



geensys

*Global Embedded Electronics & Networked System  
Solutions*

**Sphinx**

**An Industrial Strength Tool Platform Fostering  
Model-driven Development of Embedded Systems**

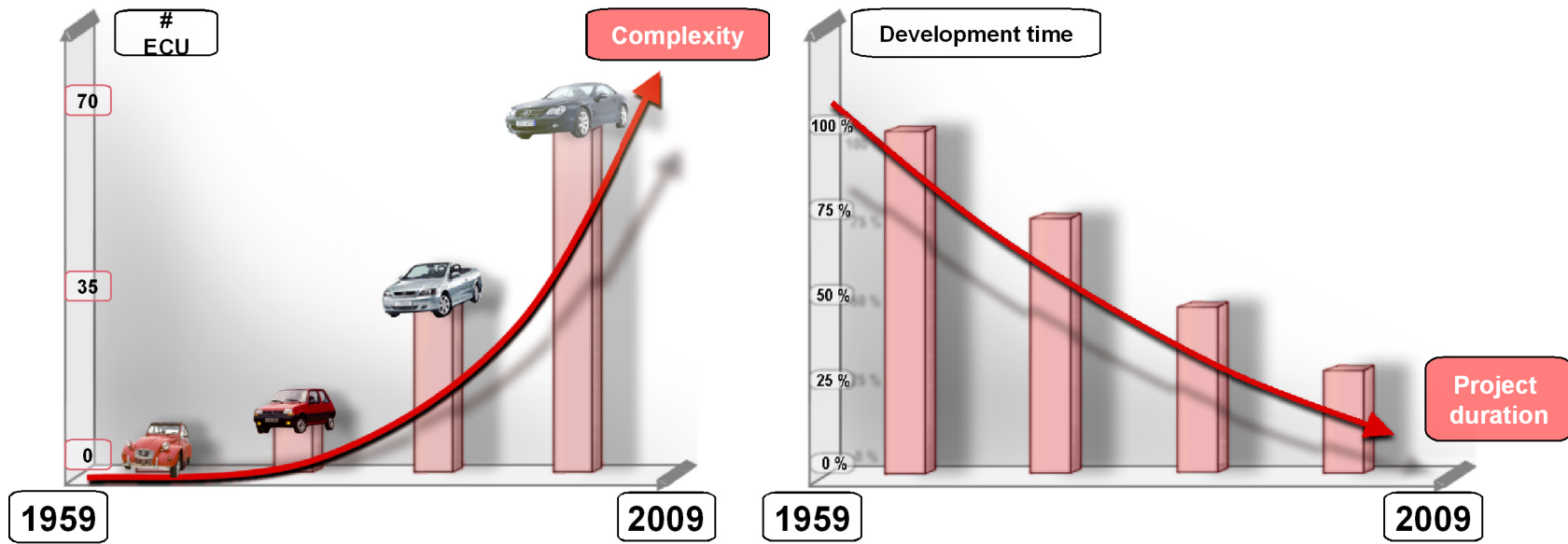
Dr. Stephan Eberle

2011-01-26

- **Stephan Eberle**
  - ❑ Development manager at See4sys in Paris, France
  - ❑ Lead of Artop Core and Validation
  - ❑ Sphinx project co-lead
  - ❑ Frequent speaker at conferences and events

- ▣ **About Embedded System Design Tooling**
  - What has happened in Eclipse so far?
  - New: The Sphinx project
  - Wrap-up

# Increasing Complexity & Expectations



Compliance with quality and safety standards:

