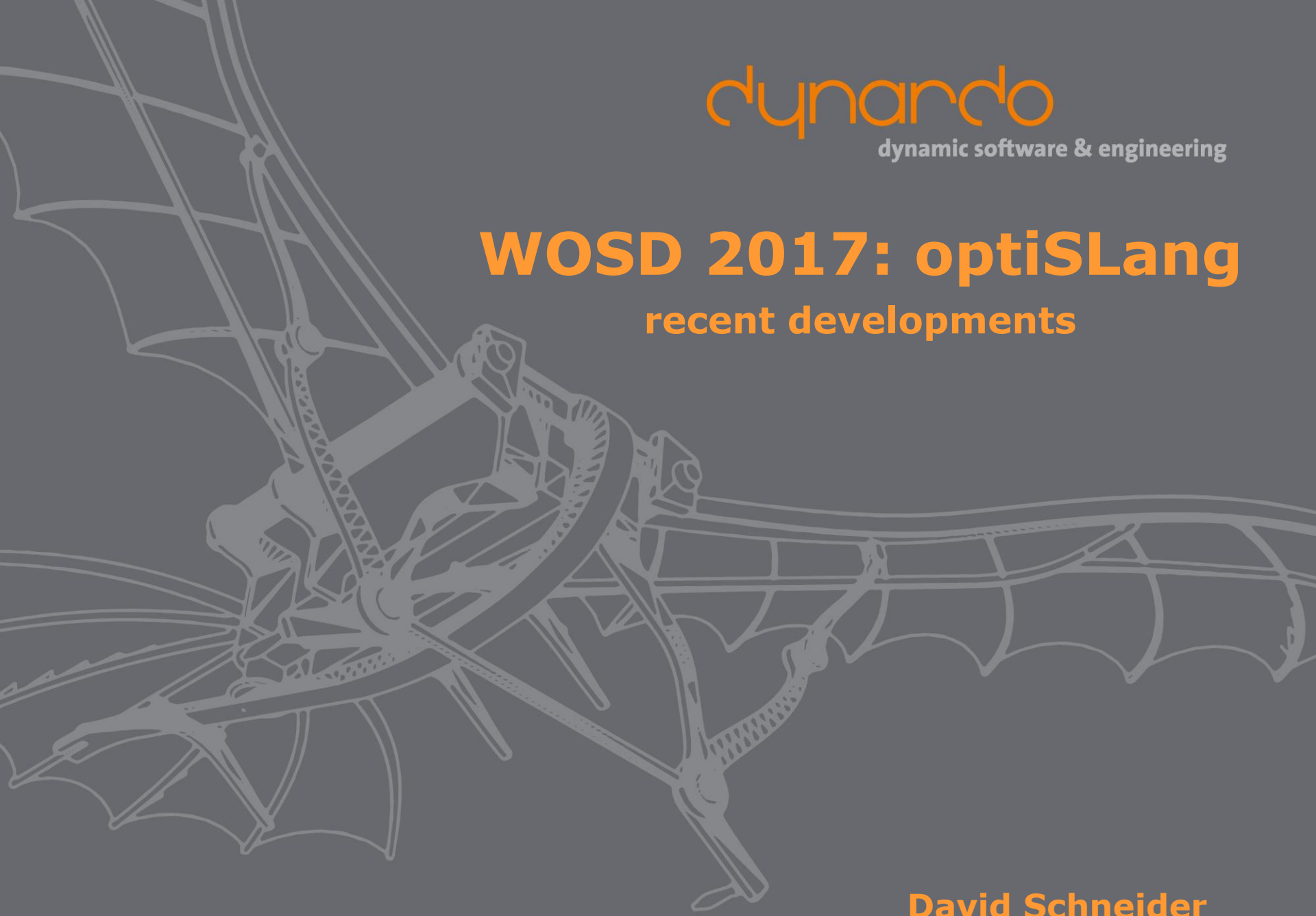
dynardo
dynamic software & engineering

WOSD 2017: optiSLang

recent developments



David Schneider

optiSLang product manager

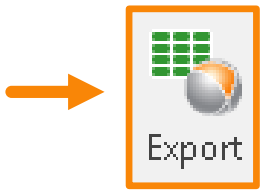
MOP

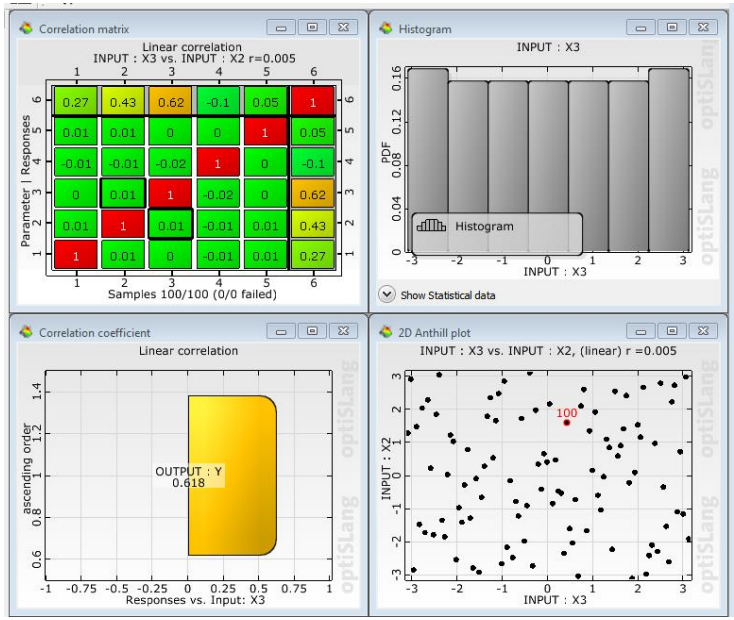
Create MOP in Postprocessing

- Directly perform MOP analysis in Postprocessing

X1	X2	X3	X4	X5	Y
-1.9154	-2.4178	2.2294	-2.6062	-2.5434	2.118684923
2.1038	-2.5434	-2.041	-0.9106	-1.2246	-8.9288626
1.2874	-1.3502	-2.355	0.7222	-0.6594	-5.03687828
-1.0362	1.8526	-2.4806	-2.7318	-0.9734	-3.33853575
		54	-0.2198	-1.6642	2.9202	-1.65162618
		54	3.1086	2.041	0.8478	-1.5880376
		38	-1.2246	2.1038	-2.8574	-2.90273991
		66	1.099	0.8478	1.9154	4.655269812
		74	-2.983	-3.1086	-1.8526	-1.80035601
		55	-1.2874	2.6062	-3.1086	-4.81617802
		66	-0.9106	2.2922	-0.785	-5.27812873
		86	2.6062	-0.4082	0.0314	0.130472038
		62	2.669	-0.785	0.0942	-0.09953846
		06	1.6014	1.413	0.6594	3.467131661
		85	-0.7222	-1.9782	-0.0942	-4.32309474
0.2198	1.4758	-2.9202	-2.983	-0.0314	0.050207929
2.041	0.9734	2.355	-1.7898	1.4758	6.316629243

coupled_function.xlsx





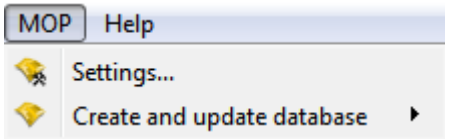
→ Direct feedback regarding outlier deactivation, MOP settings etc.

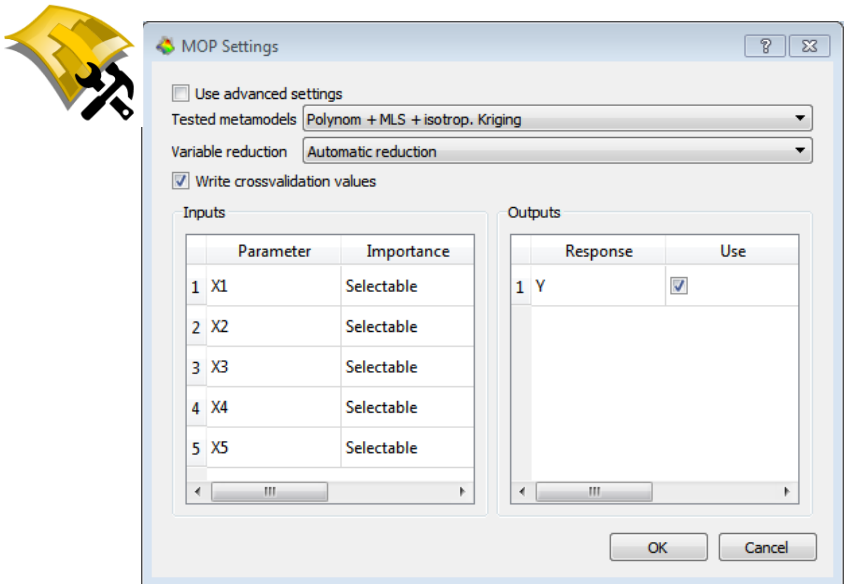
→ Direct usage on (external) data with Excel Addin

