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ITEA 3 is a EUREKA strategic ICT cluster programme

Exploitable Results by Third Parties

ITEA2 Call 7 12035 AVANTI

Project details

Project leader:	Dr. Thomas Bär
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Name: Co-simulation Framework		
Input(s):	Main feature(s)	Output(s):
▪ Computational models of individual components Functional Mock-Up Units ▪ Simulation set-up connecting the components	▪ Behavior models and co-simulation ▪ Modeling and simulation of mechatronic components ▪ Fast and lightweight FMI-based co-simulation of physical behavior models ▪ Integration of co-simulation approaches into existing processes	▪ Running co-simulation ▪ Simulated behavior of complex physical systems

Unique Selling Proposition(s):	▪ Performant, versatile, and scalable simulation approach ▪ Multi-domain simulation based on Functional Mock-Up Units ▪ Integration of open or black-box component models ▪ Protection of Intellectual Property ▪ Easy integration into existing Virtual Commissioning toolchains
Integration constraint(s):	▪ Functional Mock-Up Units have to be available ▪ Licenses for needed proprietary solvers have to be available ▪ Integration into existing toolchains has to be via FMI standard
Intended user(s):	▪ End-users mainly in manufacturing industry
Provider:	▪ TWT GmbH Science & Innovation
Contact point:	▪ Dr. Ulrich Odefey ▪ +49 (0) 711 215 777 0 ▪ ulrich.odefey@twt-gmbh.de
Condition(s) for reuse:	▪ commercial license with yearly costs

Latest update: 09.05.2016

Name: Mechatronic Component Model Description with AutomationML		
Input(s):	Main feature(s)	Output(s):
▪ Description of mechatronic component behaviour ▪ 3d geometry model of the mechatronic component	▪ Modelling of various mechatronic component via AutomationML and FMU as service ▪ Provide and support of AutomationML export and import function for the tool NX-MCD ▪ Technical and organizational consulting concerning the modelling of mechatronic component models with AutomationML	▪ AutomationML file of mechatronic component via links to 3d geometry models as COLLADA and behaviour models as FMU

Unique Selling Proposition(s):	▪ Usage of existing common standard data formats to describe mechatronic components.
Integration constraint(s):	▪ Simulation tool to create and modify mechatronic components ▪ Export and import functionalities to handle AutomationML and FMU mechatronic component models
Intended user(s):	▪ End-users mainly in manufacturing industry ▪ Component manufacturers
Provider:	▪ EKS InTec GmbH
Contact point:	▪ Dr. Anton Strahilov ▪ +49 (0) 751 362 16 85 ▪ anton.strahilov@eks-intec.de
Condition(s) for reuse:	▪ single cost service upon request

Latest update: 09.05.2016

Name: AVANTI Virtual Commissioning Simulator (AViCS)		
Input(s):	Main feature(s)	Output(s):
▪ Behavioural models of system components in terms of physical effects ▪ Modelling languages formats	▪ Generic co-simulation framework for physics based industrial simulation ▪ Modelling and simulation of production line system components ▪ Integration of state-of-the-art physics engine (PE) to the virtual commissioning (VC) simulation environment ▪ Multiple physics engine support over Physics Abstraction Layer (PAL) with extensible plug-in architecture ▪ Computational statistical based approach for standardized selection of PE	▪ Realistic dynamic multi-body simulation of production line system components ▪ Collision detection & contact determination ▪ To be able to handle problems with physics engines in terms of modelling of collisions and the residuals ▪ Application of physics-based simulation capabilities for VC

Unique Selling Proposition(s):	▪ Loose coupled communication framework ▪ Platform-independent architecture ▪ Developing solutions for integrating a state-of-the-art physics engine to the VC simulation environment ▪ Computational statistical based approach for standardized selection of PE ▪ Various standardized model support
Integration constraint(s):	▪ Problems with the physics engines in terms of their modeling of collisions have to be handled ▪ PAL should take care of these problems ▪ Standardized selection of PE for each problem should be realized
Intended user(s):	▪ End-users mainly in wide spread of industrial solutions; o Production Line – White Goods o Automotive o Aviation & Aerospace o Defense & Military
Provider:	▪ KaTron Defence Inc.
Contact point:	▪ Fırat Yüzbaşıoğlu ▪ +49 (0) 555 252 0 800 ▪ firat.yuzbasioglu@katron.com.tr