DO 178B

CMMI



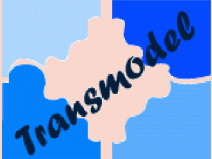
IEC 61508

DO 254

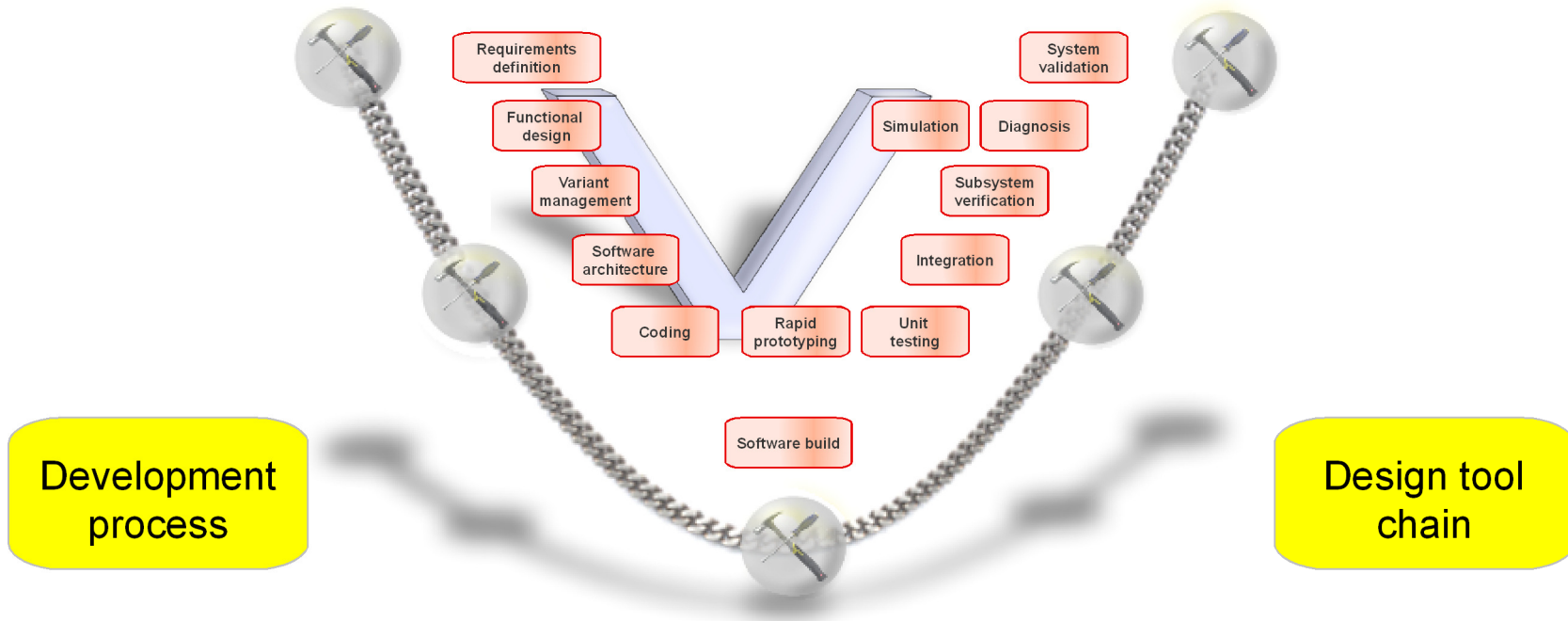
ISO 26262

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# Domain-Specific Design Standards

Design Standard	Covered Aspect	Target Domain
 AUTomotive Open System Architecture	Software architecture	Automotive
ODX Open Diagnostic data eXchange format	Diagnosis	Automotive
RIF Requirements Interchange Format	Requirements definition	Automotive
 AADL Architecture Analysis & Design Language	Software architecture	Aerospace
	Software architecture	Transportation

# Goal: Integrated Full Lifecycle Tool Support



- ▶ Support of multiple domain-specific standards/methodologies in parallel
- ▶ Support of user-defined development practices

# Outline

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# Two major initiatives: Artop & Papyrus

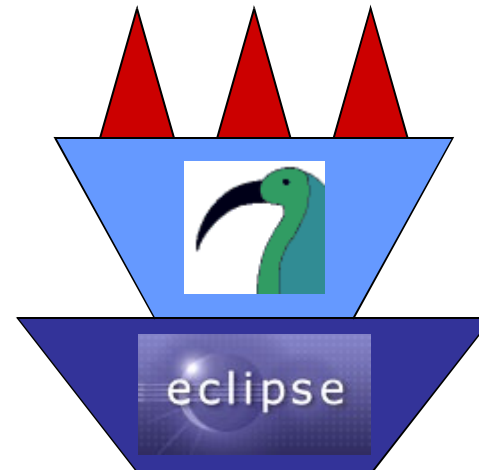
Since Oct 2008:

## Artop

The logo for AUTOSAR, featuring the word "AUTOSAR" in a bold, black, sans-serif font. The letter "O" is stylized with a red circular element.