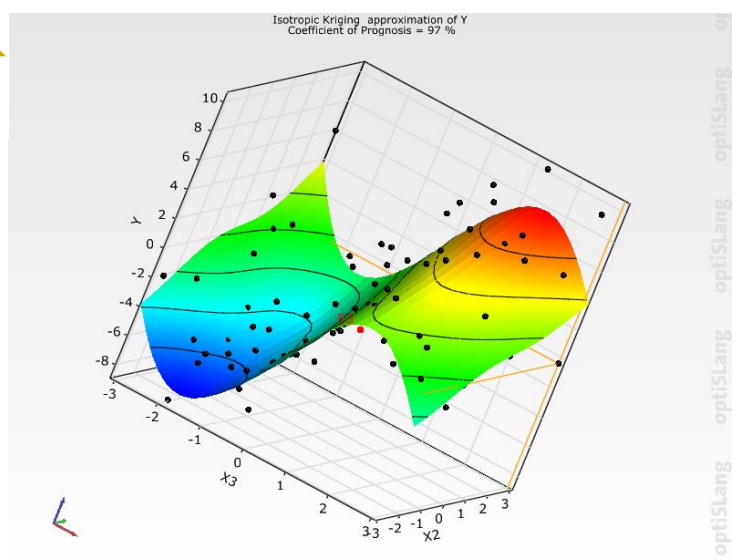
➔ More efficient work with optiSLang's powerful data analysis tools

Create MOP in Postprocessing

- Directly perform MOP analysis in Postprocessing



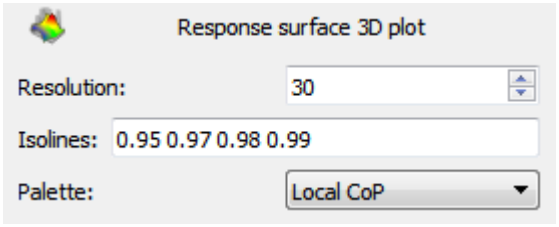


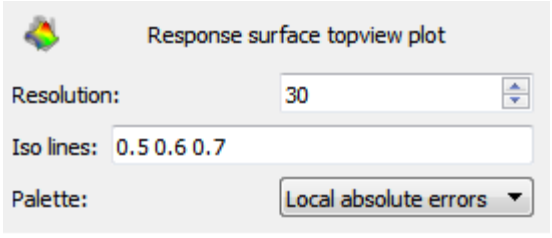


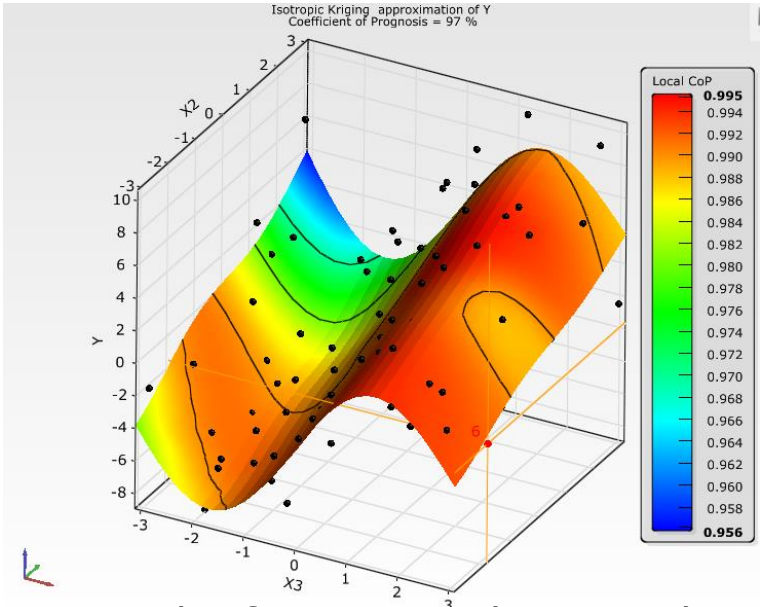
➔ More efficient work with optiSLang's powerful data analysis tools

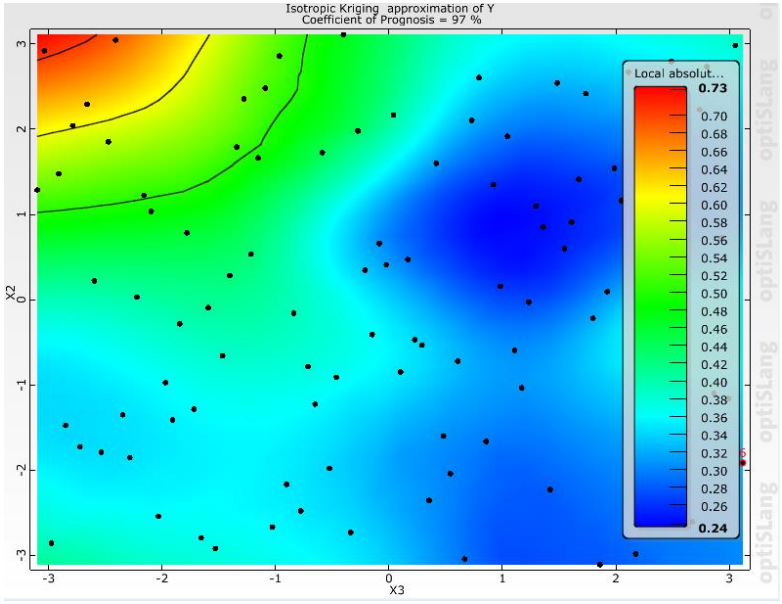
Show local approximation quality

- Estimated approximation error used as color in plots







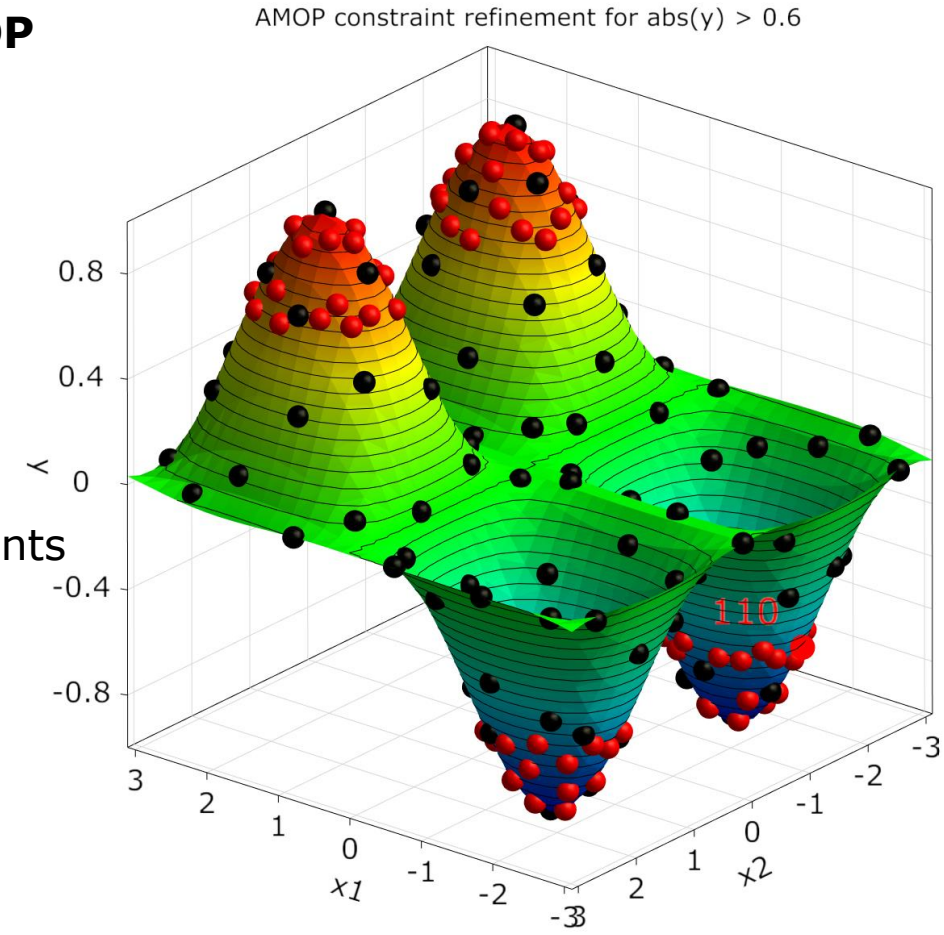


➔ Local information about quality available

Adaptive MOP

Iterative adaptation of initial MOP according to user requirements:

