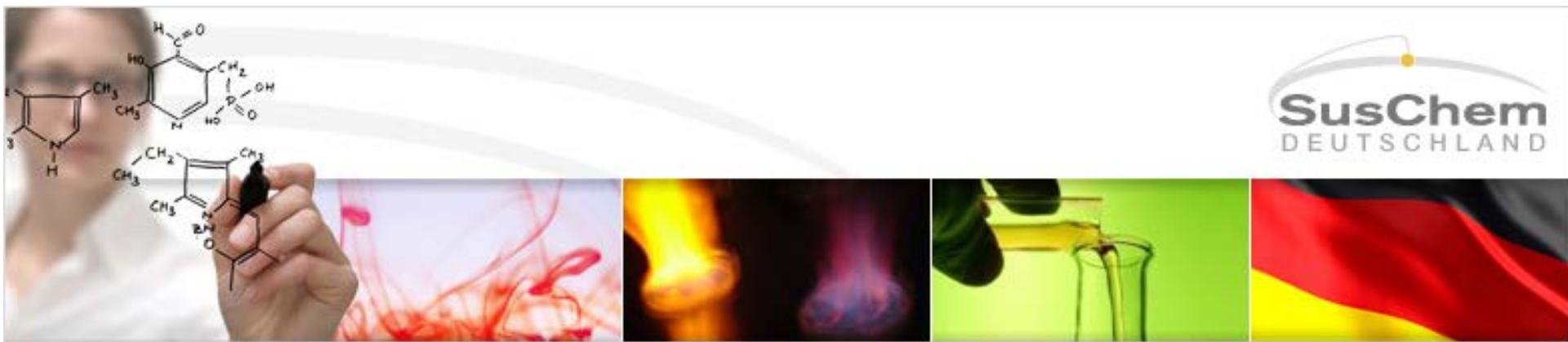# Working Party DEXPI ISO 15926
of
ProcessNet* Section „Process, Apparatus and Plant Technology"

DEXPI - Data EXchange Process Industry

* ProcessNet - A Joint initiative of DECHEMA and GVC/VDI

Austausch intelligenter Engineeringdaten mittels der ISO 15926 – Stand der Arbeitsgruppe DEXPI

M. Theißen, AixCAPE e.V., Aachen;
A. Teinert, H. Mannsperger, BASF SE, Ludwigshafen;
L. von Wedel, J. Kussi, Bayer Technology Services GmbH, Dormagen;
H. Temmen, H. Richert, Evonik Industries AG;
M. Wiedau, RWTH Aachen, Aachen

IDA 2013 - Integrierte Digitale Anlagenplanung und –führung
21. - 22. März 2013 im DECHEMA-Haus, Frankfurt am Main

