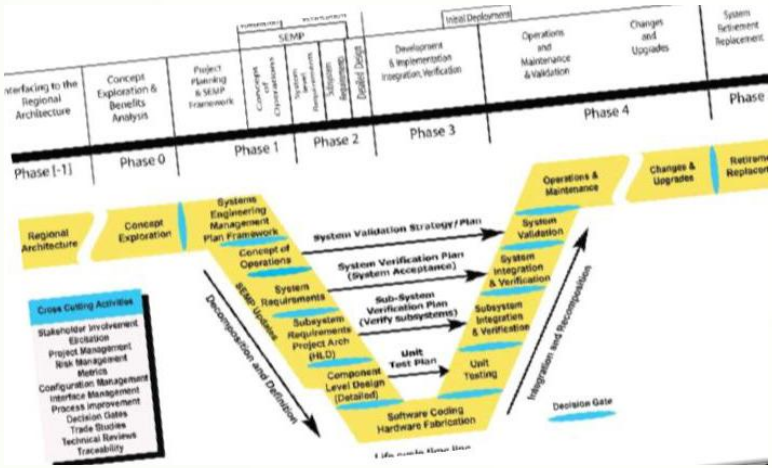


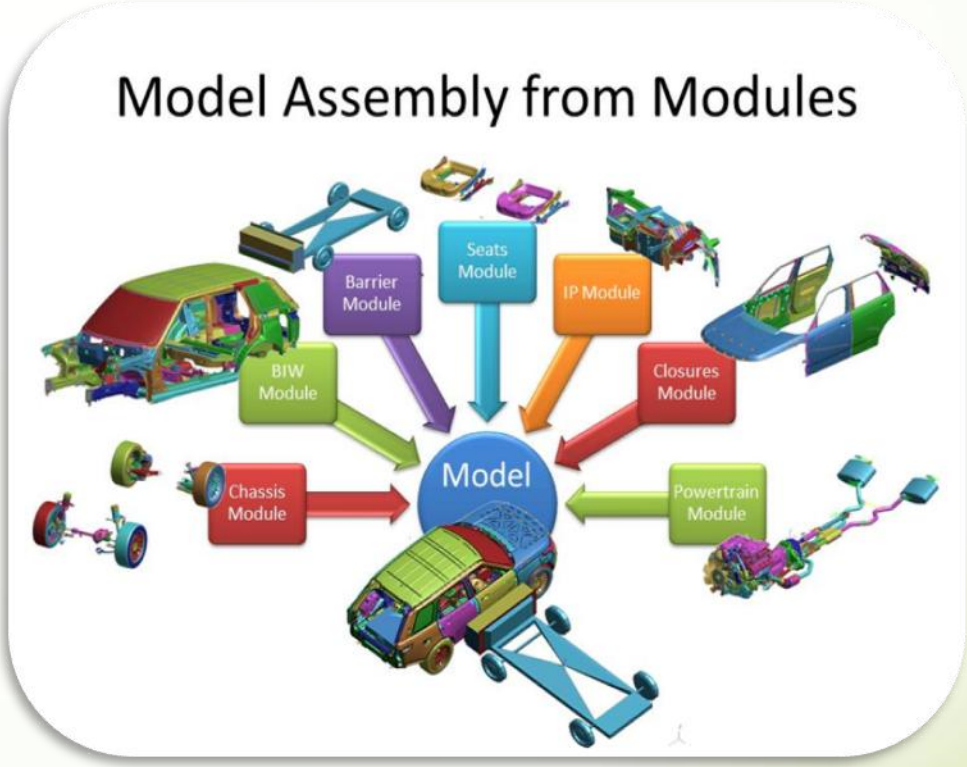
시스템 기반 제품개발-구조관리




End-to-End
프로세스를 위한
PLM

시스템 기반 제품개발

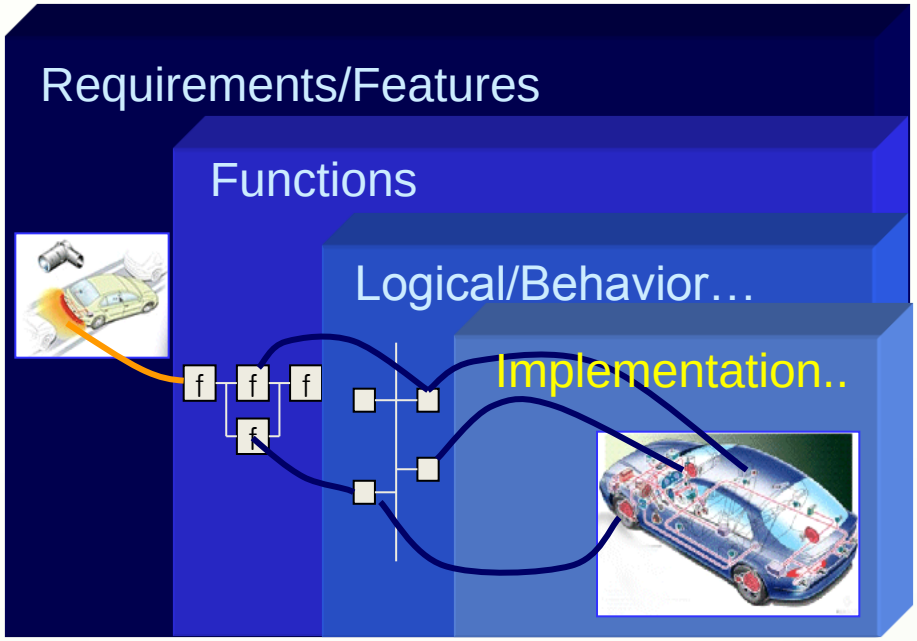

SEMP
Phase [-1]
Phase 0
Phase 1
Phase 2
Phase 3
Phase 4
Regional Architecture
Concept Exploration
Systems Engineering Management Plan Framework
Concept of Operations
System Requirements
Subsystem Requirements
Project Arch (HLD)
Component Level Design (Detailed)
Software Coding
Hardware Fabrication
Unit Test Plan
Unit Testing
Subsystem Integration & Verification
System Integration & Verification
System Validation
System Validation Strategy / Plan
System Verification Plan (System Acceptance)
Sub-System Verification Plan (Verify Subsystems)
Operations & Maintenance
Changes & Upgrades
Decision Gate
Cross Cutting Activities
Stakeholder Involvement Ecolution
Project Management
Risk Management
Metrics
Configuration Management
Interface Management
Process Improvement
Decision Gates
Trade Studies
Technical Reviews
Traceability


Model Assembly from Modules
Barrier Module
Seats Module
IP Module
BIW Module
Closures Module
Chassis Module
Model
Powertrain Module

시스템 기반 제품개발

Knowledge

- *Customer Value*
- *Regulatory*
- *Warranty*
- *Technology*
- *Competition*
- *Quality*



Detailed Design

- *Mechanical*
- *Electrical*
- *Electronic*
- *Software*
- *Simulation*
- *Test/V&V*