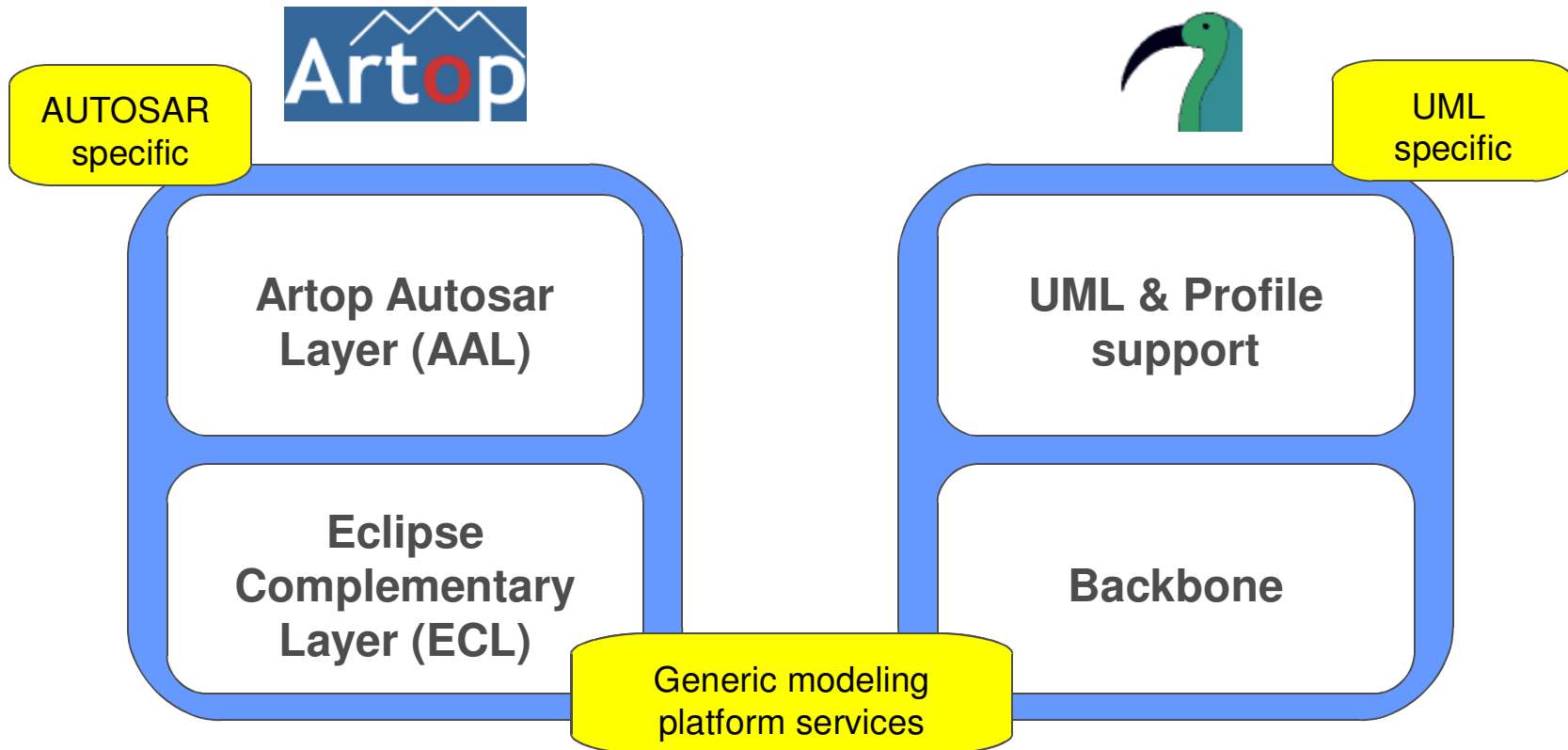
Since Nov 2008:

## MDT Papyrus

Logos for SysML.org and UML/MARTE. The SysML.org logo features a stylized "U" and "ML" in yellow and blue. The UML/MARTE logo features a clock icon and the text "UML" and "MARTE" in blue.