Working party DEXPI ISO 15926
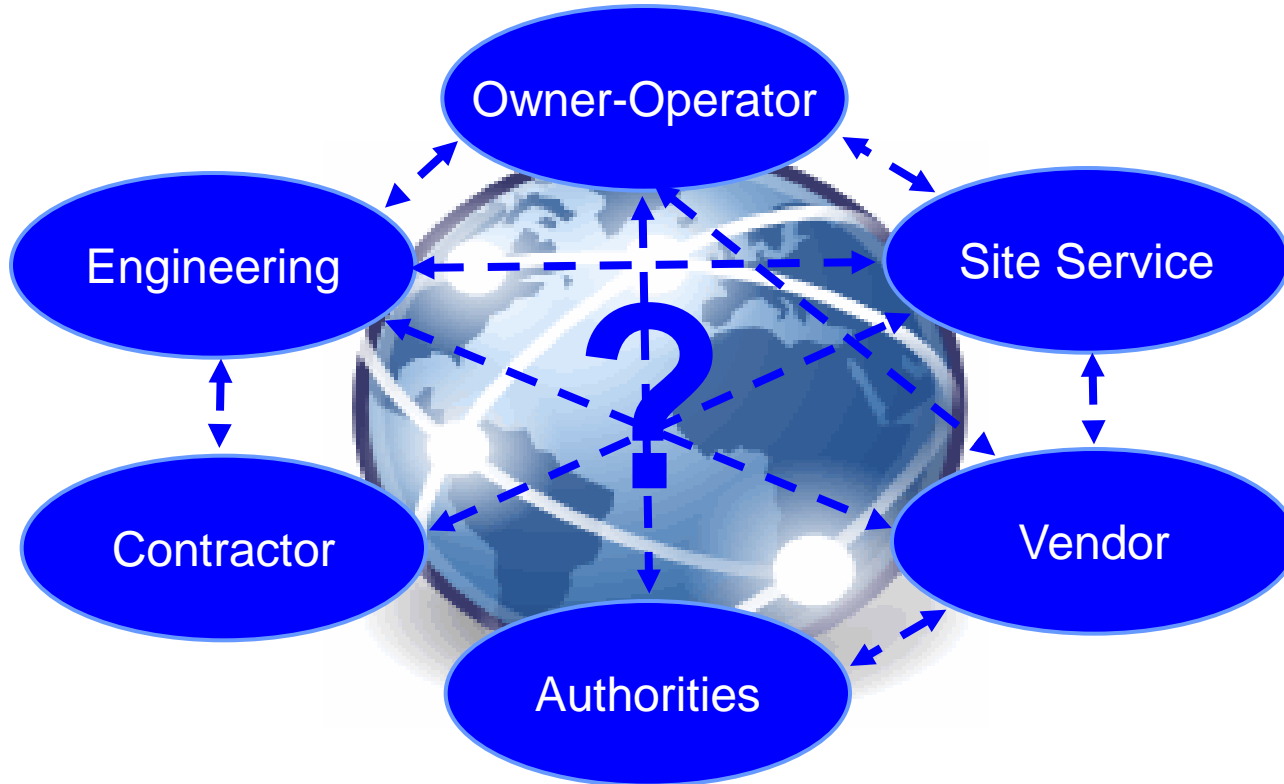
Agenda Part 1

- DEXPI Overview

- Use case P&ID exchange

- Challenges

- Technology

- Next steps

- Success factors

Part 2: Technology, Michael Wiedau

DEXPI – common problem

Lack of interoperability between CAE systems is a major business barrier
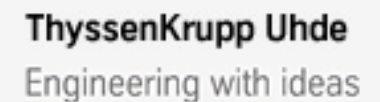
DEXPI

Focus

- Data exchange in plant life cycle
- Exchange of engineering data between disciplines & partners

Members

- BASF Engineering and Maintenance
- Bayer Technology Services
- Evonik Process Technology and Engineering
- ThyssenKrupp Uhde

- In cooperation with CAE vendors, research institutions and Fiatech
- working party Open for additional members
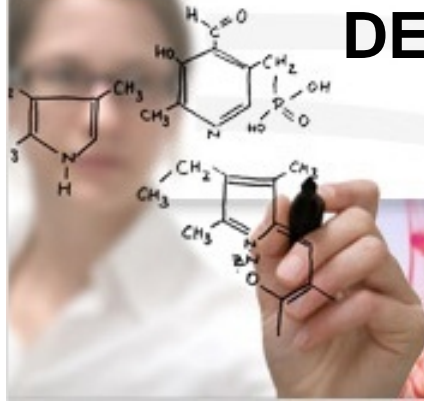- established in 2011

DEXPI - use of ISO 15926

"This International Standard specifies a representation of information associated with engineering, construction and operation of process plants. This representation supports:
- the information requirements of the ***process industries*** *in* ***all phases of a plant's life-cycle***;
- sharing and integration of information ***amongst all parties*** *involved in the plant's life-cycle."*