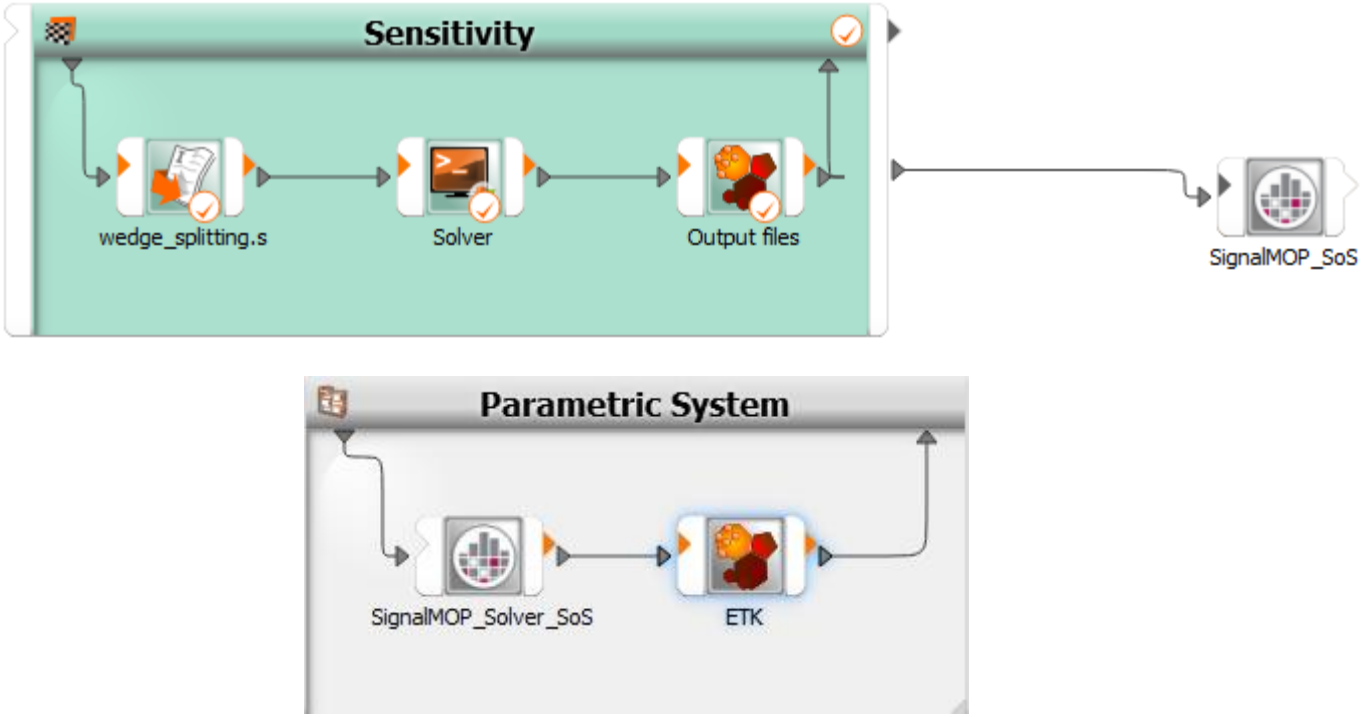
- **Global refinement** with advanced and space-filling LHS
- **Local refinement** considering local errors
- **Constraint refinement** considering input/output constraints
- **Single-objective** optimization refinement with constraints
- **Multi-objective** optimization refinement with constraints



Postprocessing

SignalMOP*

- New integration: SignalMOP & SignalMOPSolver



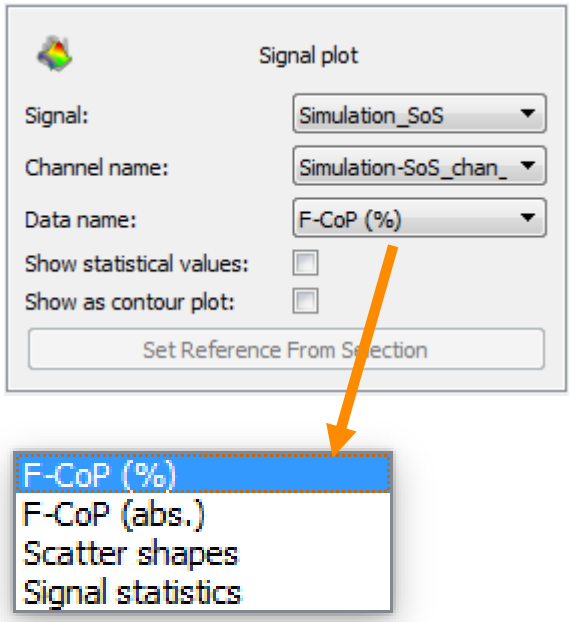
➔ Set up a MOP analysis for signals

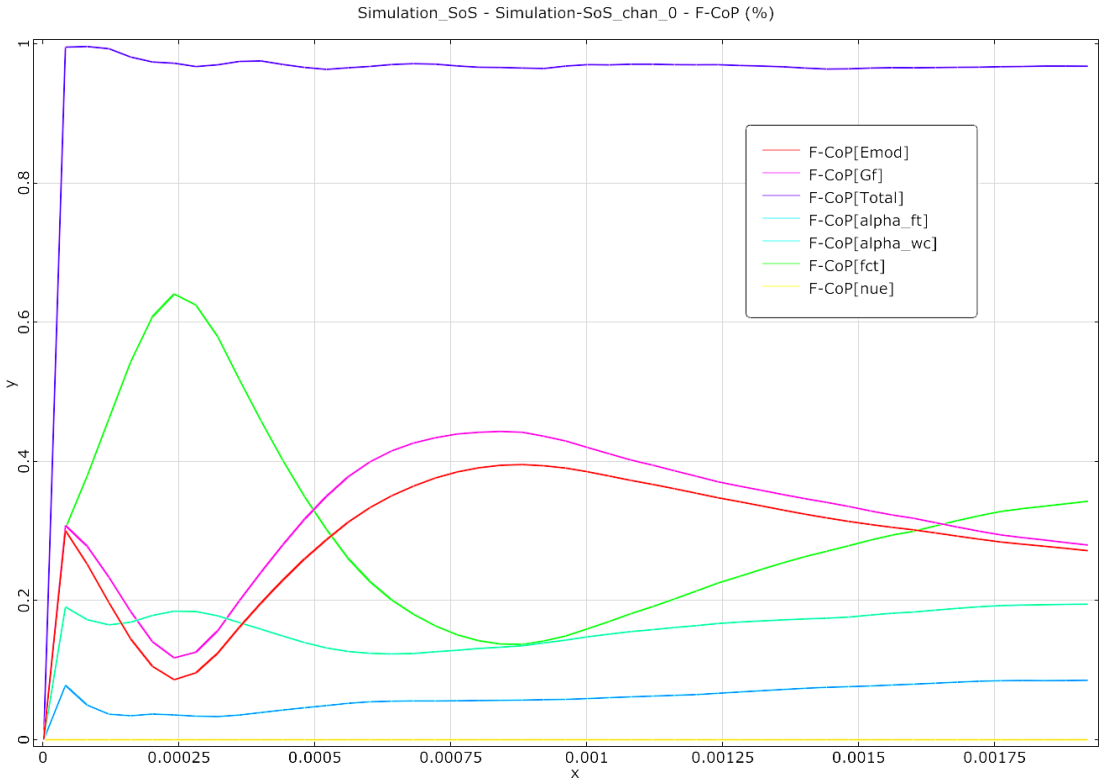
➔ Use Metamodels of Signals (e.g. for calibration)

*Requires SoS, which is not part of ANSYS optiSLang – please contact support@dynardo.de