Name: AVANTI Virtual Commissioning Simulator (AViCS)	
Condition(s) for reuse:	▪ Single cost service upon request ▪ Commercial license with yearly costs
	Latest update: 13.05.2016

Name: Physics Middleware		
Input(s):	Main feature(s)	Output(s):
▪ AutomationML-files of machine construction or material flow systems	▪ Automated creation of simulation models from AutomationML files. ▪ Dynamic simulation of object movement and collision detection and response ▪ Use-case dependent selection of physics-engine is possible	▪ simulation model of machines or material flow systems to simulate movement and detect collisions

Unique Selling Proposition(s):	▪ Reduce time effort to create a simulation model based on CAD-data ▪ Use-case dependent selection of different physics-engine is possible
Integration constraint(s):	▪ CAEx files including kinematic descriptions in COLLADA-parts
Intended user(s):	▪ IT ▪ Manufacturers of material handling systems ▪ Manufacturers of mechatronic systems ▪ Mechanical engineering
Provider:	▪ tarakos GmbH
Contact point:	▪ Klaus Hanisch ▪ +49 (0) 391 597 495 52 ▪ klaus.hanisch@tarakos.com
Condition(s) for reuse:	▪ Commercial license with yearly or single cost available

Latest update: 13.05.2016

Name: Process simulation tool for gearboxes		
Input(s):	Main feature(s)	Output(s):

▪ Behavioral models from measured and/or simulated data
▪ Gearbox parameters
▪ Datasheets for components
▪ Component models
▪ Test scenario
▪ Process environment description
	▪ Multi-physics simulation including:
	  ○ Heat transfer
	  ○ Heat generation
	  ○ Heat dissipation
	  ○ Power losses
	  ○ Control
	  ○ Thermal-Hydraulics
	  ○ Mechanics (gears, bearings, inertia)
	  ○ Oil-gear and oil-bearing interaction
	▪ Transient analysis
	▪ Simulation of long lasting scenarios (up to several hours) within minutes
		▪ Shortened prototyping time due to virtual prototyping
		▪ Increased AEP (Annual Energy Production) for wind turbines and other processes

Unique Selling Proposition(s):	▪ Increased energy production of wind turbines due to optimized start-up procedure ▪ Shortened prototyping time due to virtual prototyping ▪ Verified behavioral models of gearbox internals to have accurate simulation results ▪ Computationally efficient simulations capable of simulating several hours of gearbox operation in just several minutes ▪ Fidelity of the simulation tool reduces time for physical testing by up to a month
Integration constraint(s):	▪ Detailed design data is available for the gearbox ▪ Verified component models are available, measured or datasheet data is provided ▪ Test scenario is required (can describe normal or extreme operating conditions)
Intended user(s):	▪ Moventas ▪ Wind turbine manufacturers ▪ Other customers as service
Provider:	▪ Moventas Gears Oy, Eteläportintie 91, FI-40530 Jyväskylä, Finland
Contact point:	▪ Jukka Elfström, +358 (0)20 184 7879 ▪ jukka.elfstrom@moventas.com
Condition(s) for reuse:	▪ Commercial license to be negotiated ▪ Service upon request

Latest update: 09.05.2016

Name: Integrated physics engine and behaviour models		
Input(s):	Main feature(s)	Output(s):
▪ Layout description ▪ Behavior description	▪ more realistic results for material handling simulation in tarakos software tools ▪ Reduced engineering effort due to availability of reusable physics components	▪ simulation model of machines or material flow systems to simulate movement and detect collisions

Unique Selling Proposition(s):	▪ Time effort for behavior simulation by script-programming can be reduced by using physic simulation components
Integration constraint(s):	▪ None
Intended user(s):	▪ Manufacturers of material flow systems ▪ Manufacturers of mechatronic systems ▪ Mechanical engineering
Provider:	▪ tarakos GmbH
Contact point:	▪ Klaus Hanisch ▪ +49 (0) 391 597 495 52 ▪ klaus.hanisch@tarakos.com
Condition(s) for reuse:	▪ Commercial license with yearly or single cost available