„The following are ***outside*** *the scope of ISO 15926:*
- ***commercial, business, and administrative data*** *that are not directly related to the engineering, operation and maintenance of process plants."*

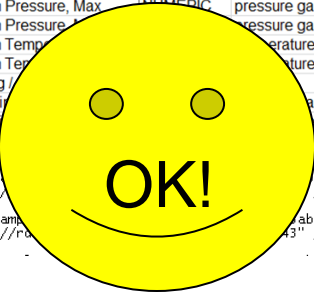# DEXPI proof of concept ISO 15926 – PAAT Fulda 2011

Some equipment properties as ISO 15926 OWL format

DEXPI - common goals

General standard for the process industry based on ISO 15926, implemented in the next CAE software generation

Input from process industry (working party DEXPI ISO 15926):
Open and international information model for the entire plant lifecycle

Functional Requirements → **Functional Design** → **Asset Specification** → **Asset in Operation**

Input from the CAE vendors:
- General exchange standard for graphics
- export and import functions based on the new information model and graphics standard

DEXPI - roadmap until 2015

Project Timeline: DEXPI ISO 15926

2011
- modeling of 3 apparatus types with some attributes
- first software prototypes from 5 CAE vendors
- successful presentation at PAT Fulda

2012
- modeling of some PID classes (EQ...E&I, Piping), obj... and Attributes
- first software prototype for PI... export and imp...

Frankfurt, Dechema, 9.3.2012

White paper
Data exchange with ISO 15926

ISO 15926 DECHEMA working group, BASF, Bayer, Evonik, Linde, Uhde

Motivation
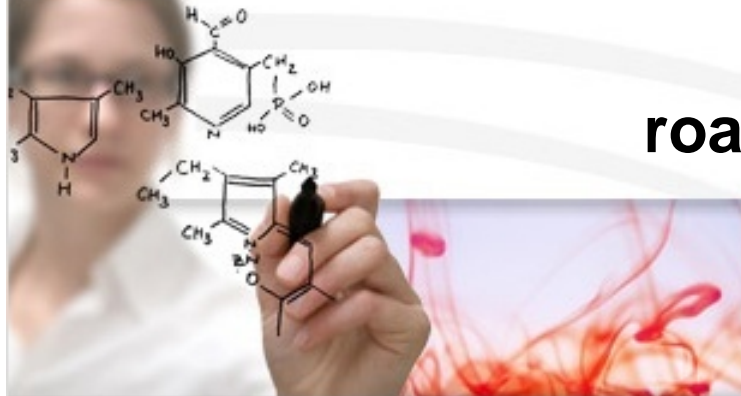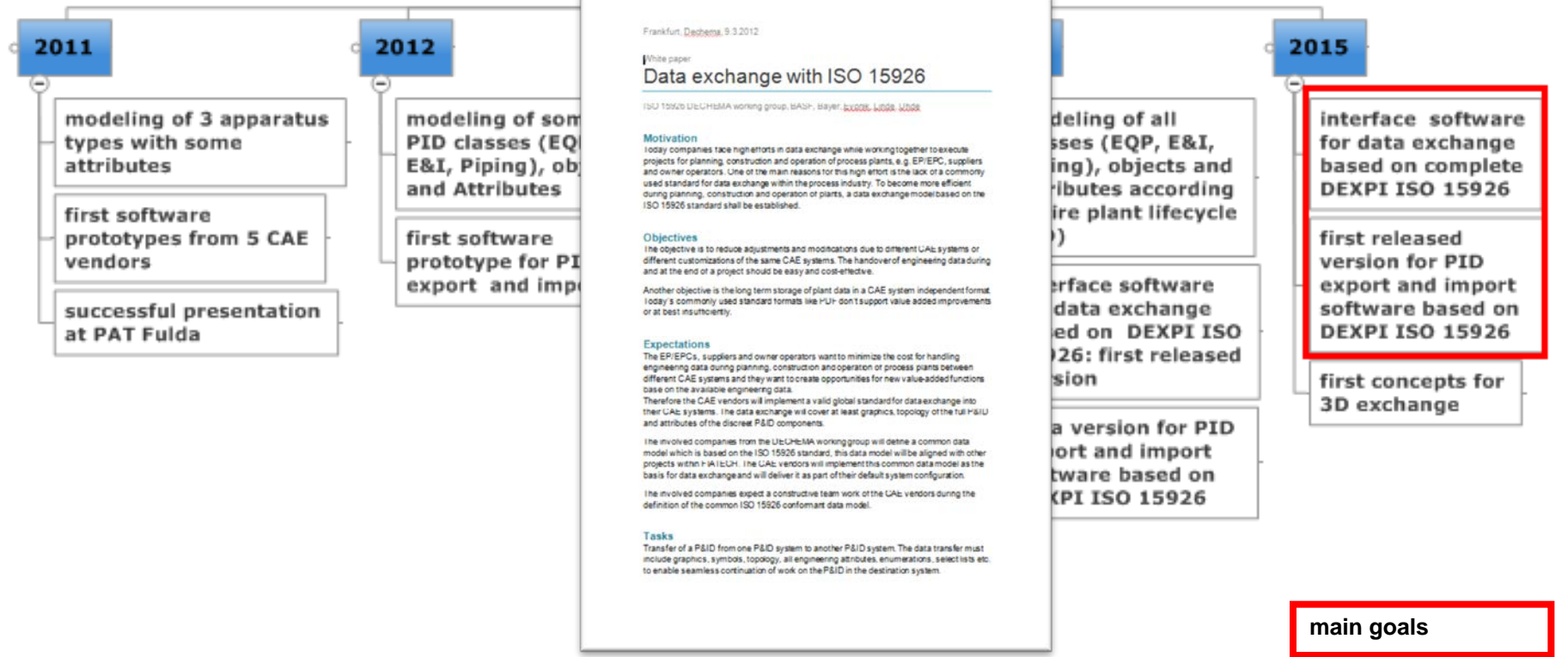Today companies face high efforts in data exchange while working together to execute projects for planning, construction and operation of process plants, e.g. EP/EPC, suppliers and owner operators. One of the main reasons for this high effort is the lack of a commonly used standard for data exchange within the process industry. To become more efficient during planning, construction and operation of plants, a data exchange model based on the ISO 15926 standard shall be established.

