PI-Data AG

SysLand Toolbox 2017/18

PI-Data AG

Established 1991

Mobile Software stands for
– Automobile – The industry of our most important customers
– Mobile Devices – App development sice 2000 – much longer
  than the word "app" exists
– Mobile Minded – We are meeting IT challenges and creating
  innovative solutions.

SysLand Toolbox – The UML Toolbox by PI-Data
– 9 years of concentrated Enterprise Architect expertise at
  Daimler AG
– Big number of users: 6 functional safety projects and 4 model-
  ling projects at Daimler AG
– PI-Data is bridge between users
– High tool quality by large number of users

Philosophy
– Listen to customer and identify its needs
– Use existing standards whenever useful
– Develop and optimze tools based on real life projects

Why SysLand

SysLand Toolbox advantages
– Simplifies working with Enterprise Architect
– Partially hides complexity of modelling
– More efficient working (less clicks)
– Interfaces to DOORS and Excel
– Powerful features are based on UML standard api (enables
  easy migration to another UML-Tool – Rhapsody already in
  work)

What is SysLand Toolbox?
– Java application with JavaFX user interface
– Started by an EXE file, then launches Enterprise Architect
– Works like another toolbox for Enterprise Architect
– Installation does not require administrative rights
– Needs actual Java 8 Runtime, at least 1.8_121 (may be placed
  on disk without installation)

Further parts of SysLand
– Modelling methodology for functional networks
– UML Profile

SysLand development process

No license costs

Each customer or project
– benefits from development of all other customers
– provides features developed for him to all other customers
– is required to finance development of new features

Process for adding new features to SysLand
– Conceptual design together with PI-Data
– Specifiaction in PI-Data's ticketing system (YouTrack), visible to all customers
– PI-Data coordinates new features with needs of other projects
– PI-Data cares about the master plan for SysLand and organizes user meetings
– After effort estimation by PI-Data the customer can order the feature

Development process
– Agile development in 14-day sprints
– Releases based on customer needs, typically every 3 to 6 sprints
– Ticketing system (YouTrack) is used for error reports and feature requests

SysLand-Toolbox overview

Modelling helpers

– Replace many click by a single one

– Care about consistency when creating multiple dependent elements

Navigation aids

– Search and replace

Layout helpers

– Arrange pins on same level

– Inputs on the left, outputs on the right
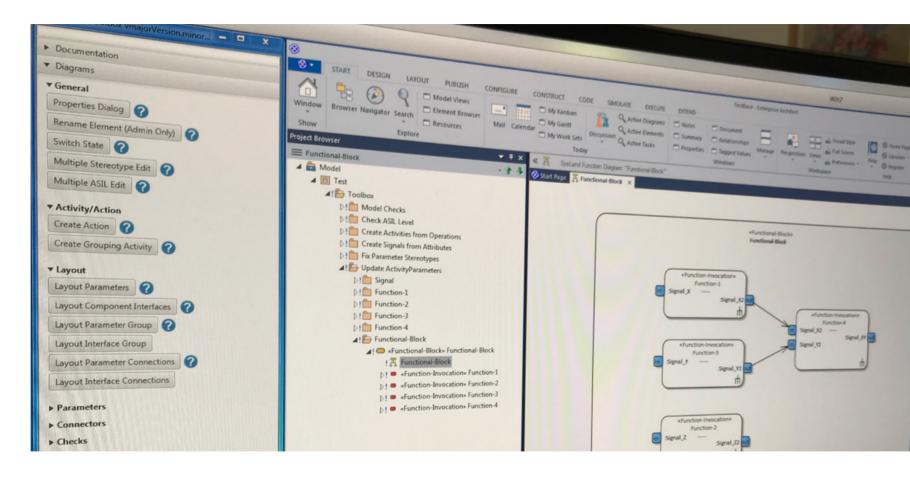
– Arrange pins/parameters to have same distance