Show SignalMOP results

- See S-MOP data in built-in plot

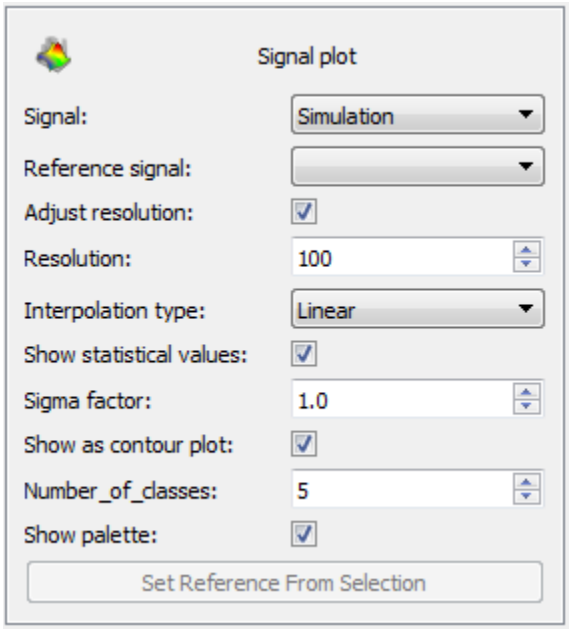


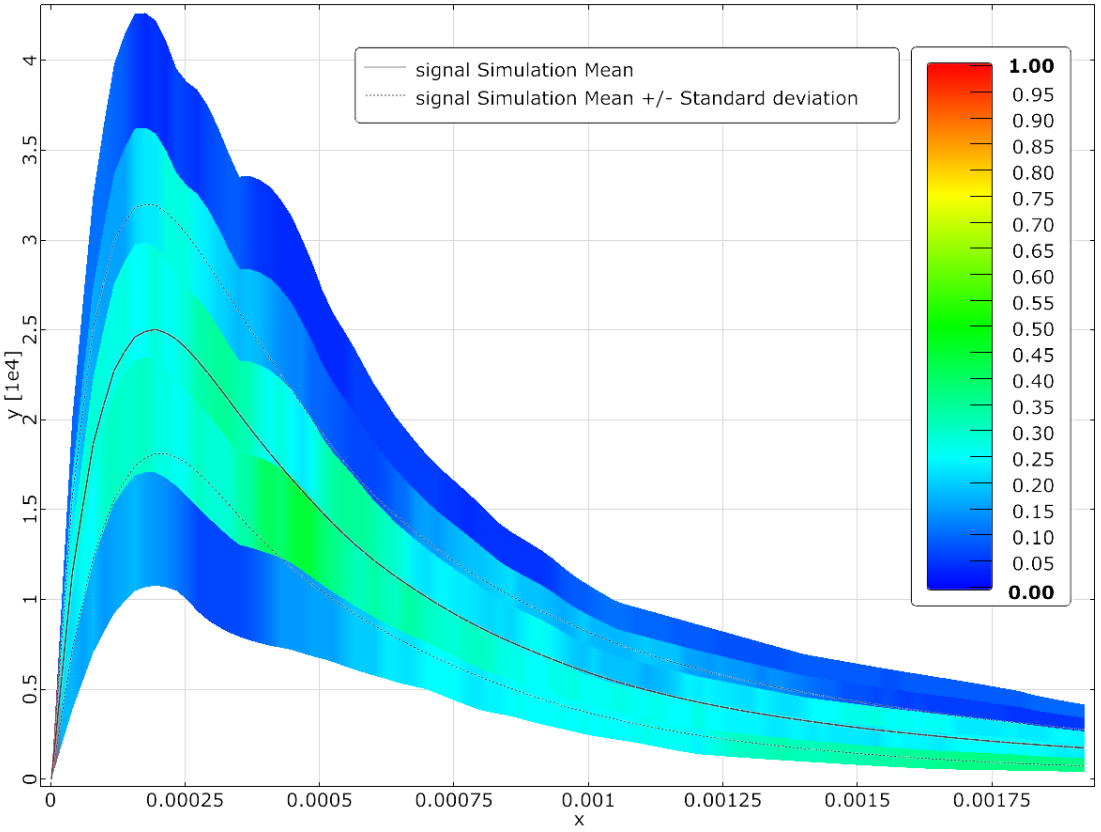


➔ All data for postprocessing in one window

Signal statistics

- Contourplot shows “histogram” for signals

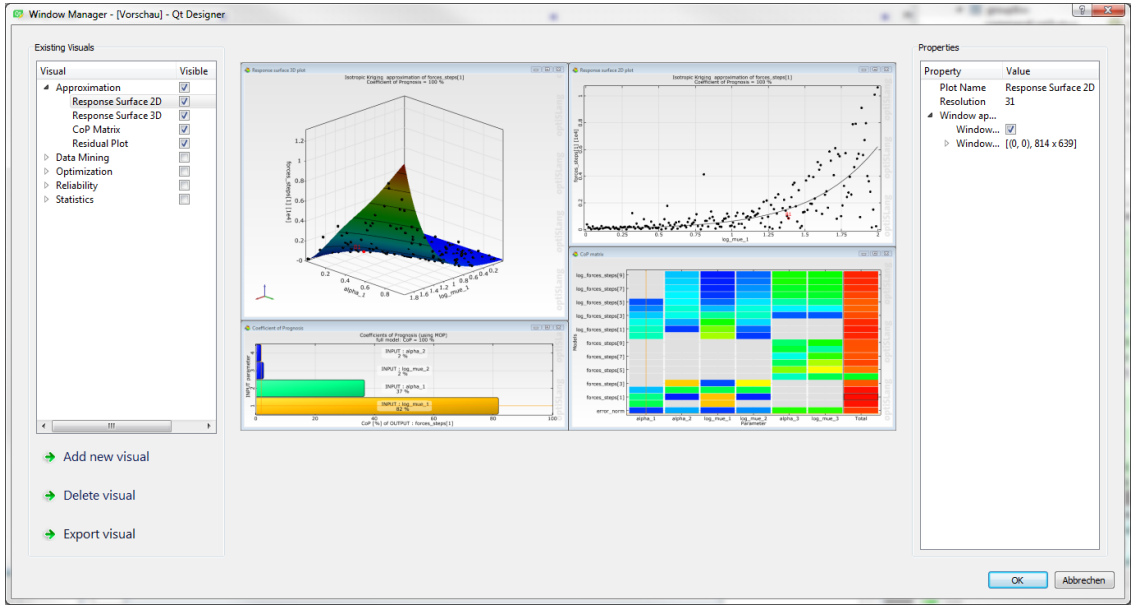


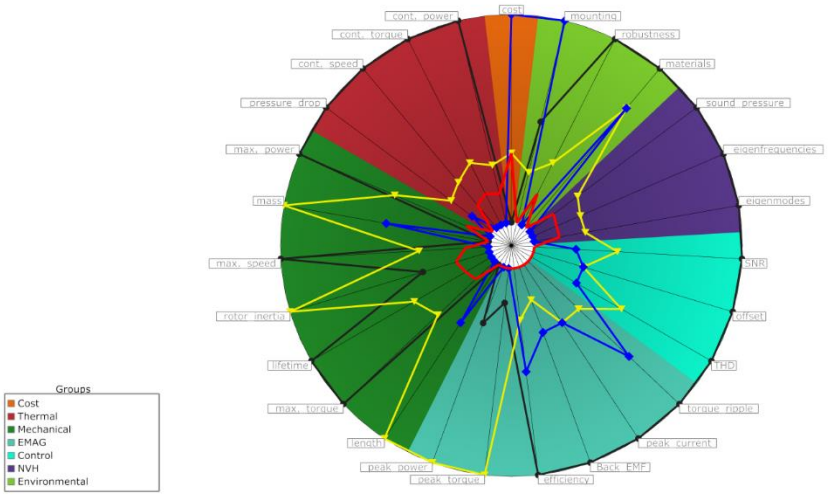


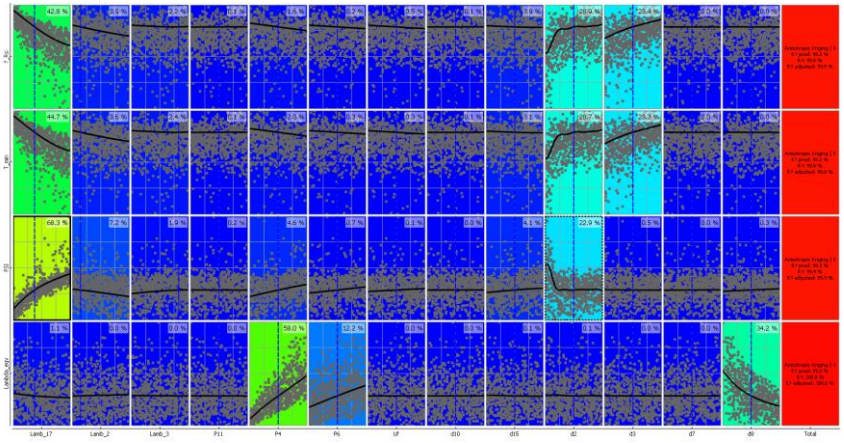
➔ Robustness assessment directly on the signal

Outlook

- Radar Chart
- Window manager
- Extended CoP
- Add Criteria
- Save postprocessing
- ...