Objectives
The objective is to reduce adjustments and modifications due to different CAE systems or different customizations of the same CAE systems. The handover of engineering data during and at the end of a project should be easy and cost-effective.

Another objective is the long term storage of plant data in a CAE system independent format. Today's commonly used standard formats like PDF don't support value added improvements or at best insufficiently.

Expectations
The EP/EPCs, suppliers and owner operators want to minimize the cost for handling engineering data during planning, construction and operation of process plants between different CAE systems and they want to create opportunities for new value-added functions base on the available engineering data.
Therefore the CAE vendors will implement a valid global standard for data exchange into their CAE systems. The data exchange will cover at least graphics, topology of the full P&ID and attributes of the discreet P&ID components.

The involved companies from the DECHEMA working group will define a common data model which is based on the ISO 15926 standard, this data model will be aligned with other projects within FIATECH. The CAE vendors will implement this common data model as the basis for data exchange and will deliver it as part of their default system configuration.

The involved companies expect a constructive team work of the CAE vendors during the definition of the common ISO 15926 conformant data model.

Tasks
Transfer of a P&ID from one P&ID system to another P&ID system. The data transfer must include graphics, symbols, topology, all engineering attributes, enumerations, select lists etc. to enable seamless continuation of work on the P&ID in the destination system.