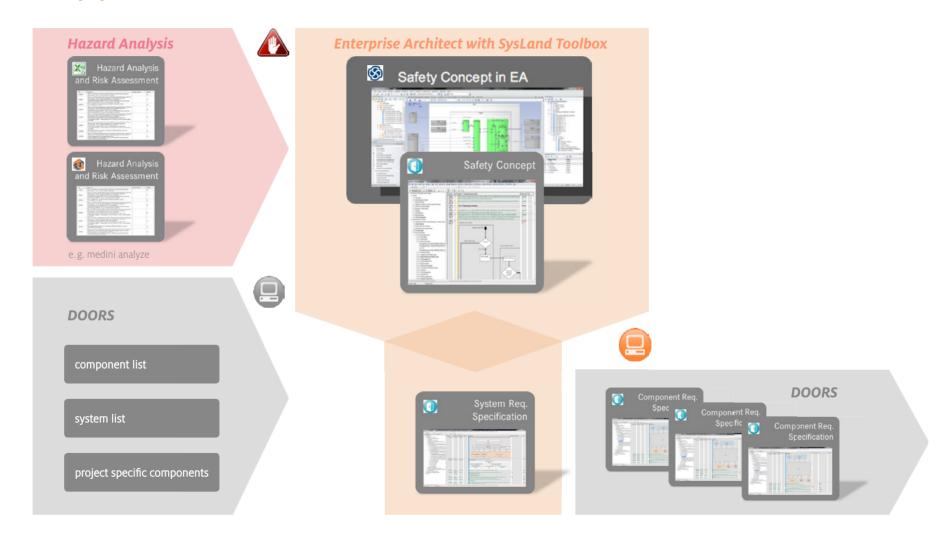**Modell checks**

– Care about adherence of modelling rules

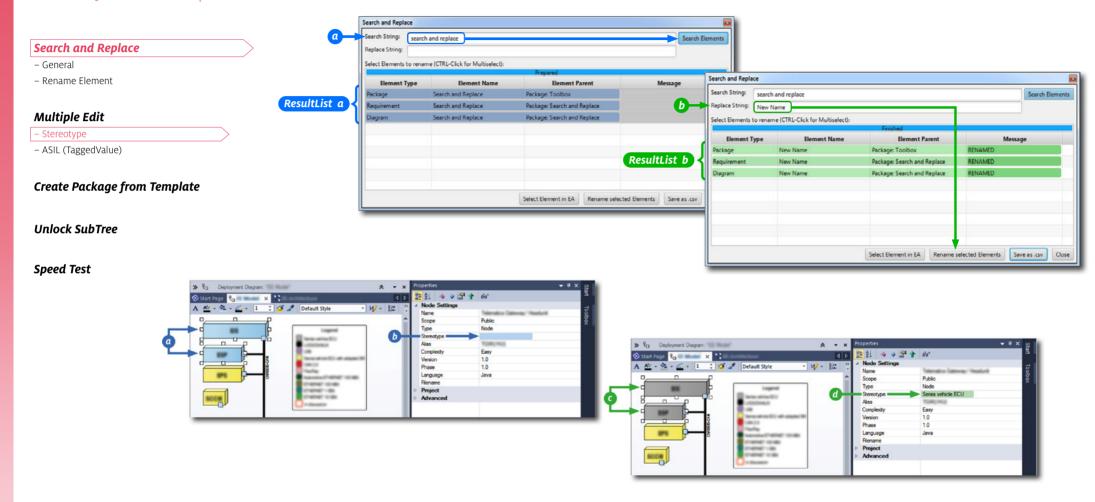**Import/Export**

– Excel

– DOORS

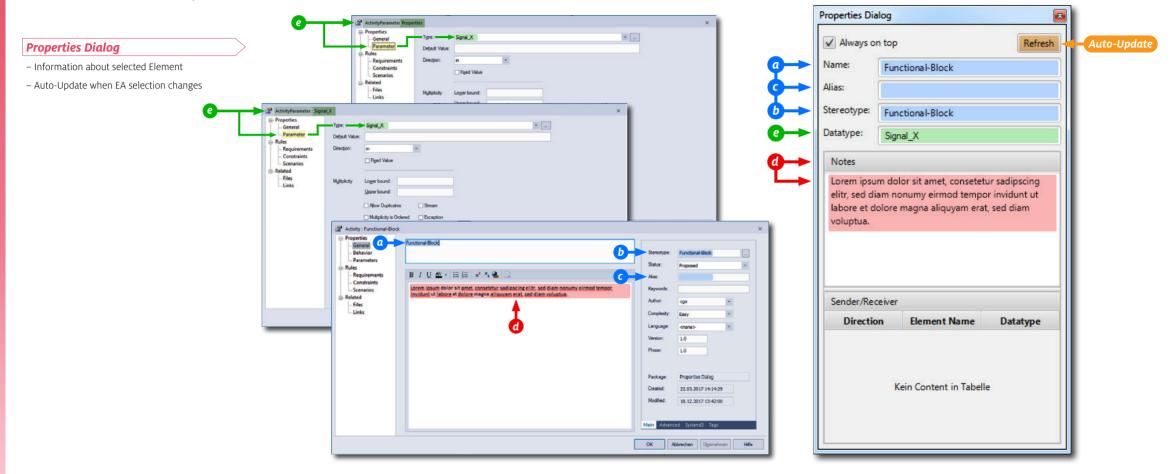**Voluminous help documents**

Toolbox in context of functional safety

Hazard Analysis

Hazard Analysis and Risk Assessment

Hazard Analysis and Risk Assessment

e. g. medini analyze

Enterprise Architect with SysLand Toolbox

Safety Concept in EA

Safety Concept

DOORS

component list

system list

project specific components

System Req. Specification

Component Req. Spec.

Component Req. Specific

Component Req. Specification

DOORS

General features   *1* | 4

Search and Replace
– General
– Rename Element

Multiple Edit
– Stereotype
– ASIL (TaggedValue)