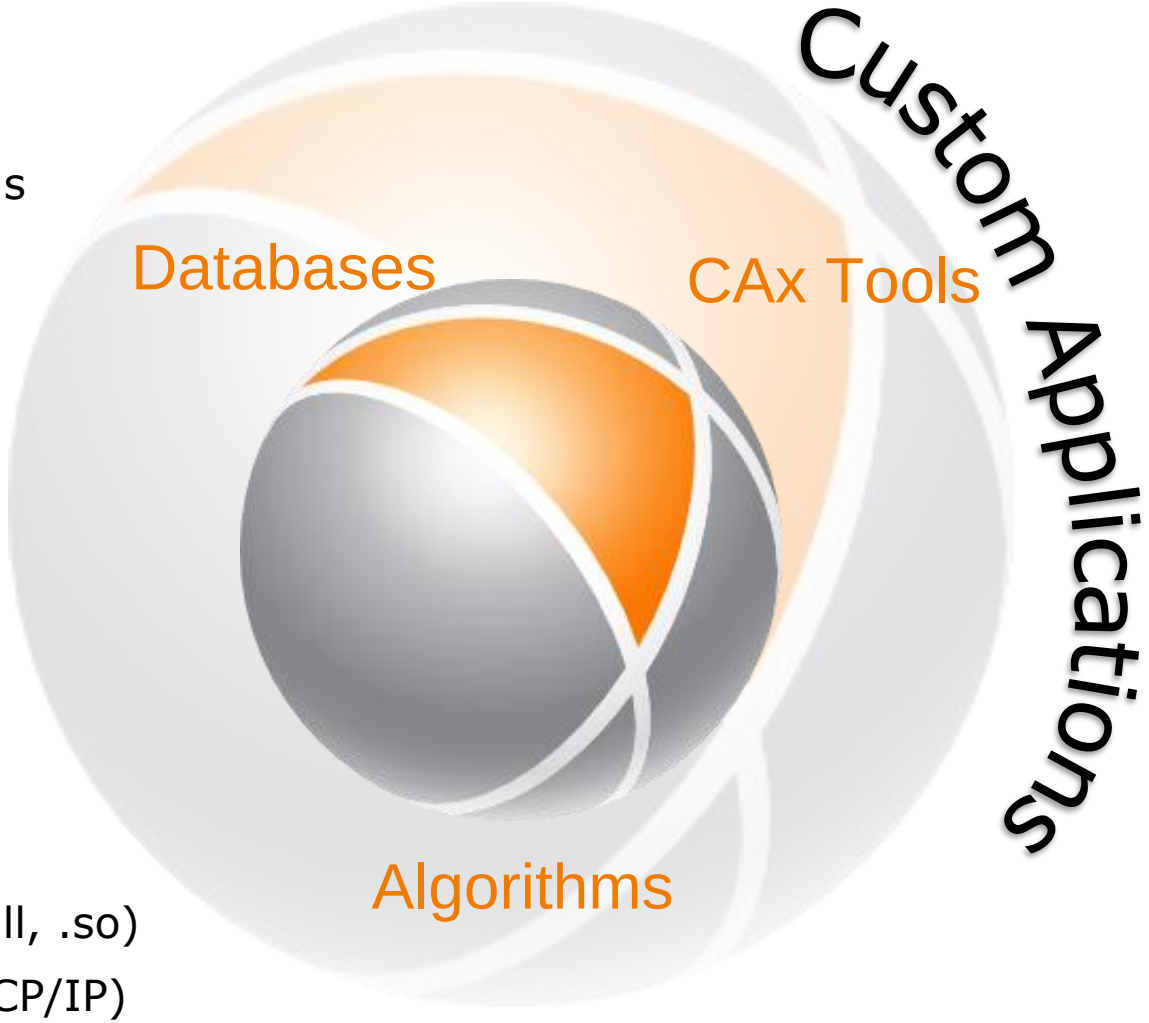




Workflows

Openness – open and programmable architecture

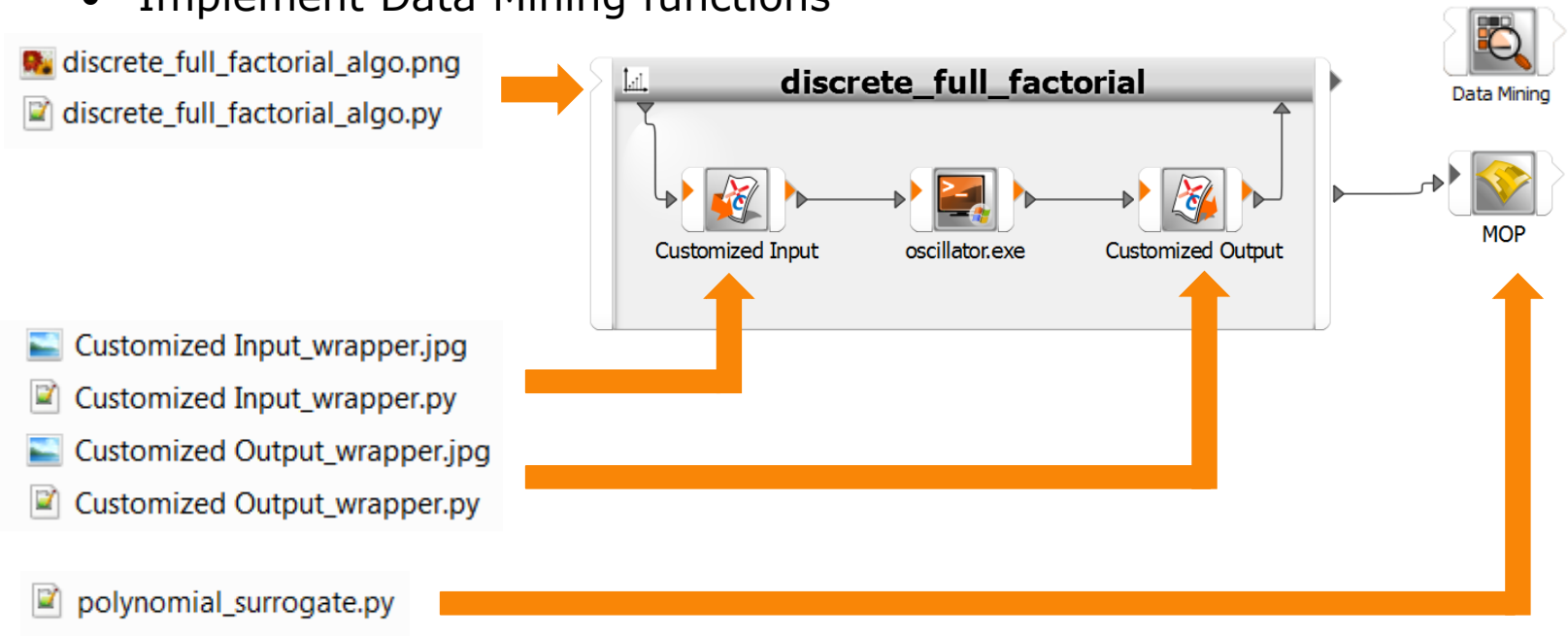
- Plugins
  - CAx Toolintegrations
  - Algorithms
  - (PLM-) Databases



- Interfaces
  - Batch
  - Scriptable (.py)
  - Shared libraries (.dll, .so)
  - Remote control (TCP/IP)

Customization overview

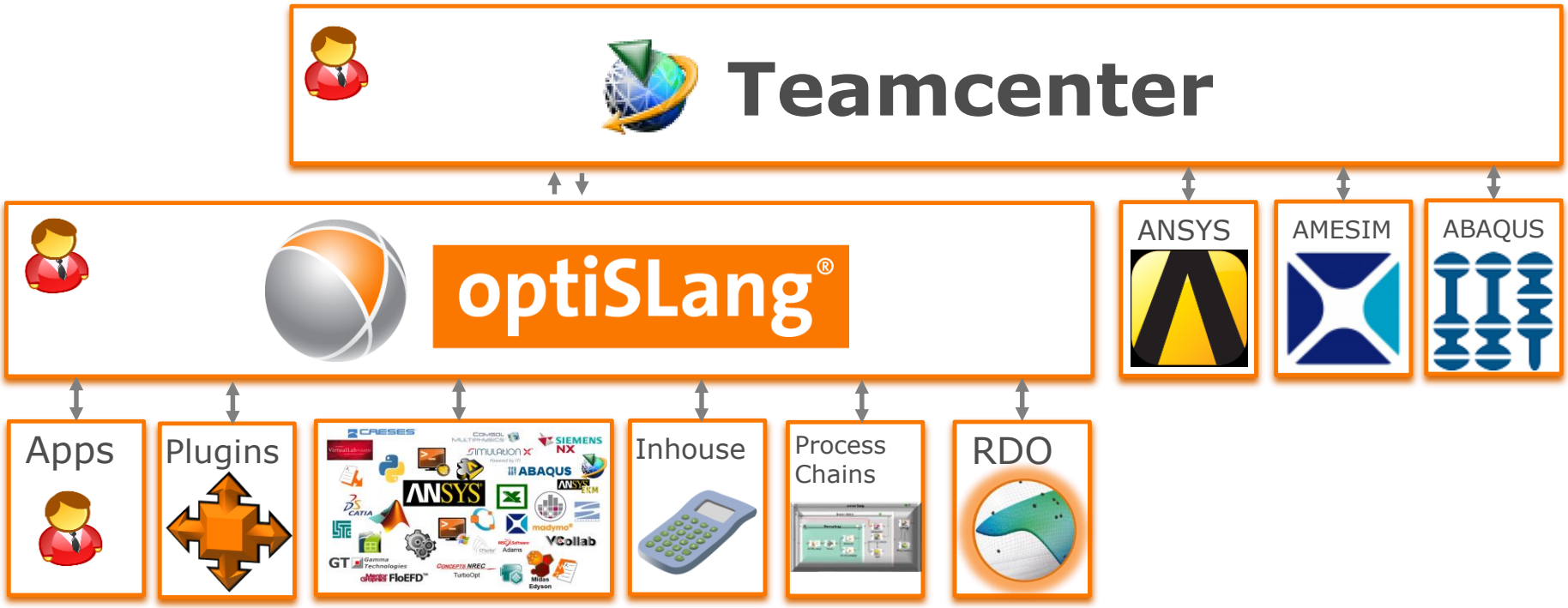
- optiSLang provides plugin mechanisms via Python scripting
  - Define own integration nodes
  - Implement own algorithms
  - Customize Solver Wizard and Postprocessing
  - Extend MOP algorithm with own surrogates (beta)
  - Implement Data Mining functions



optiSLang & Teamcenter for Simulation

- Some standard integrations
- optiSLang for whole CAx-world, workflows,...

➔ Most efficient solution (cost, flexibility, time, innovation)



