NGEA, Next Generation Electrical Architecture

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Overview of the Next Generation Electrical Architecture

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NGEA – a Vinnova partly financed project

Vinnova is Sweden's innovation agency

FFI - Strategic Vehicle Research and Innovation program within Vinnova

FFI is a partnership between the Swedish government and automotive industry for joint funding of research, innovation and development

http://www.vinnova.se/en/FFI---Strategic-Vehicle-Research-and-Innovation/

The NGEA project is a project within the Vinnova, FFI - Electronics, software and communication branch (EMK)
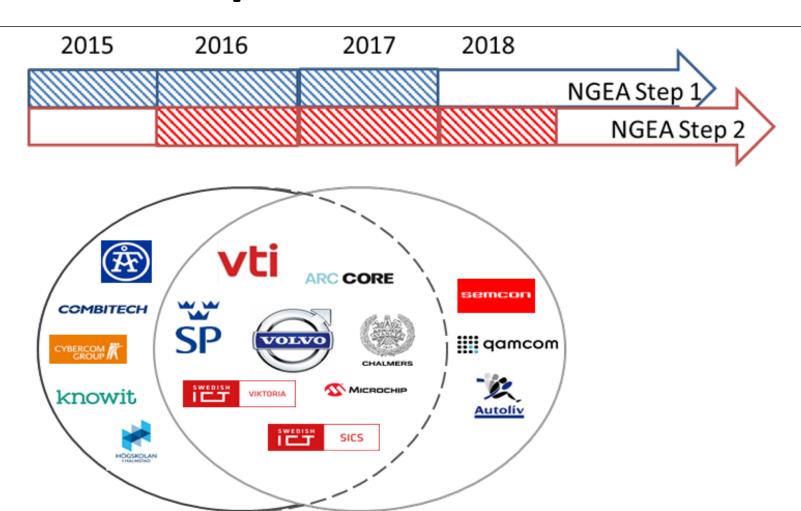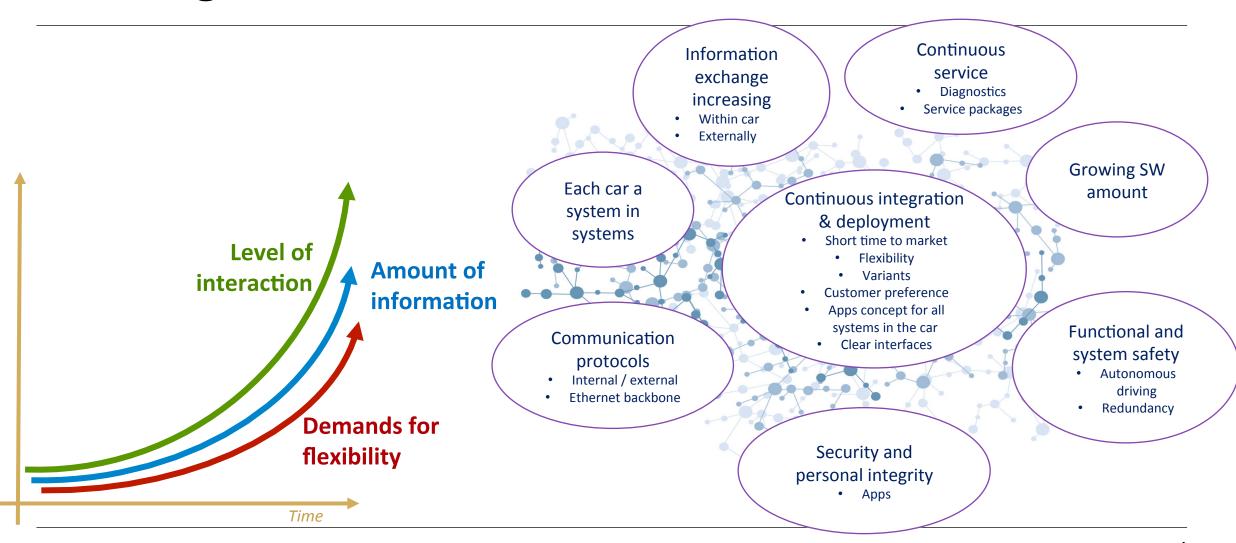
NGEA – two steps

Challenges for future electrical architecture

Level of interaction

Amount of information

Demands for flexibility

Time

Information exchange increasing
- Within car
- Externally

Continuous service
- Diagnostics
- Service packages

Each car a system in systems

Growing SW amount

Continuous integration & deployment
- Short time to market
- Flexibility
- Variants
- Customer preference
- Apps concept for all systems in the car
- Clear interfaces