- ...deling of all ...sses (EQP, E&I, ...ing), objects and ...ributes according ...ire plant lifecycle ...)
- ...erface software ...data exchange ...sed on DEXPI ISO ...26: first released ...sion
- ...a version for PID ...ort and import ...ftware based on ...XPI ISO 15926

2015
- interface software for data exchange based on complete DEXPI ISO 15926
- first released version for PID export and import software based on DEXPI ISO 15926
- first concepts for 3D exchange

main goals

Use case P&ID exchange – challenges

What makes exchange of P&IDs difficult?

- Symbol mismatch across systems, insufficient standard so far

- Transferring intelligent labels – what is desired?

- Start small (P&ID) and extend later

  - all engineering data

  - on the full plant lifecycle
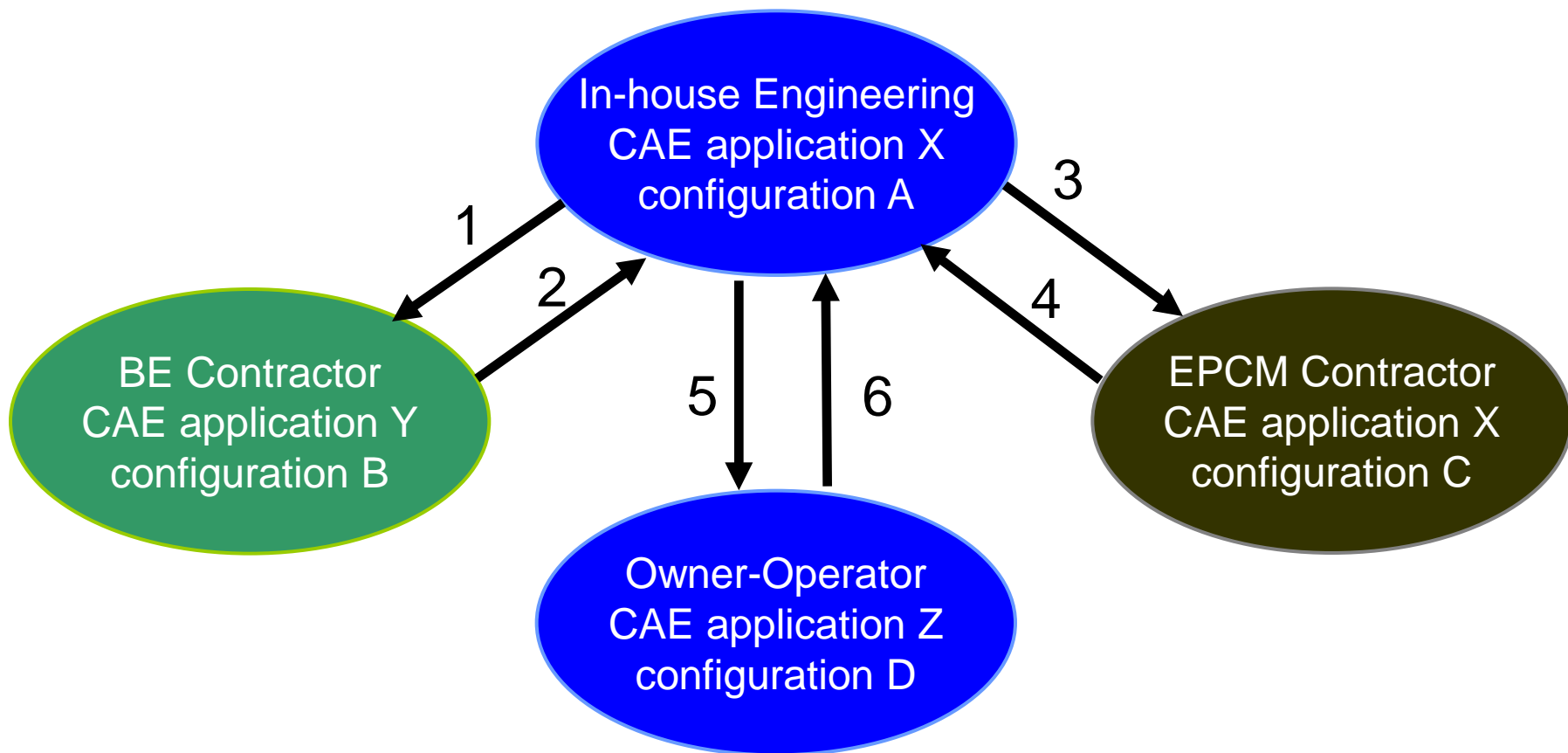
- CAE -> CAE and CAE -> CAD

- Keep it simple!