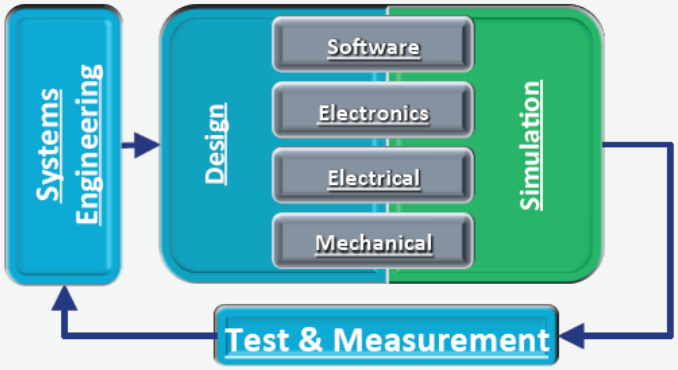
Core Capabilities

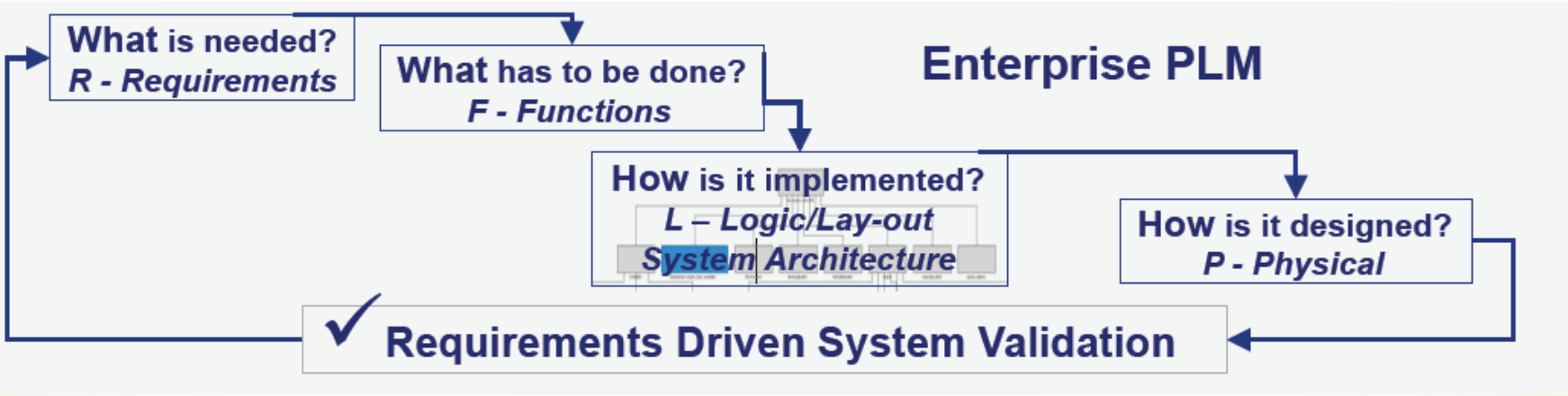
✓ Security
✓ Data Distribution
✓ Configuration Management
✓ Document Management
✓ Change Management
✓ Workflow Collaboration

TEAMCENTER

시스템 기반 제품개발

✓ Design Right First Time
Based on "Simulation and Test"