# Artop & Papyrus



- ▶ Common need for generic services enabling IDE-like tool support for modeling languages
- ▶ Common need to meet scalability and robustness requirements of real world industry use cases

# Outline

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# Genesis of Sphinx

- New **Eclipse MDT project** providing an **integrated modeling tool platform**
- Main use case:

**Modeling language(s) + Sphinx**

**Industrial strength  
integrated modeling tool environment**

- Initial contributions from
  - AUTOSAR-independent layer (ECL) of **Artop**
  - Backbone of **Papyrus**

# Key Services

- **Minimum effort modeling IDE support**

- Model explorer views
- Form editors
- Compare & merge editor
- Validation & problem indication
  
- Draft: GMF-based graphical editors
- Draft: Xpand-based code generation
  
- Planned: Graphiti-based graphical editors
- Planned: Xtext-based textual editors

# Key Services

- **Model-oriented viewing and editing**
  - ❑ Explorers, editors, compare/merge, etc. capable of acting upon individual model elements rather than just entire resources
  - ❑ Shared model instances and common load-edit-save-unload lifecycle
  - ❑ Automatic synchronization of model instances with workspace resource changes
    - Model load upon creation/drap & drop of new file
    - Model reload upon file change,
    - Model unload upon file/project deletion
    - ...

# Key Services

- **Multi-model support**
  - ❑ Multiple models based on same metamodel
  - ❑ Models based on different metamodels
  - ❑ Models based on different versions of same metamodel
  - ❑ Migration of models between different metamodel revisions
  - ❑ Extensible scoping of resources belonging to same model instance; used for
    - Loading, unloading complete models
    - Proxy resolution
    - Model-level dirty state tracking and saving

# Key Services

- **Handling of large models (scalability)**
  - ❑ Operation on shared model instances rather than loading individual instances in every editor/view
  - ❑ Performance-optimized content type detection
  - ❑ Fast proxy resolution, avoidance of repeated unsuccessful proxy resolution attempts
  - ❑ Memory-optimized unloading of models
  