ANSYS EKM

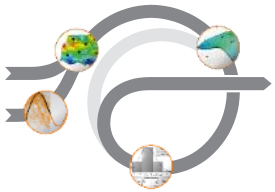
Process Execution & Data Management

EKM interfacing layer

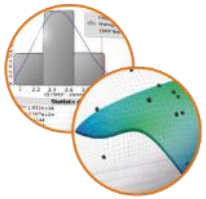
optiSLang®

Simulation Workflows

CAx Automation



Robust Design Optimization



Data Analysis & ROM

ANSYS Simulation Plattform

Fluids

Structures

Electronics

Semiconductors

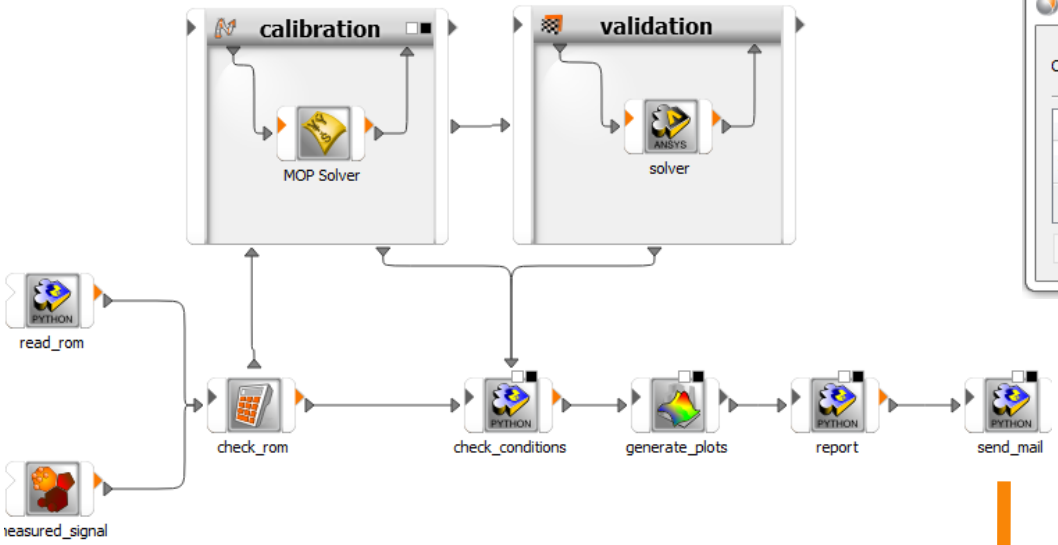
Systems

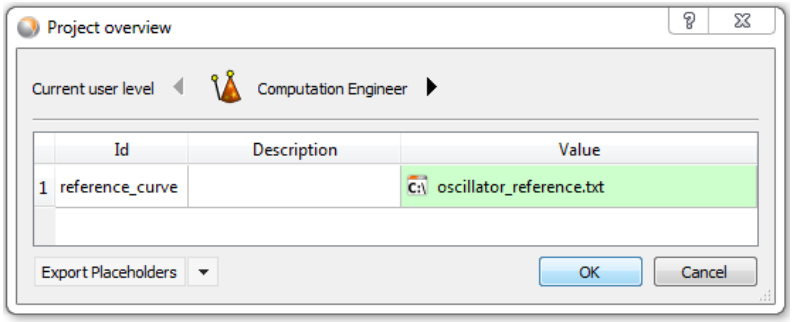
Embedded Software

Multiphysics

Platform

Combine different analyses to a complete workflow + publish in EKM





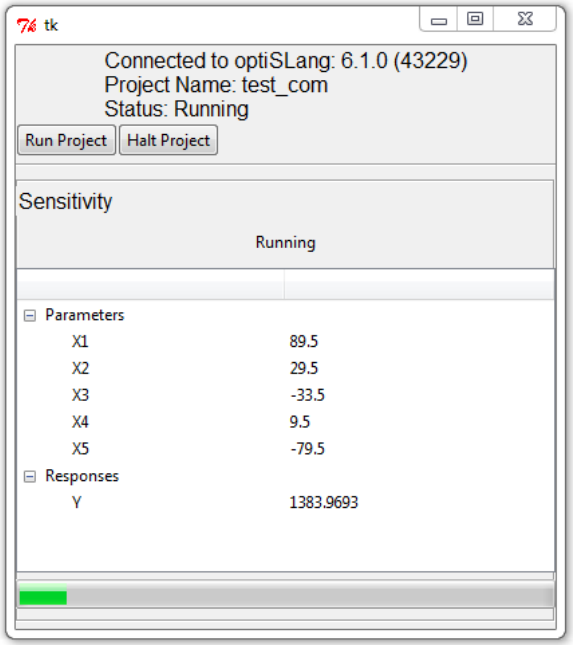
publish ROM based calibration workflow

ANSYS EKM

Process Execution & Data Management

Submit & Remote Control with Custom App

- End user can Monitor Status of optiSLang project
- End user can interact with optiSLang project



- via TCP/IP

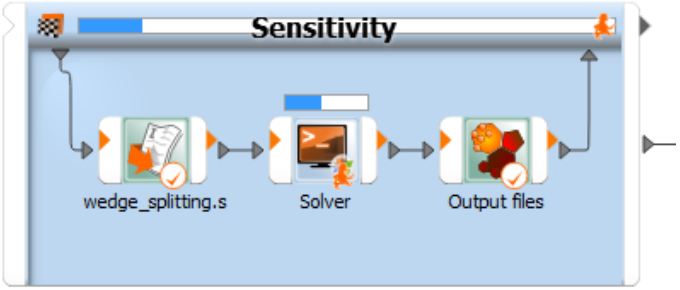
  connect to submitted project

- Get Status

  (Project, node...)

- Start/Stop/Reset

  (Project, node, single id)



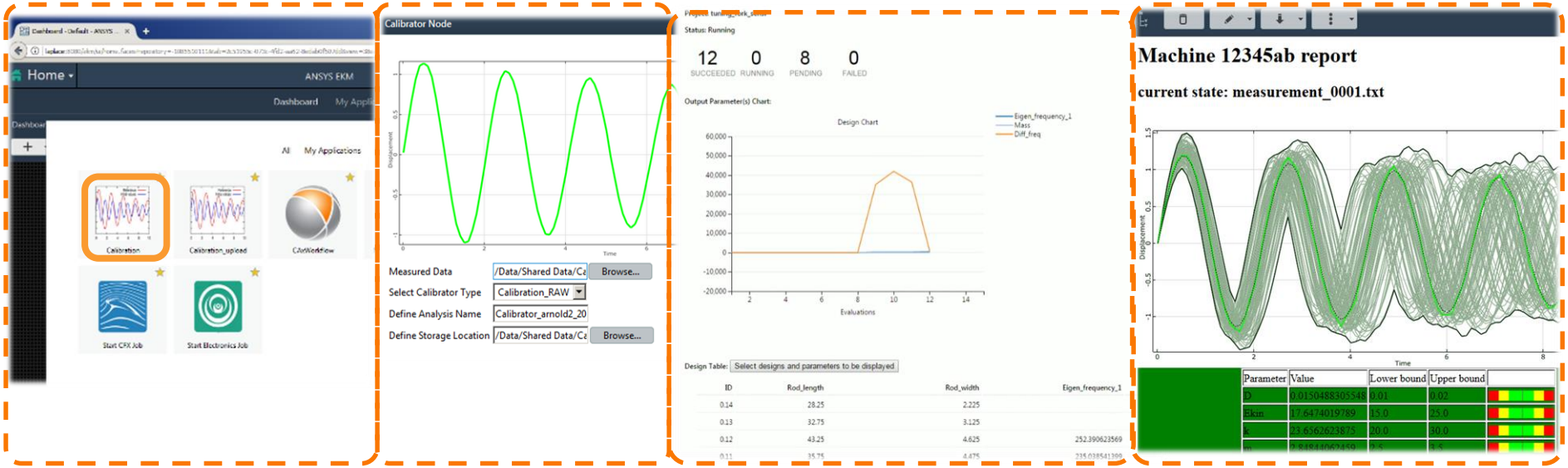
Example: „in-field“ engineer uses digital twin

➔ Start EKM in web browser

➔ Connect measurement curve to Calibration flow (to identify machine status)