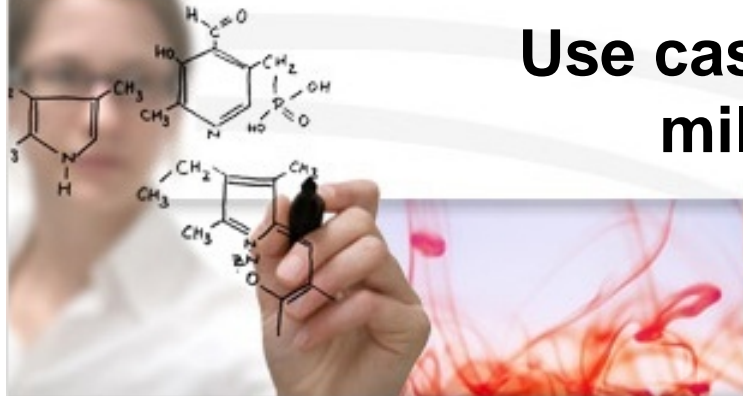# Use case P&ID exchange – challenges

What makes the process difficult?

- ONE common data model between all parties

- DEXPI model for all disciplines

- DEXPI model as a general information model for the process industry

- Every standard needs implementations

- Early involvement of the CAE vendors required

- Limited budgets and resources

- Communication of the benefits

Use case P&ID exchange – quick wins - examples

In-house Engineering
CAE application X
configuration A

BE Contractor
CAE application Y