Create Package from Template

Unlock SubTree

Speed Test

General features   **2** | 4

Properties Dialog

– Information about selected Element

– Auto-Update when EA selection changes

Meta Model Check

message column

General features *4* | 4

PlantUML integration

Activity Diagram   *1* │ 2

Create Actions and Activties

– Create Action » CallBehaviorAction incl. Activity

– Create Grouping Activity » Replace Group of Actions by CallBehaviorAction

– Create Activity from Action

– Create Activities from Operations

Activity Parameters

– Add incoming/outgoing
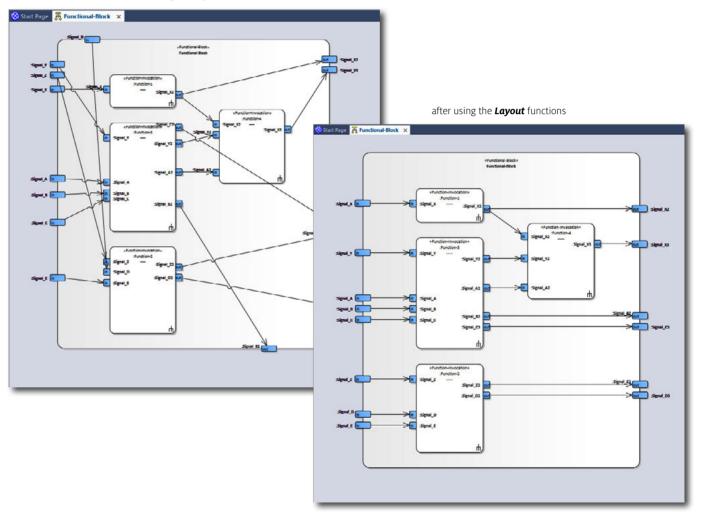
– Set Direction

– Create outer Parameters

– Fix Pins

Layout

– ActivityParameters

– ActionPins

Create Connectors

– Connect matching Pins of Actions

– Connect Parameters and matching ActionPins

before using the **Layout** functions

after using the **Layout** functions

Activity Diagram   *2* │ 2

Diagram Checks

– Check if types of connected ActionPins matches
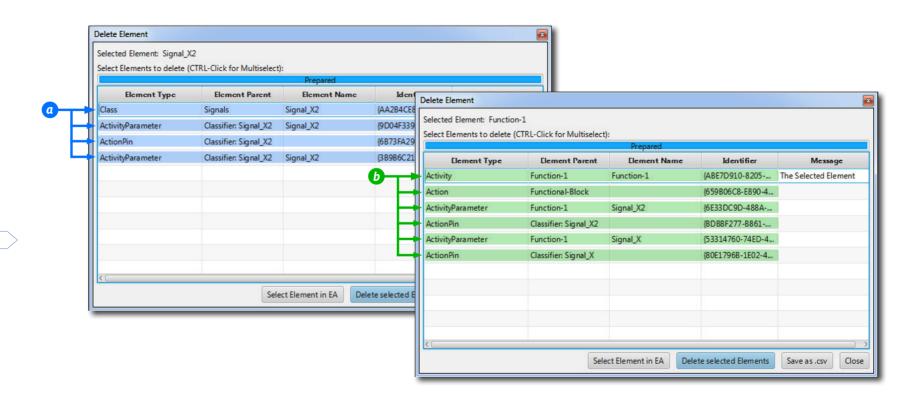
EA Bug workarounds

– Fix Parameters

Parameters

– Update ActivityParameters

– Add incoming/outgoing Parameter

Delete Element incl. dependent Elements
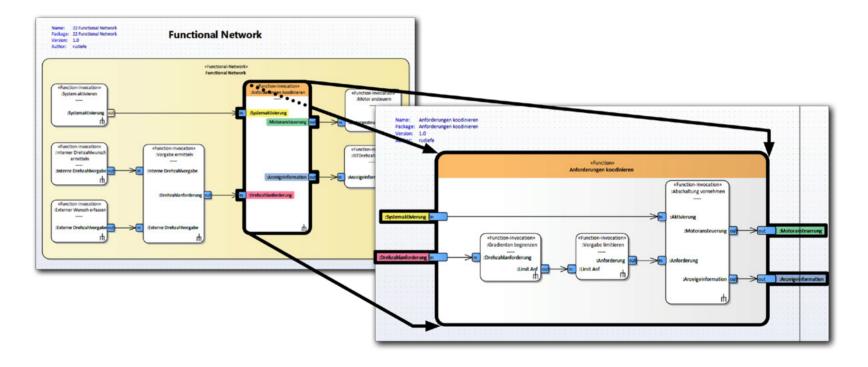
– Action, Activity, ActionPin, ActivityParameter, Signal

Functional-Network   *1* │ 4

Graphical development of functional safety

– More overview in EA compared to DOORS
– DOORS-Links can be created in EA
– Creation of functional network:
  · Function
  · Allocation on components
  · Signal flow
  · Grouping functions, e.g. for each control unit