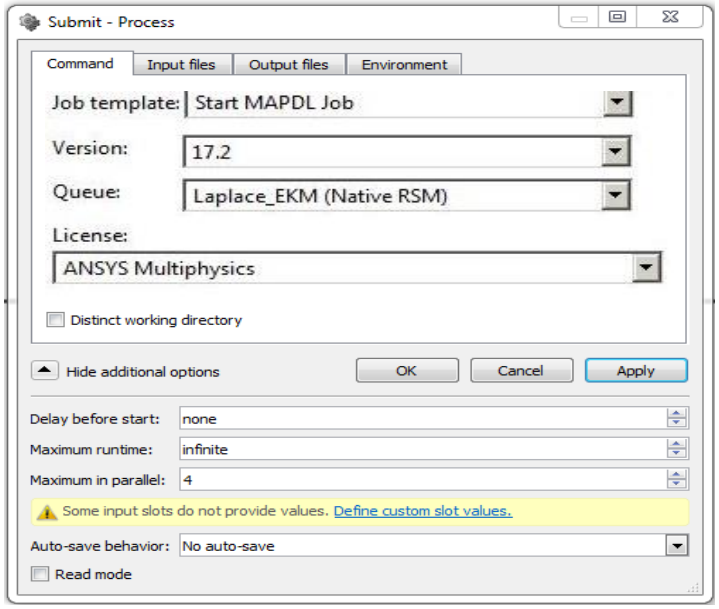
➔ Wait for results and monitor progress

➔ Identifies machine parameter within minutes/hours/days



Outlook: Submit to EKM/RSM

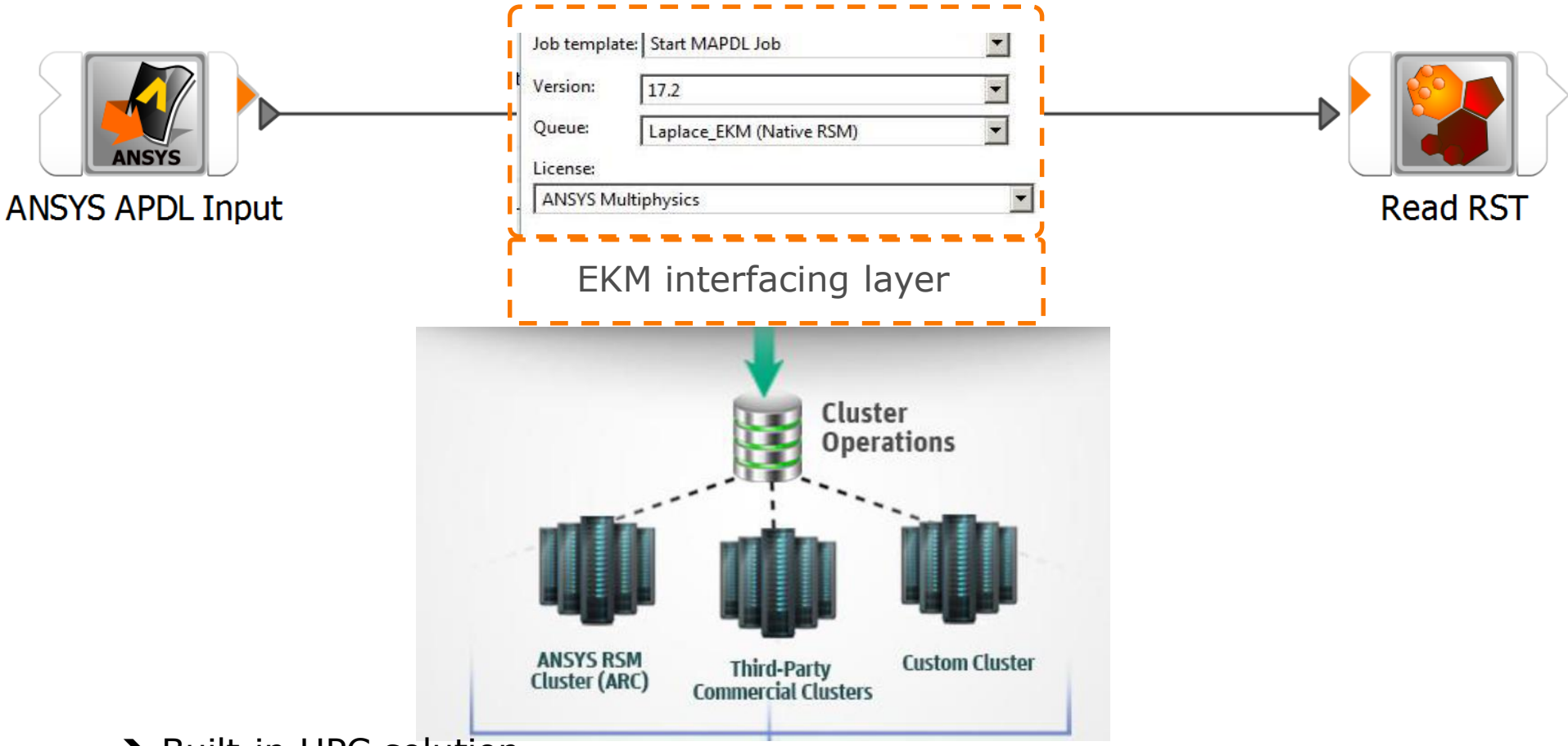
- Submit jobs to ANSYS EKM portal



➔ Built-in HPC solution

Outlook: Submit to EKM/RSM

- Submit jobs to ANSYS EKM portal

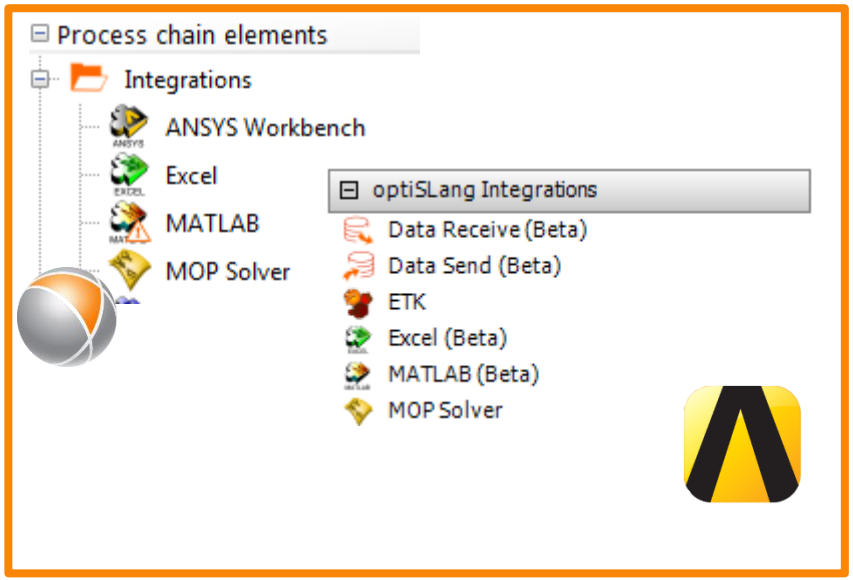


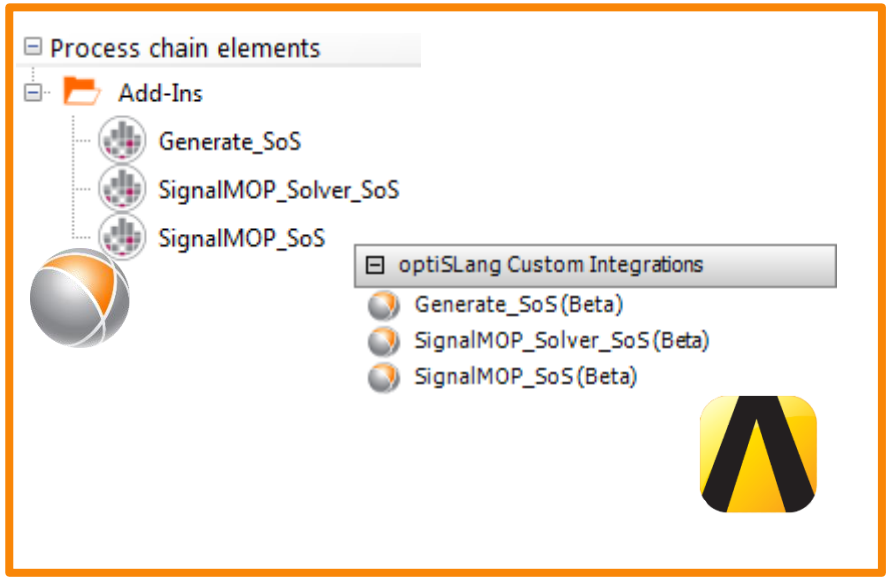
➔ Built-in HPC solution

inside ANSYS

Two new categories inside ANSYS Workbench

- Use optiSLang integrations directly in ANSYS Workbench





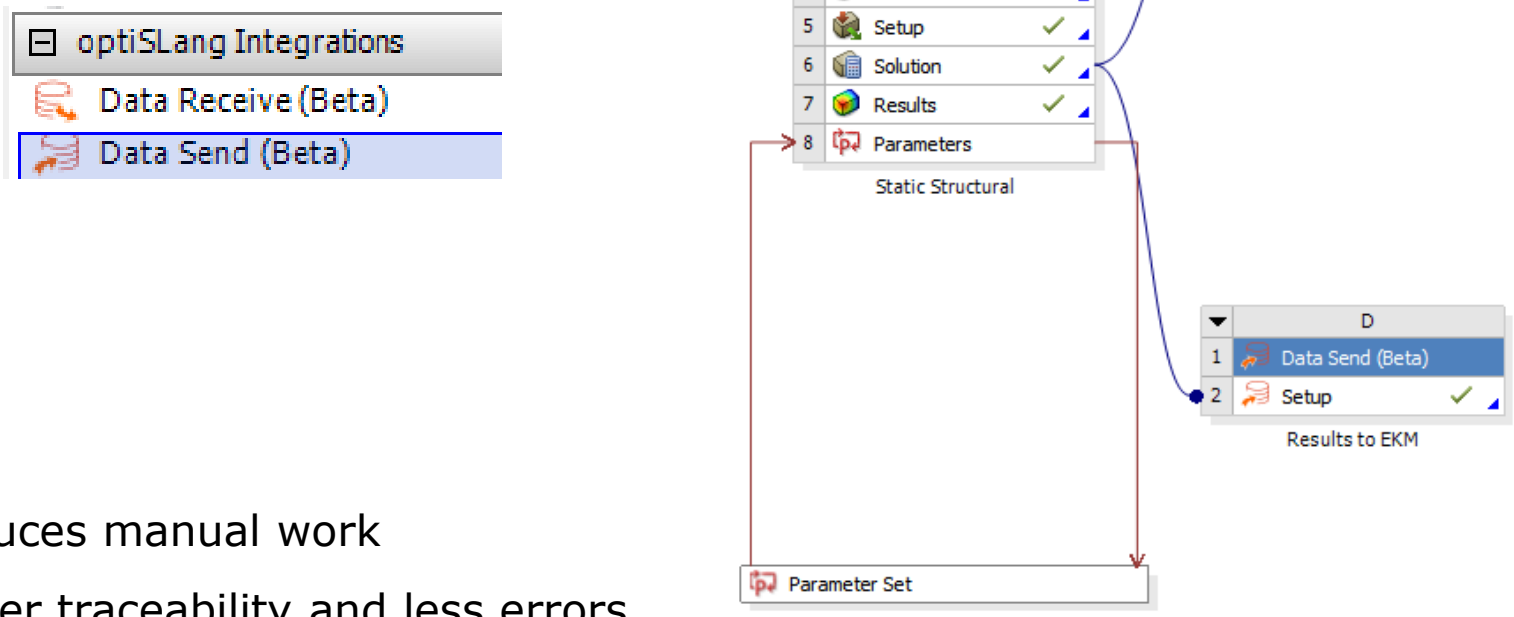
➔ Same Look&Feel in optiSLang and Workbench