configuration B

EPCM Contractor
CAE application X
configuration C

Owner-Operator
CAE application Z
configuration D

1

2

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5

6

P&ID export of

- equipment symbols
- equipment data
- equipment label
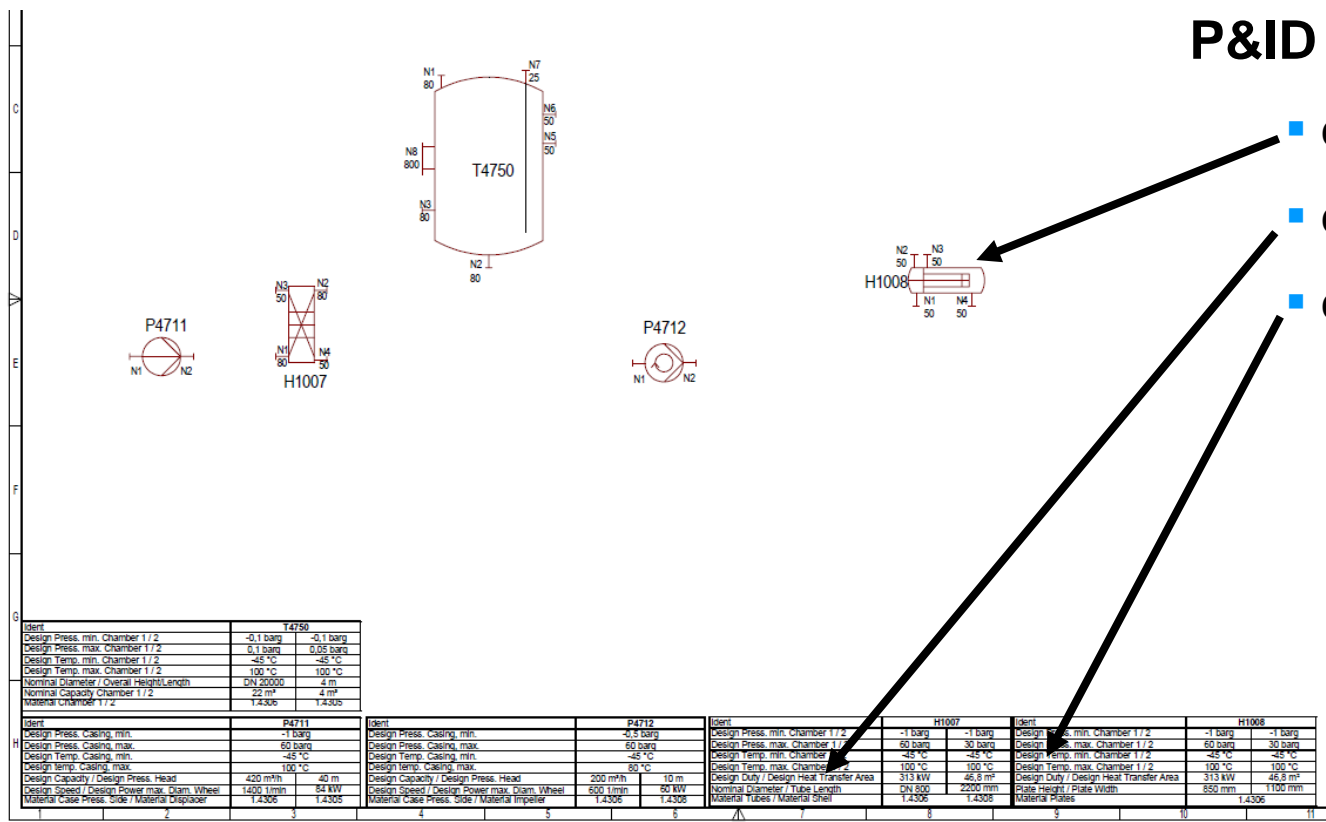
Technology – Proteus / XMpLant schema to bridge the gap for P&IDs

to bridge the gap

ISO 15926 Part4 XMpLant

ISO 15926 Part7/Part8

No or poor data exchange
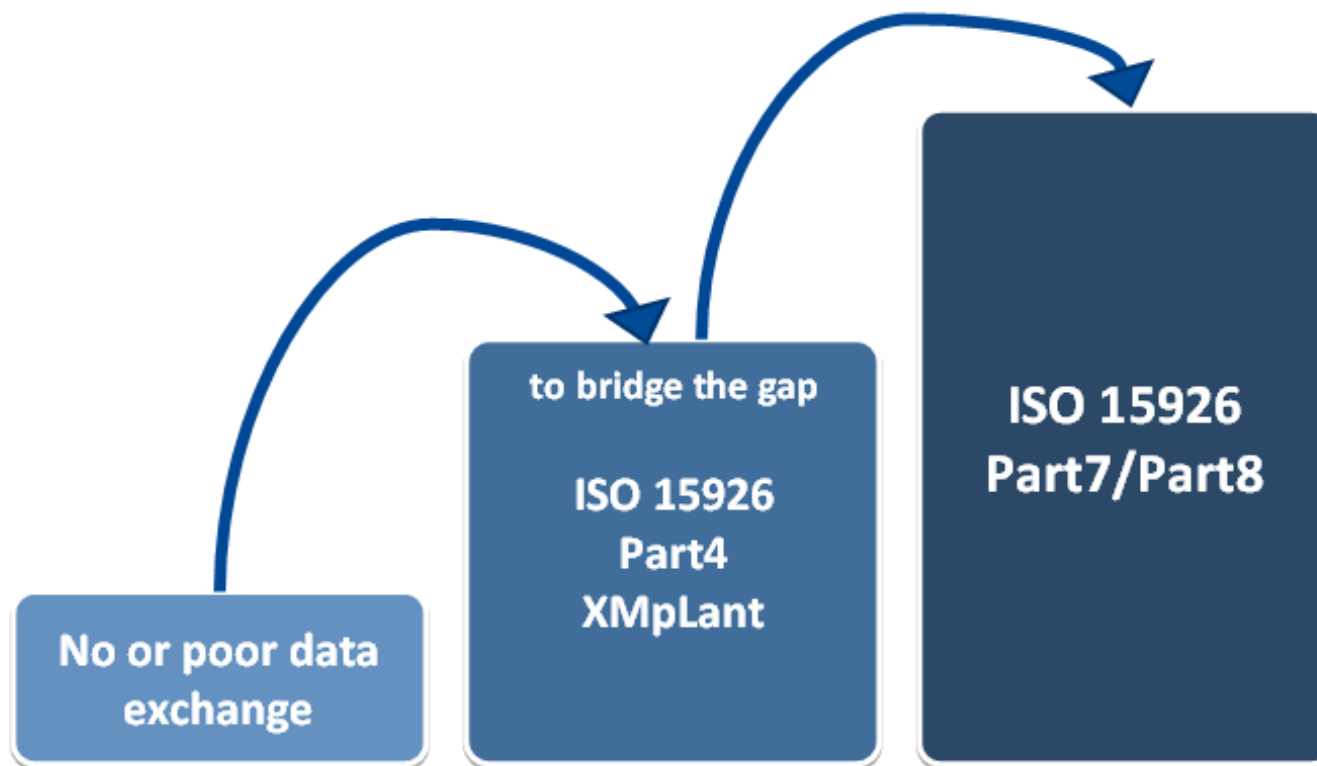
Data part OK, but graphic part is only well under way