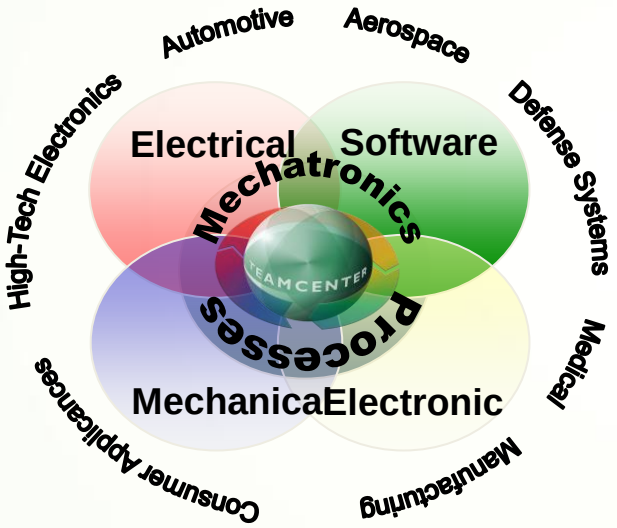


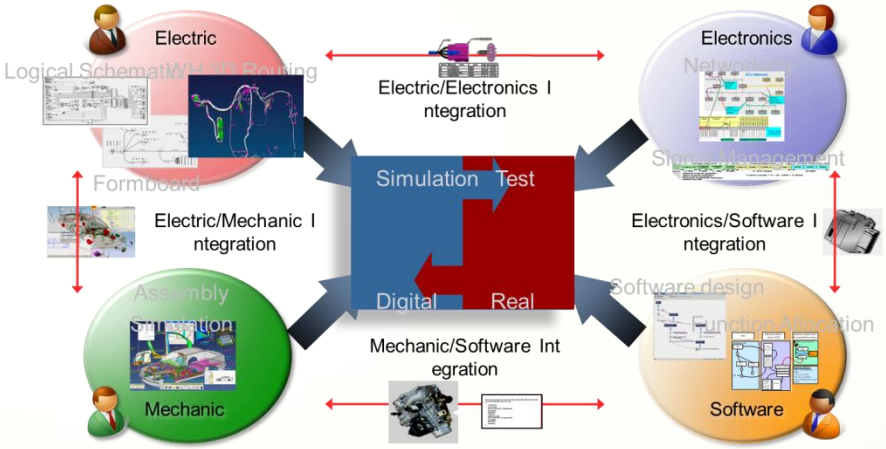


Core Capabilities

✓ Security ✓ Configuration Management ✓ Change Management
✓ Data Distribution ✓ Document Management ✓ Workflow Collaboration