  - ❑ Planned: Model repository integration
  - ❑ Planned: Model indexing service

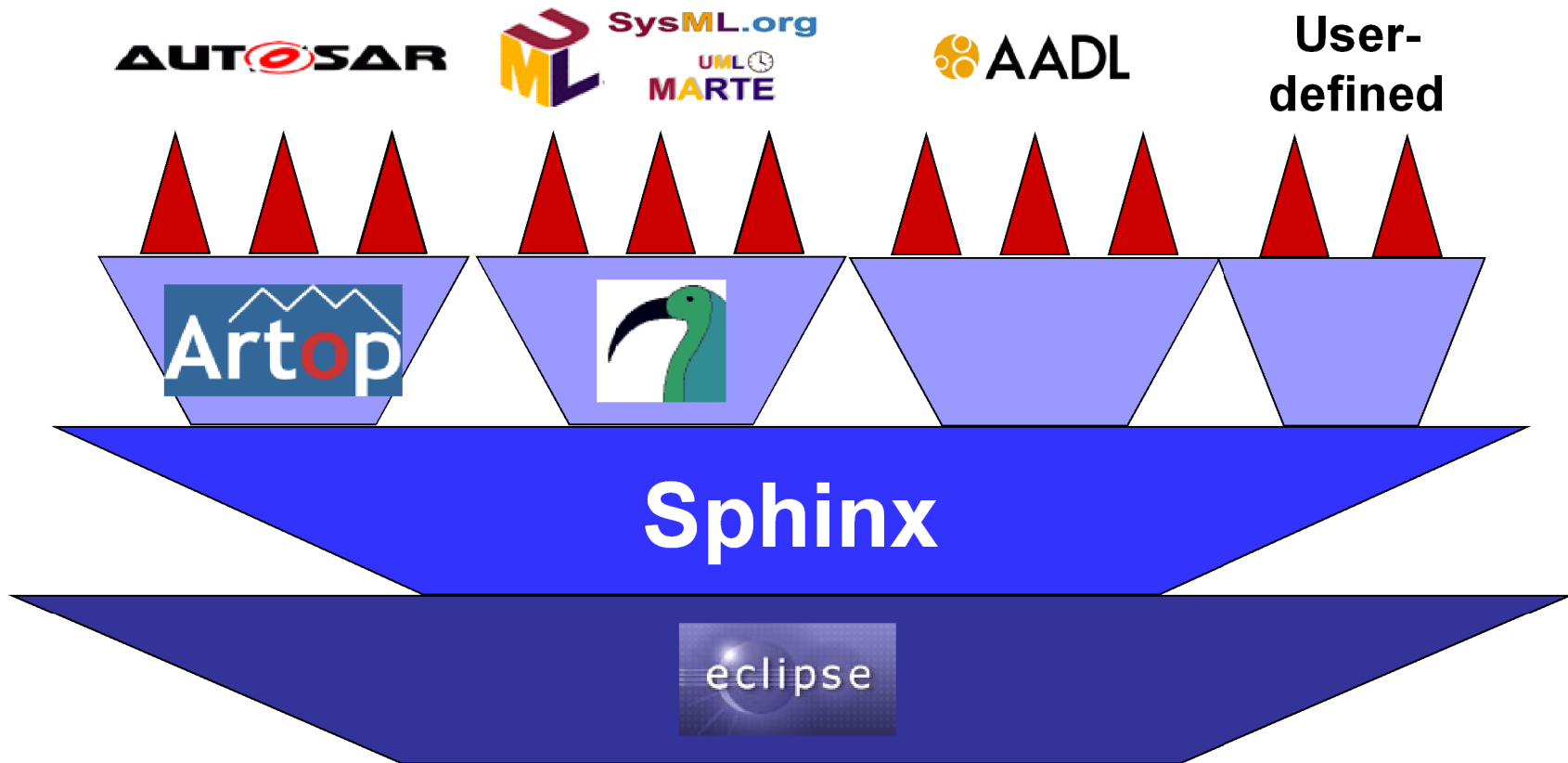
# Key Services

## ▪ Robustness

- ❑ Loading of damaged models & problem indication
- ❑ On-the-fly XSD validation
- ❑ Thread-safe sockets for explorers, editors, property sheets
- ❑ Thread-safe APIs for asynchronous loading/unloading large models



# Mission of Sphinx



- ▶ Reduced effort in tool-supporting design standards/practices
- ▶ Increased cross-vertical interoperability

# Mission of Sphinx (cont'd)

- Beyond embedded system design tools

**Sphinx**

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**General purpose  
integrated modeling tool platform**

- Participation in
  - ❑ Modeling Platform IWG
  - ❑ Automotive IWG

# Wrap-up (cont'd)

- Current Status
  - ❑ Project created and provisioned
  - ❑ Initial code contribution from Artop almost done
    - Preliminary IP review passed
    - Checked-in to Eclipse SVN
    - Awaiting some last updates accumulated on Artop SVN

# Wrap-up (cont'd)

- Next Steps
  - ❑ February 2011: Migration of Artop to Sphinx
  - ❑ February 2011: Downloadable stable Sphinx builds
  - ❑ March 2011: More contributions from See4sys:
    - Advanced Model Explorer customization support
      - Transient category nodes
      - Referenced elements as children
    - Support of Xpand-based code generation
      - Generation from models already loaded and managed by Sphinx
      - Workflow-less invocation from selected model element
    - Support for Graphiti-based graphical editors

# Wrap-up (cont'd)

- Next Steps
  - ❑ Later in 2011: Contribution from SAP:
    - Scalable EMF Event Manager from SAP
  - ❑ Later in 2011: First Sphinx release

# Thank you!