➔ User can stay in Workbench

➔ More flexibility in Workflow management

Data Send & Data Receive

- Beta: Receive Geometries from (PLM-) Databases
- Beta: Send/Archive results in Database

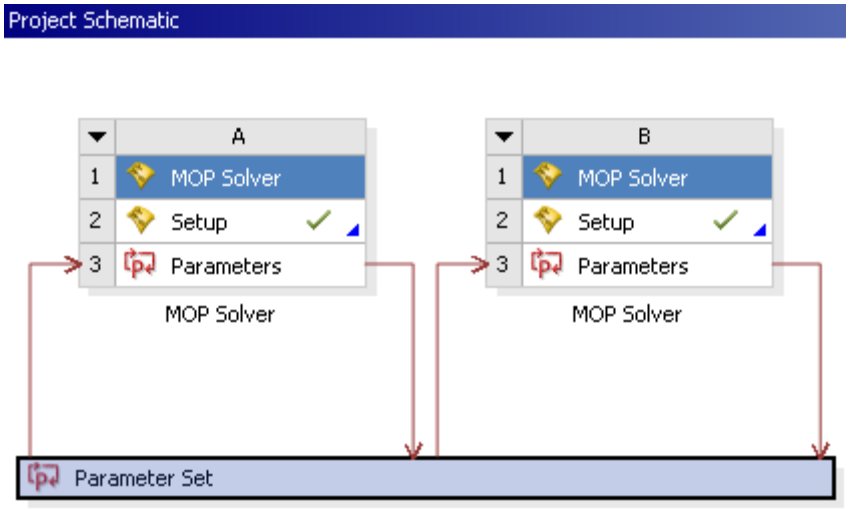


➔ Reduces manual work

➔ Better traceability and less errors

MOPSolver inside

- Use databased ROM’s in Workbench Workflow

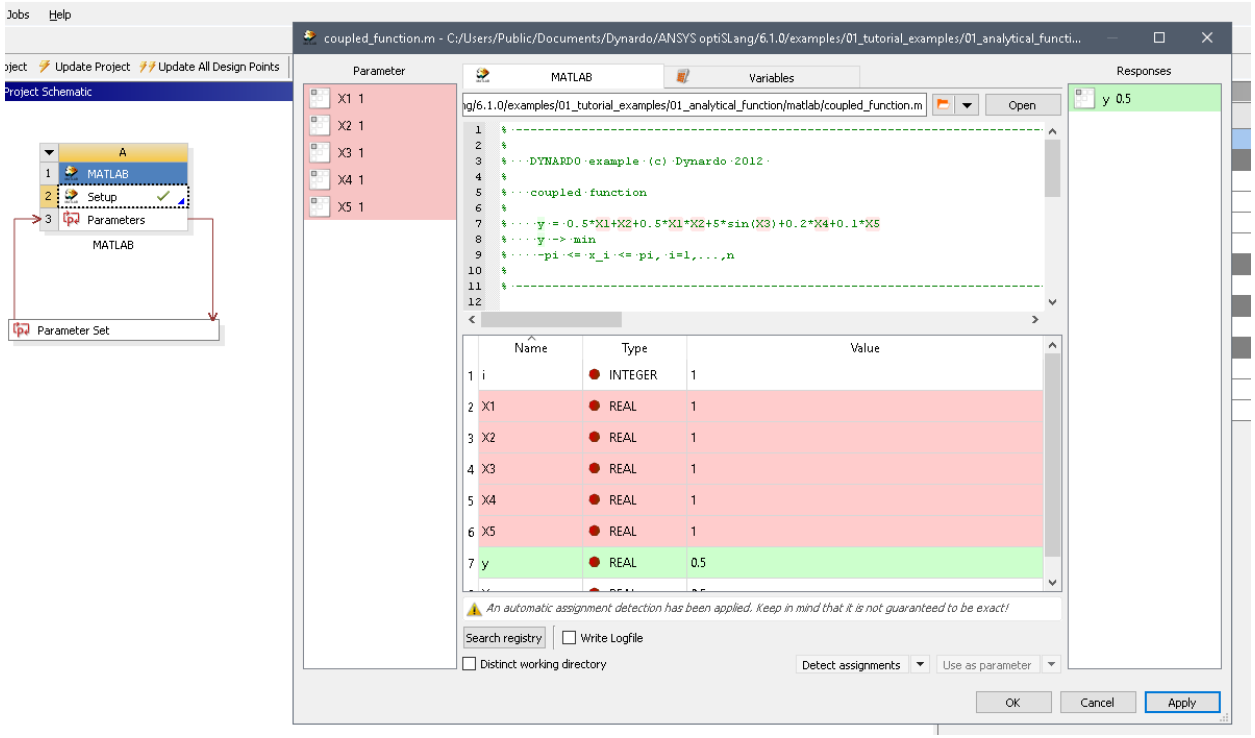


➔ User can stay in Workbench

➔ More flexibility in Workbench schematic

optiSLang's integrations in ANSYS

- Beta: Use optiSLang's Matlab and Excel nodes in Workbench workflow
- Beta: Use custom integrations in Workbench Workflow



➔ Same Look&Feel in Workbench and optiSLang

➔ More flexibility within ANSYS Workbench

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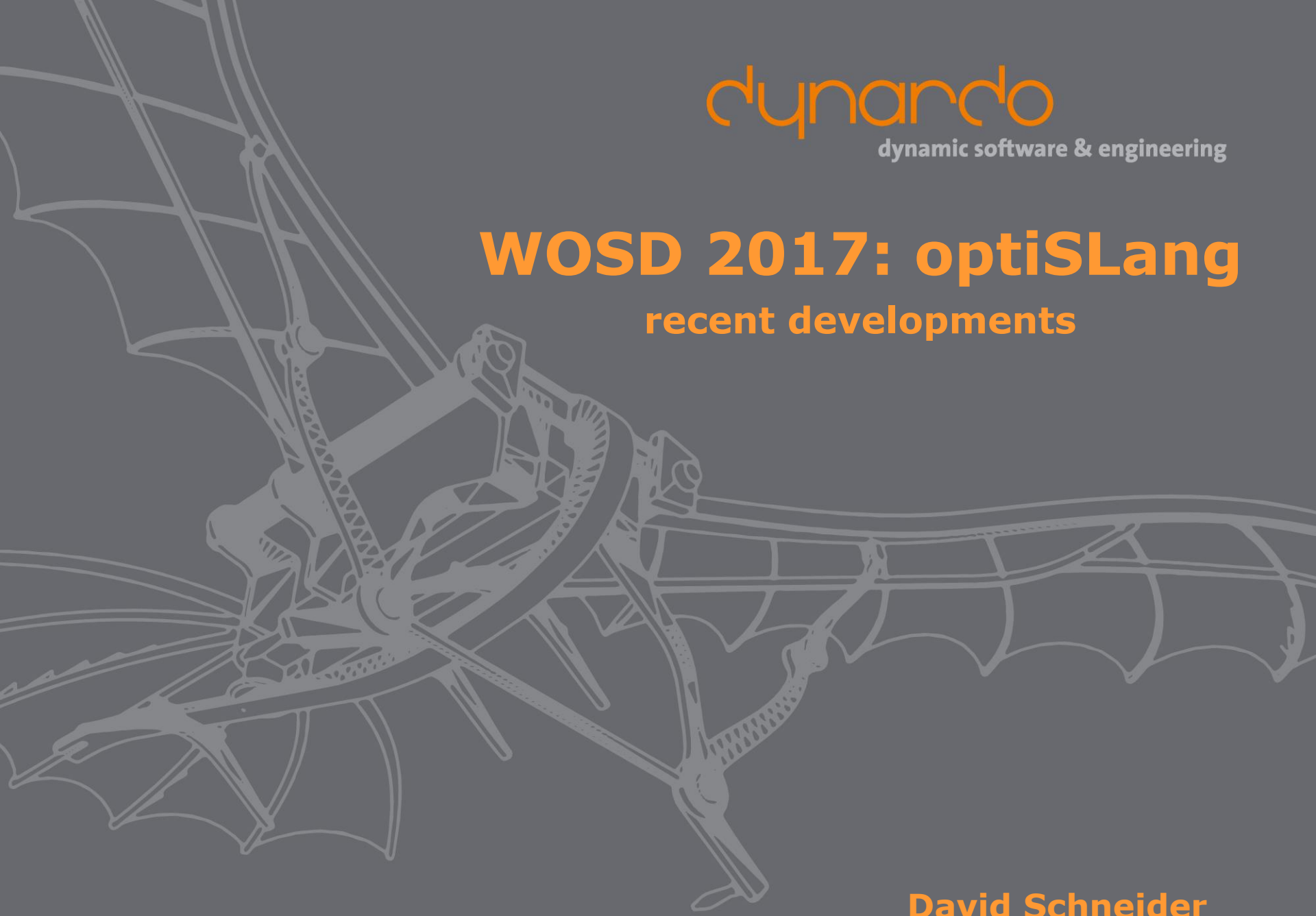
WOSD 2017: optiSLang

recent developments



David Schneider

optiSLang product manager