시스템 기반 제품개발-Mechatronics

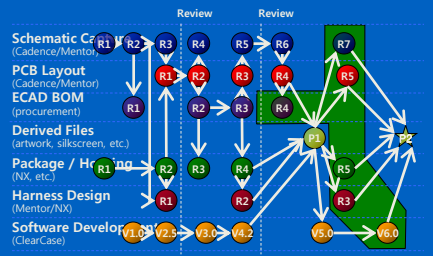




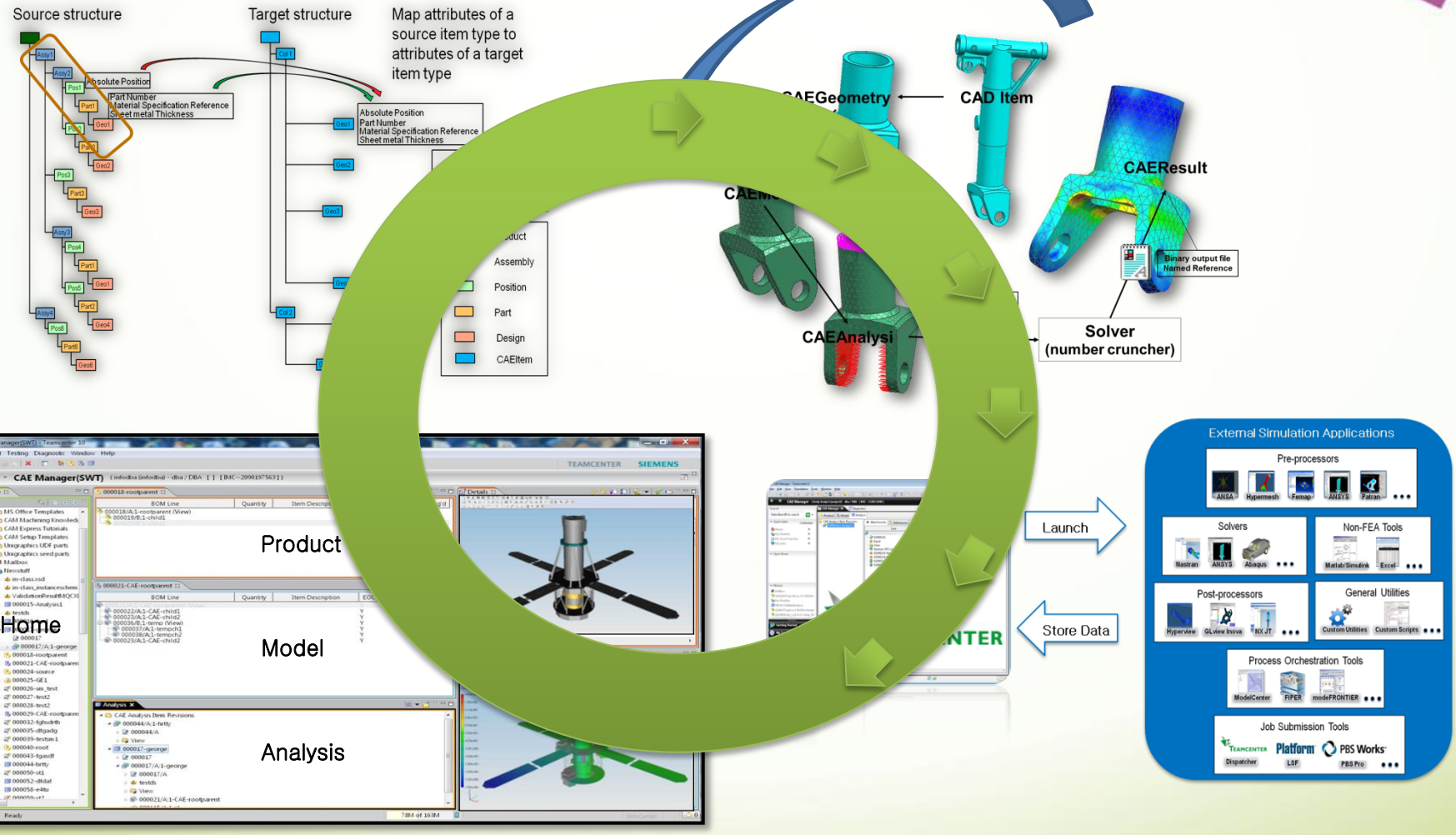
Teamcenter Mechatronics Data Model

Supported Standards

- ✓ STEP AP 210, 212, 214
- ✓ STEP AP 233
- ✓ PLM XML
- ✓ JT
- ✓ EDIF
- ✓ PDX*
- ✓ RosettaNet*