Extra view for each safety goal

– Hide not relevant functions
– Feature for transferring changes on master network to clones
– Write safety requirements and assign them to functions
– Write acceptance criterias
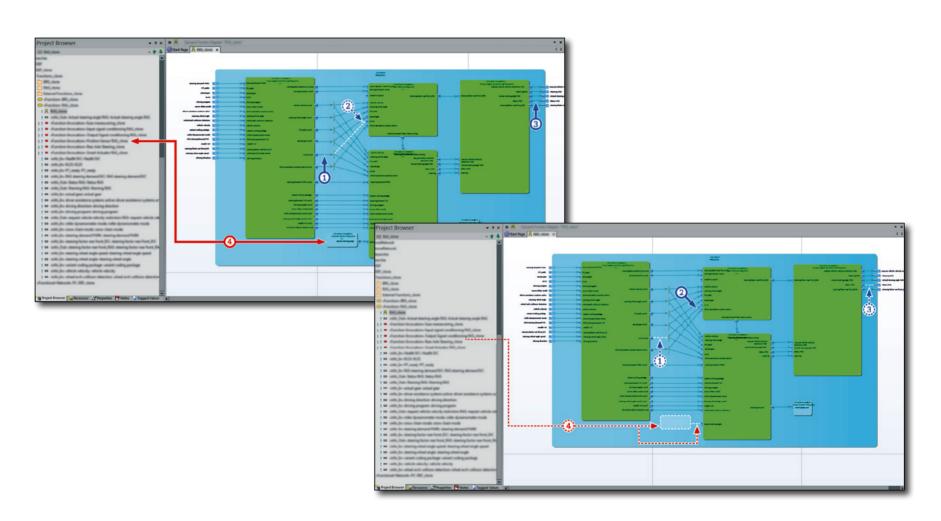– Write verifications criterias