Communication protocols
- Internal / external
- Ethernet backbone

Functional and system safety
- Autonomous driving
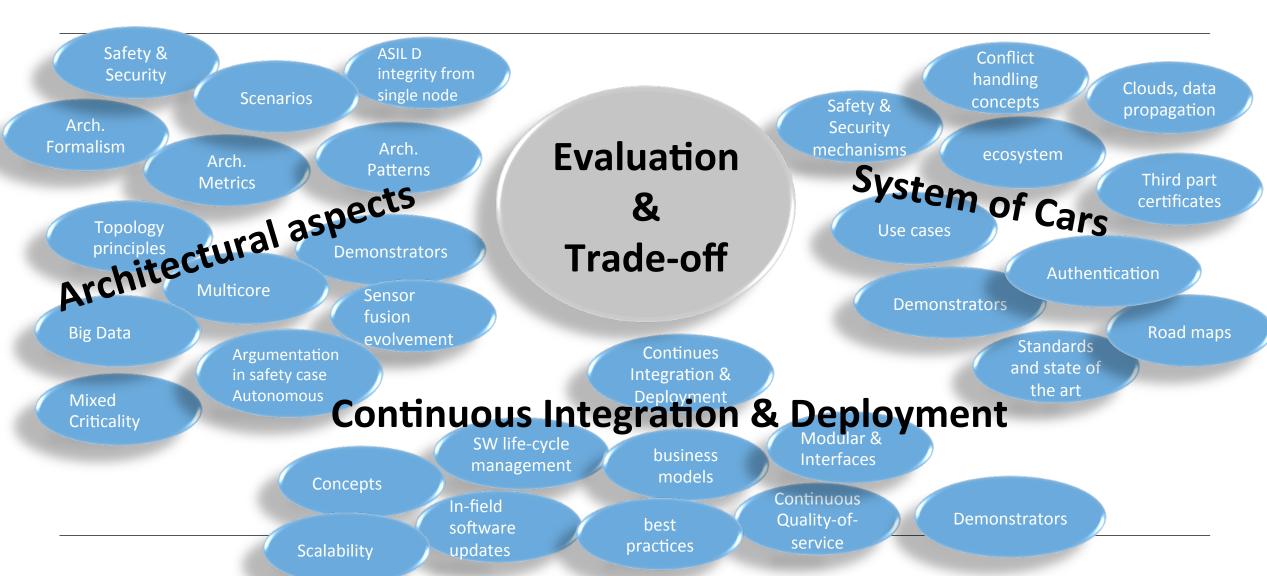- Redundancy

Security and personal integrity
- Apps

NGEA - Expected Impact and results

NGEA

The NGEA project will develop processes, studies and proof of concepts to improve the competiveness of the automotive industry in Sweden and strengthen the research in different fields:
- Architecture and infrastructure for continuous integration and deployment
- Evaluation of large-scale and cross-organizational cooperation strategies
- Methodology and organizational patterns
- Reports system of systems use cases, road map, architecture and requirements on vehicle architecture
- Journals/Conferences/Workshops/Scientific papers

NGEA – Focus areas

NGEA

Evaluation & Trade-off

Architectural aspects

- Safety & Security
- ASIL D integrity from single node
- Scenarios
- Arch. Formalism
- Arch. Metrics
- Arch. Patterns
- Topology principles
- Demonstrators
- Multicore
- Big Data
- Sensor fusion evolvement
- Argumentation in safety case Autonomous
- Mixed Criticality

System of Cars

- Safety & Security mechanisms
- Conflict handling concepts
- Clouds, data propagation
- ecosystem
- Third part certificates
- Use cases
- Authentication
- Demonstrators
- Road maps
- Standards and state of the art

Continuous Integration & Deployment

- Continues Integration & Deployment
- SW life-cycle management
- business models
- Modular & Interfaces
- Concepts
- In-field software updates
- best practices
- Continuous Quality-of-service
- Demonstrators
- Scalability

NGEA – Evaluation & Trade-off

Evaluation
&
Trade-off

To evaluate all of the focus areas different concepts, NGEA will develop an customized evaluation process in order to find architectural approaches and important trade-offs.

NGEA deliveries within System of cars

- Report on:
  - Architectural Concepts for system of systems in future transport systems
  - Standards and state of the art
  - Technical and methodical framework
  - Use Case & requirements on vehicle architecture
  - Road map for connected vehicle & business opportunities
  - Architectural strategies for dependable and robust system of cars
  - Clouds and data propagation
  - Safety & security mechanism for system of cars
  - Verifying emergent properties
  - Car within system of system
  - Third part certificates
  - Authentication
  - System of cars as an ecosystem

NGEA deliveries within System of cars

- Demonstrators for system of cars to investigate and select concepts:
  - Will make use of existing simulators
  - V2x on test tracks to demonstrate scenarios

  Will produce technical reports on the simulation environment

NGEA

Thank You.