시스템 기반 제품개발-TC4Sim

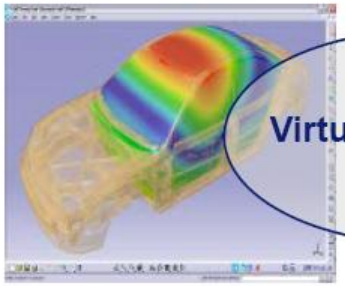


시스템 기반 제품개발-TDM in LMS

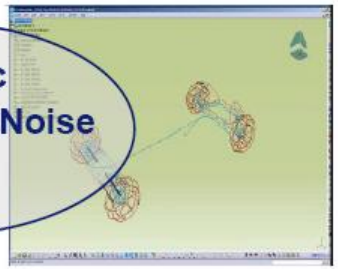
Realistic Simulation

Example: Test Based Tire Model for Road Noise Simulation

Test Based Virtual Tire



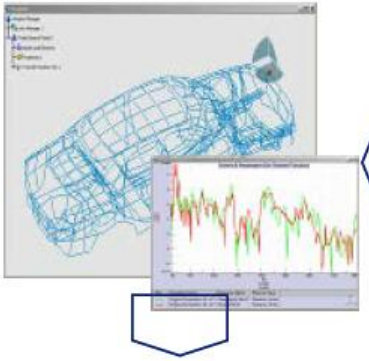
Realistic Virtual Road Noise Model



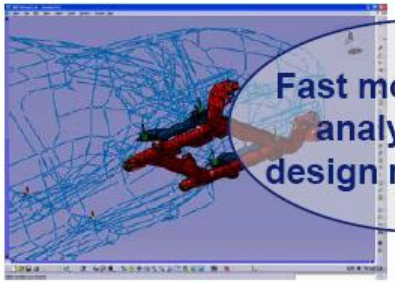
Vehicle Dynamics Model for Road Noise

Accelerated Simulation

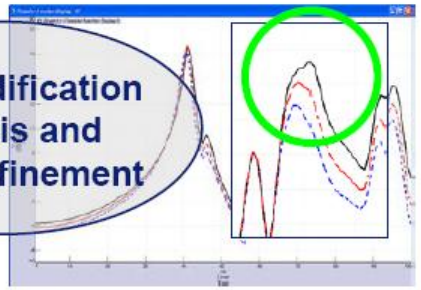
Example: Test Based Trimmed Body Model



Test Based Trimmed Body



Fast modification analysis and design refinement



Test – CAE Substructuring