Functional-Network *2* | 4

Create/Update Functional-Network

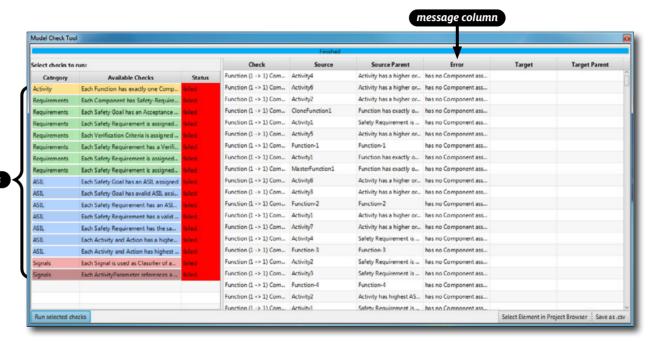– Clone from Master

– Update Clone from Master

Model Checks

– 1 Function ➡ 1 Component

– 1 Component ⬅ x Requirements

– 1 Safety-Goal ⬅ x Acceptance-Criterias

– x Safety-Requirements ➡ 1 Safety-Goal

– x Verification-Criterias ➡ 1 Safety-Requirement

– 1 Safety-Requirement ⬅ x Verification-Criterias

– 1 Safety-Requirement ➡ x Actions/Activities

– Safety-Goal ➡ ASIL

– Safety-Goal ➡ Valid ASIL

– Safety-Requirement ➡ ASIL

– Safety-Requirement ➡ Valid ASIL

– Safety-Requirement's ASIL ⬌ Safety-Goal's ASIL

– Activity's ASIL ⬌ Safety-Requirement's ASIL

– Signal ➡ ActivityParameter

– ActivityParameter ➡ Signal

message column