Latest update: 13.05.2016

Name: Virtual Commissioning Test Generation and Execution Tool		
Input(s):	Main feature(s)	Output(s):
▪ Requirements of the production systems ▪ Predefined user specific checklists ▪ Existing real control program ▪ Mechatronic model of the whole production system (e.g. 3d simulation model and behaviour model)	▪ Providing of the test generation and exestuation tool as standalone application for virtual commissioning ▪ Support users of the application to define respectively prepare tests and execute them during virtual commissioning ▪ Technical and organizational consulting concerning the management and preparation of tests for virtual commissioning	▪ Automatic executable and repeatable tests ▪ Overview of results of executed tests ▪ High quality control programs

Unique Selling Proposition(s):	▪ Automated generation of detailed test cases ▪ Automated performing of test cases ▪ Detailed overview of performed test case results
Integration constraint(s):	▪ Test definition tool to create user specific test cases regarding the production system requirements ▪ Test conduct tool to perform predefined test cases
Intended user(s):	▪ End-users mainly in manufacturing industry
Provider:	▪ EKS InTec GmbH
Contact point:	▪ Dr. Anton Strahilov ▪ +49 (0) 751 362 16 85 ▪ anton.strahilov@eks-intec.de
Condition(s) for reuse:	▪ Single cost service upon request ▪ Commercial license with yearly costs

Latest update: 09.05.2016

Name: Communication Platform for Engineering Data Exchange		
Input(s):	Main feature(s)	Output(s):
▪ Each type of engineering files created during the development process of production systems	▪ Provision and support of Communication Platform as an internet access service: ▪ Web-based engineering data exchange platform ▪ Management of projects and users ▪ Version management of various engineering data ▪ Technical and organizational consulting concerning the management of engineering data in specific work flows	▪ Overview of the current status of each project file ▪ Download of the actual state of project specific files
Unique Selling Proposition(s):	▪ Permanent access to recent as well as to former project specific files regarding to user rights and roles ▪ Management of participating persons and their roles into the development process	
Integration constraint(s):	▪ Internet connection ▪ Internet browser ▪ Java Version 8 or higher	
Intended user(s):	▪ End-users mainly in manufacturing industry	
Provider:	▪ EKS InTec GmbH	
Contact point:	▪ Dr. Anton Strahilov ▪ +49 (0) 751 362 16 85 ▪ anton.strahilov@eks-intec.de	
Condition(s) for reuse:	▪ Single cost service upon request ▪ Commercial license with yearly or per-use costs	
	Latest update: 09.05.2016	

Name: AutomationML Exporter/Importer		
Input(s):	Main feature(s)	Output(s):
▪ Layout Description of plants and material flow systems ▪ 3d geometry model ▪ Process- and behavior description	▪ AutomationML export and import function for tarakos-software-tools ▪ Integration of tarakos-software-tools into the engineering tool-chain of customers	▪ AutomationML file to describe material flow systems - including 3d geometry models as COLLADA

Unique Selling Proposition(s):	▪ Automated data transfer between different engineering software-tools and tarakos-software ▪ Reduce time effort in transition period from rough planning to detailed planning ▪ Compliant with standardized material flow objects by AutomationML working group “Material flow”
Integration constraint(s):	▪ AutomationML-Interface at the corresponding software-tools
Intended user(s):	▪ Plant builders ▪ Manufacturers of material flow systems
Provider:	▪ tarakos GmbH
Contact point:	▪ Klaus Hanisch ▪ +49 (0) 391 597 495 52 ▪ klaus.hanisch@tarakos.com
Condition(s) for reuse:	▪ Commercial license with yearly or single cost available

Latest update: 13.05.2016

Name: Pneumatic Plans of Components & Systems within AutomationML		
Input(s):	Main feature(s)	Output(s):
▪ AML-Components with specific relationships ▪ Formalized pneumatic plan	▪ First draft of pneumatic plan description with AutomationML ▪ Representation and description of pneumatic components and systems in AutomationML ▪ Further use in different software tools	▪ Full description of the pneumatic plan in AML (including logic and each single component)

Unique Selling Proposition(s):	▪ General open exchange format for component behavior ▪ AML allows a simple workflow
Integration constraint(s):	▪ AML-description for pneumatic components have to be available
Intended user(s):	▪ Machine and plant builders as well as OEMs within factory automation
Provider:	▪ Festo AG & Co.KG
Contact point:	▪ Dr. Andreas Gössling ▪ +49 (0) 711 347 53573 ▪ andreas.goessling@festo.com
Condition(s) for reuse:	▪ Open use without licensing because of common standardization

Latest update: 09.05.2016