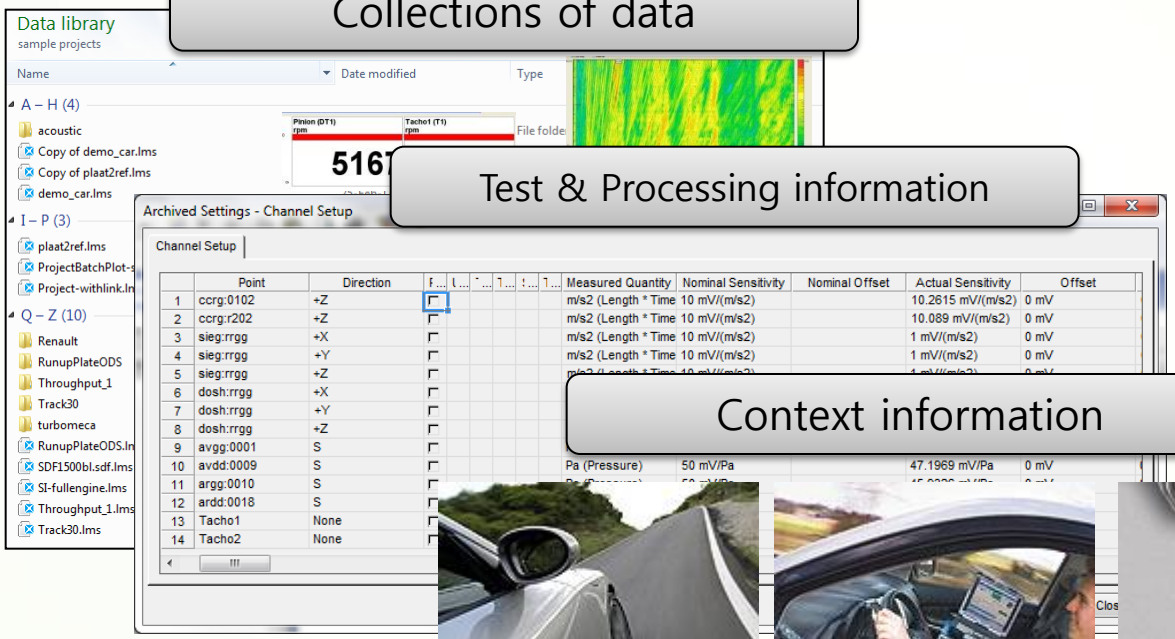
End-to-End 프로세스를 위한 PLM

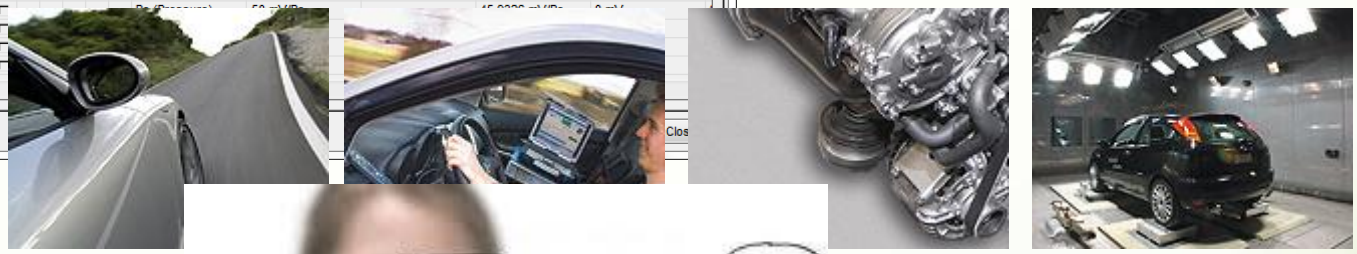
시스템 기반 제품개발-TDM with LMS

Collections of data

Test & Processing information

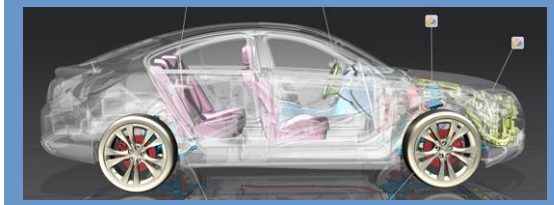
Context information



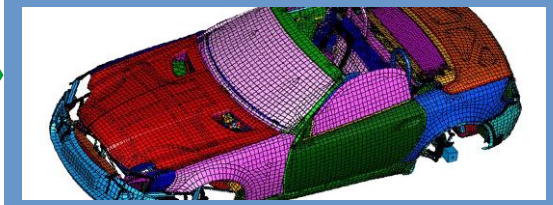


시스템 기반 제품개발

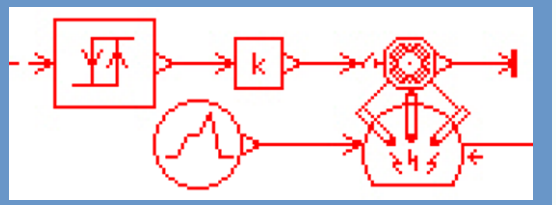
Product Design



Simulation



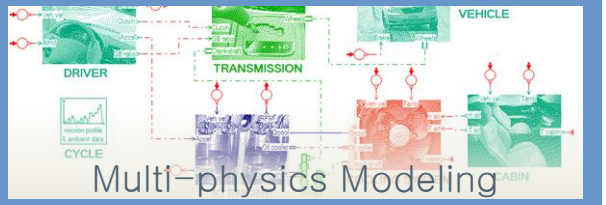
Controls Engineering



Mechatronic System Simulation

System Synthesis

System Data Management



Multi-physics Modeling

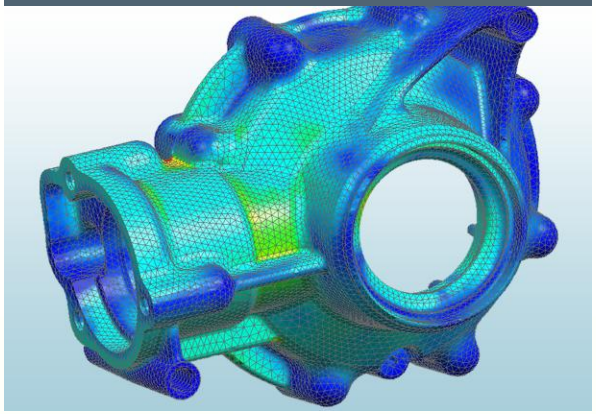
Test-based Engineering (modal, NVH, acoustics, durability)