various Model Checks

Functional-Network   *4* | 4

– Check invalid ASIL
– Check unplausible ASIL

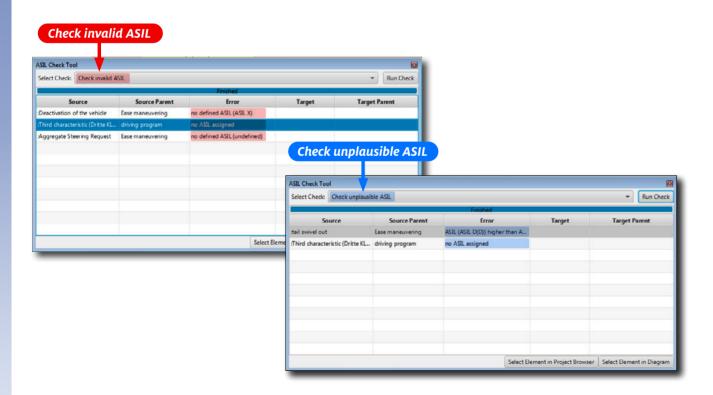*ASIL colouring per safety goal*

ASIL A >> yellow (see **A**)   ASIL D >> red (see **D**)
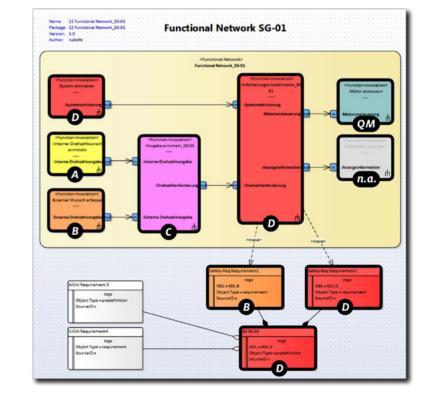
ASIL B >> orange (see **B**)   ASIL QM >> mint (see **QM**)

ASIL C >> purple (see **C**)   ASIL n.a. >> not applicable/faded (see **n.a.**)

Check invalid ASIL

Check unplausible ASIL

Other Diagrams *1* | 4

Component Diagram

‒ Layout » Component Interfaces

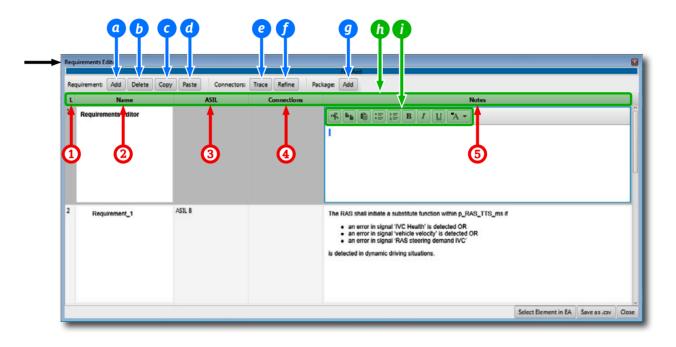before using the **Layout** functions

after using the **Layout** functions

Requirements

– Requirements Editor
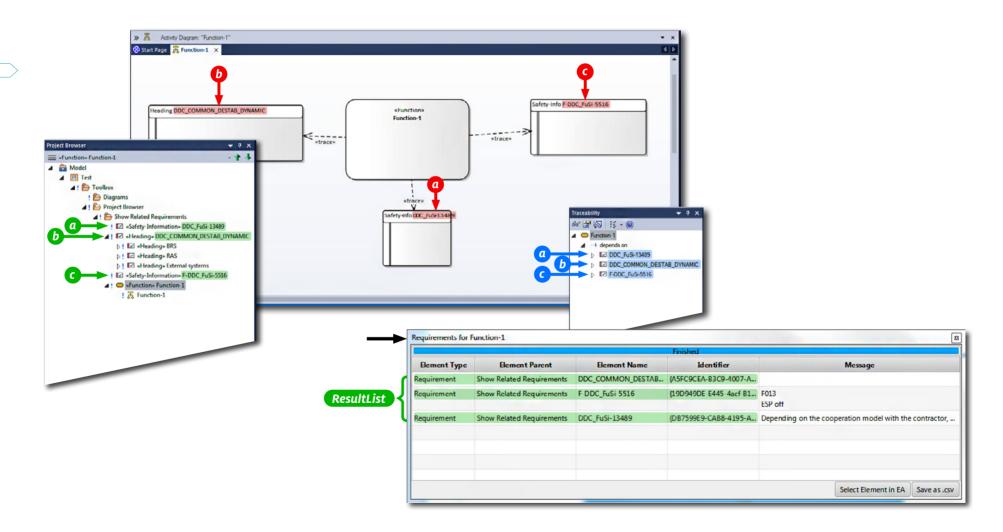
– Show related Requirements

