Model Based System Engineering with AMUSE and Enterprise Architect
Lieber Lieber in Brief

- Austrian Company
- Preferred Partner of Sparx Systems Central Europe
- 20 Engineers
- 3 Focus Areas
- Tools and services for MDE with EA
- Multitouch Solutions
- Services for Financial Sector
Model Engineering with EA

- AMUSE, EnArSpy, EnArWeb, EnArXmi, ...
- Validation Rules
- Extensions / Add-ins
- Code Generation Templates
- MDG Technologies / UML Profiles
- Legacy Import/Export
- Custom Reports
- Integration with other Tools
- Consulting / Training
Enterprise Architect
Visual Modeling Platform

- Multi-user Modeling-Platform supporting UML 2.4 & SysML 1.3 for:
  - Systems and Software Engineering
  - Requirement Engineering
  - Real-time and embedded development
  - Business and IT development, etc.

- Full traceability from requirements to deployment
- Code engineering in over 10 languages
- Generation of documentation from the model
- Scalable, team-based repository
- Rich import/export capabilities: XMI, CSV, etc.
- Integration with Eclipse, Visual Studio, Doors, SVN, etc.
Enterprise Architect
Visual Modeling Platform

UML 2.3 / SysML 1.2

Analysis & Requirements → Design → Implementation → Testing → Rollout

Tracing, Documentation, Validation, Simulation, etc.

Projekt Management

DOORS    MS Office    MS Visual Studio    Eclipse    XMI, csv    etc.
How we work together

<< founder >>
Geoffrey Sparks

<< manager >>
Hans Bartmann

Sister Company

Central Europe

<< manager >>
Daniel Siegl

Partner Company

<< founder >>
Peter Lieber

Partner Company

EA Extensions
Customer Projects
Consulting

Wien

EA Development
Sales

Australia

Partner Company

Wien

Resale
Consulting
Trainings
Kosten- und Zeitveränderungen durch die modellbasierte Softwareentwicklung entlang der einzelnen Entwicklungsphasen und in Gesamtsicht

Hypothese 1
Durch MBSE sind Zeiteinsparungen von mindestens 30 Prozent möglich.

Ergebnis: **VOLL BESTÄTIGT**

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What is UML / SysML?

What is UML or SysML? Just a Language!

Who I can communicate to?
Useful for communication:
- Humans to Human
- or Human to Machine

What I can communicate?
Using language I can:
- Communicate Concepts
- Specify Systems (reference-book)
- Develop executable Models
**Tools, Processes, Methods ...**

**Language:**
- UML
- SySML
- C#
- etc.

**Tools:**
- EA
- MS Office
- Doors
- etc.

**Methodology:**
- Harmony
- FAS
- EnArSys
- etc.

**Development Process:**
- Agile
- V-Process, etc.
  (Roles, milestones, artifacts)

**Tools, Processes, Methods ...**

- UML Profile
- Model structure
- Docu / Code Templates
- Model
- etc.
Intelligence of Engineering
Where it is hidden?
Systems Engineering

- Requirements
- Systems Engineering
- Architecture
- Behaviour

- AMUSE Model Simulation & Code Generation
AMUSE Objectives

- Assist in reaching better System Design
- Care of Model Correctness and Consistency
- Manage Complexity by Separation of Functionality and technical Realization
- Improve Communication between Stakeholders
- Assist in correct Usage of UML/SysML
Enterprise Architect at Glance

Your State Machine or Activity

UI Sketch using EA

Other class behaviors
AMUSE - At a Glance

- Your State Machine or Activity
- Other class behaviors
- Generated GUI from UI Sketch

UML Debugging
- Instance-Values
- Event Simulation

Trace Viewer (filter, sorting, export)
AMUSE From Concept to Product

Abstraction (Granularity)

Requirements

Mock

Conceptual Model

Code Generation

Level of Details

Requirement Engineer

System Engineer

Developer

User
Mock Objects and External Libraries

- Enterprise Architect
  - Mock
  - State Machine Behavior
  - Activity Behavior

- Model Simulation Engine (MSE)
  - External Libraries
  - Mock-Object
  - API Application Interface
  - External Systems Interface

- Externe Systems Interface
  - Existing Applications

- AMUSE
What it is about – Behavior?

First Class

+ MyPublicAttribute
- MyPrivateOperation()
+ MyPublicOperation()

Behaviors

State Machines

My StateMachine

Activities

My 1st Activity  My 2nd Activity

Interactions

int My Interaction
UML Communication Concept

First Class
+ MyPublicAttribute
- MyPrivateOperation()
+ MyPublicOperation()

Behaviors
State Machines
Activities
Interactions

Second Class

«signal» sigMySignal

My StateMachine

My 1st Activity
My 2nd Activity

int My Interaction

Change Event
Call Event
Signal Event
Time Event

My StateMachine

5

5
UML State Machine Concept

State1

- Initial
- trgMySignal
- /My 1st Activity
- IsFinished
- [false]
- Guards
- Transition
- Final

State2

- PseudoState
- Signal Event
- Time Event
- trgTimer_10
- + ontry / onEntry
- My 2nd Activity
- trgMySignal
- Action
- Trigger

Node [false] connected to Node [true].
Embedded Engineering
EA + AMUSE + Willert Tools

EA & AMUSE
- Create new Embedded C EA Project
- Create & Validate Model
- Generate and Deploy Code
- Offline UML-Model Debug
- UML Trace Information
- UML Target Debugger
- Debug Binary Code based on UML Model

IDE
- Activity Initial
- Create new IDE Project
- Add generated Code and Framework Code to IDE Project
- Compile Code and Deploy Code on Target
- Debug Component
- Debug Info
- Binary Code

Legend
- LieberLieber Responsibility
- Willert Responsibility
- 3'd Party Responsibility
Danke!

Wir sehen uns bei unseren Stand