Laboratory
Mobile
LMS SCADAS

시스템 기반 제품개발

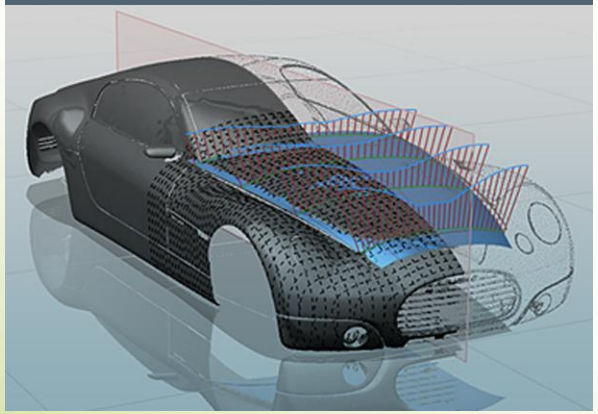
Customer Desires

Attribute Optimization

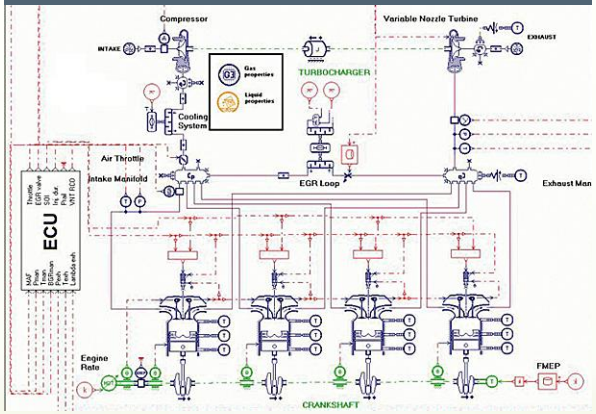


Styling and Geometry

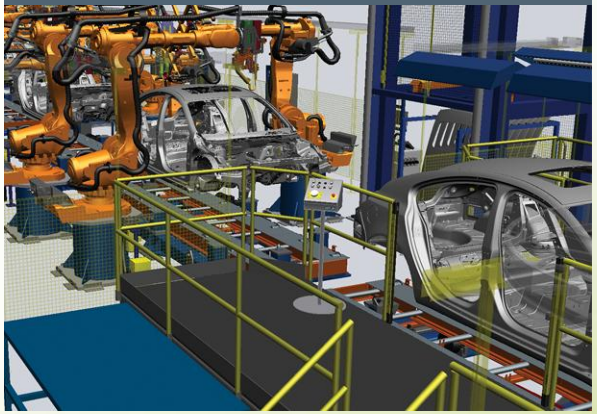
Testing

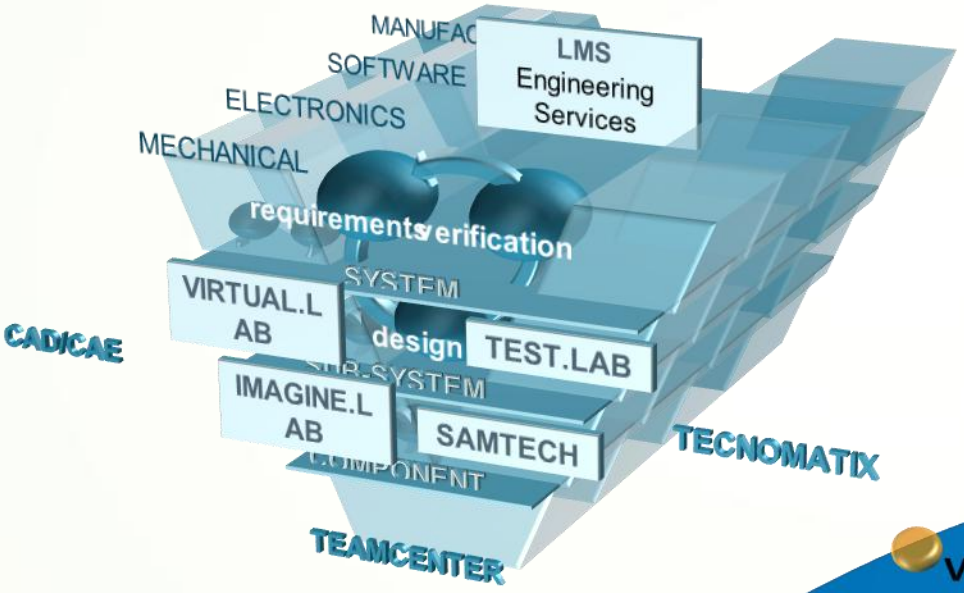


Hardware/Controls



Manufacturing





Systems-driven Product Development

Close Loop 개발 System을 통한 CostDown

Virtual과 Real의 Gap 추적 및 보완

Test환경과 결과의 보존 및 재활용

시스템 기반 제품개발-사례1

Challenge:

운동성능 향상을 위해 점점 더 복잡해지는 가변요소들을 프로토타입 이전에 최적화 하고 싶다.

Solution:

실제 물리적 테스트와 함께 모델 베이스, 멀티바디에 대한 시뮬레이션을 접목 시킴.

Results:

고객요구사항에 좀더 만족된 승차감과 핸들링을 구현함.

시스템 기반 제품개발-사례2

Challenge:

개발과정과 수리과정에서 엄청나게 증가하는 자동차에서 프로그램을 효율적으로 관리하고자 함.

Solution:

시스템 기반 제품설계를 이용 소프트웨어를 관리, 테스트, 검증함

Results:

소프트웨어의 재사용을 증가 시켜 $100 million이상의 warranty관리 비용을 세이브함

시스템 기반 제품개발-사례3

Challenge:

좀 더 친환경적인 차로 마켓에서 경쟁력을 갖추고 싶다.

Solution:

차량에 대한 모든 데이터를 한곳으로 모아 싱글소스를 구현 Physical prototype을 줄이고 검증된 디자인을 재사용 하도록 함.

Results:

개발기간이 20개월에서 10.5개월로 단축 되었고 릴리즈시 문제발생율이 80% 줄었음

감사합니다.