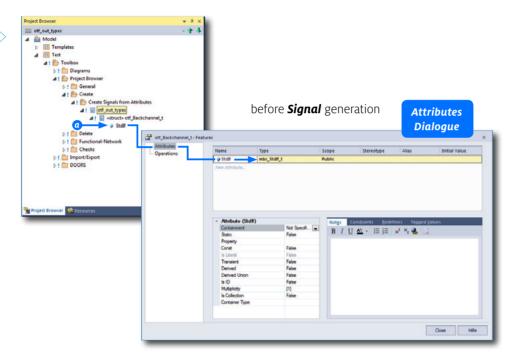## Other Diagrams   *3* | 4

Requirements

– Requirements Editor
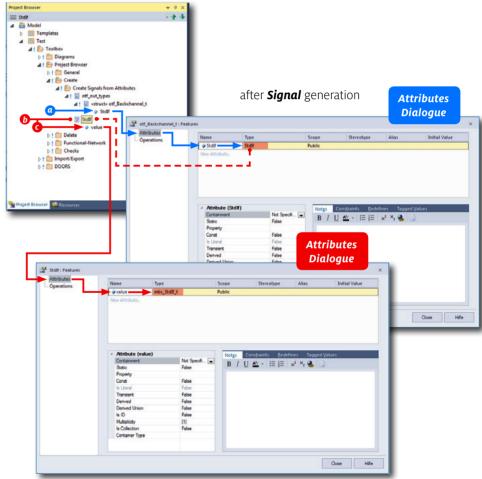
– Show related Requirements

Other Diagrams   *4* | 4

Signals

> – Create Signals from Attributes

before **Signal** generation

after **Signal** generation

Import/Export   *1* | 1

Export
– Insert/Update single Diagram in DOORS
– FuSi Requirements to Excel
– FuSi Requirements to DOORS
– Nodes to Excel
– State Machine to DOORS
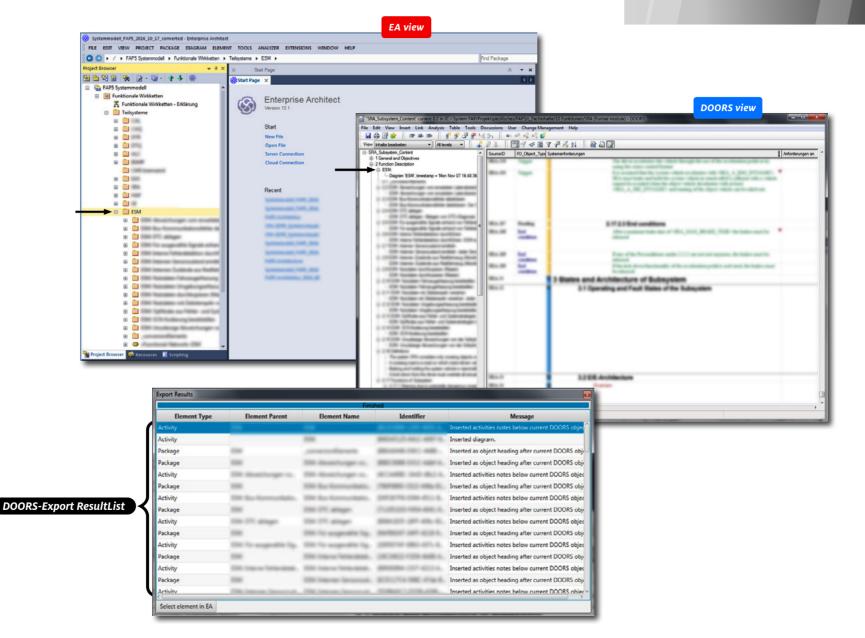– SW-Modules/SW-Blocks to DOORS

Import
– Signals from Excel (k-Matrix)
– Components from DOORS
– Requirements from DOORS

Navigation
– Find Diagram/Element in DOORS
– Find DOORS Object in EA

Create FuSi SourceID

EA view

DOORS view

DOORS-Export ResultList

Thank you for your attention.

Contact

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