Technology –
DEXPI information model
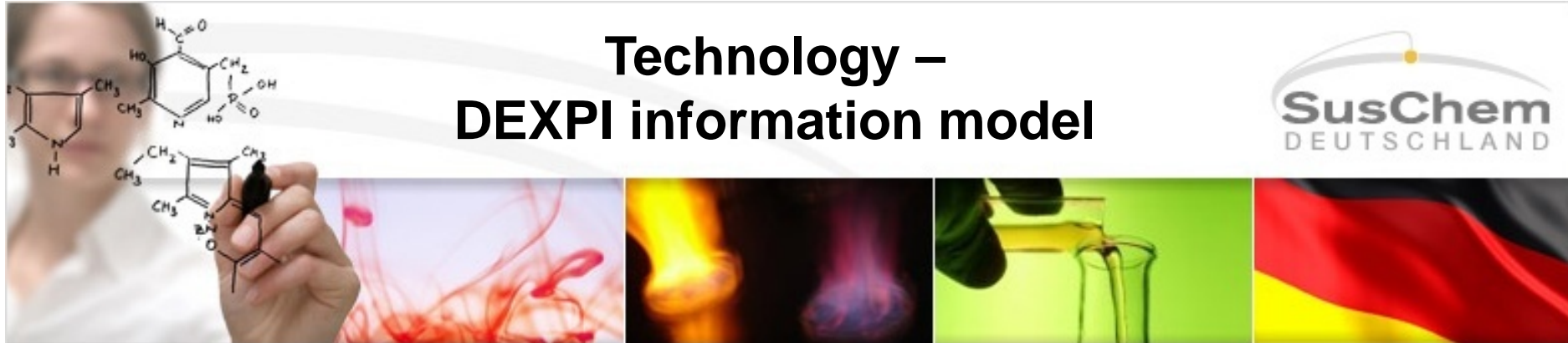
Current results so far

- Design of the information model
- using:
  - JORD/ISO Sandbox and
  - DEXPI Sandbox
- Domain registration of DEXPI.ORG
- Implementation rules for the use of XMpLant schema
- Validator for result files
- More details in part 2 of the presentation

JORD/ISO Sandbox

World standard

DEXPI Sandbox

Community
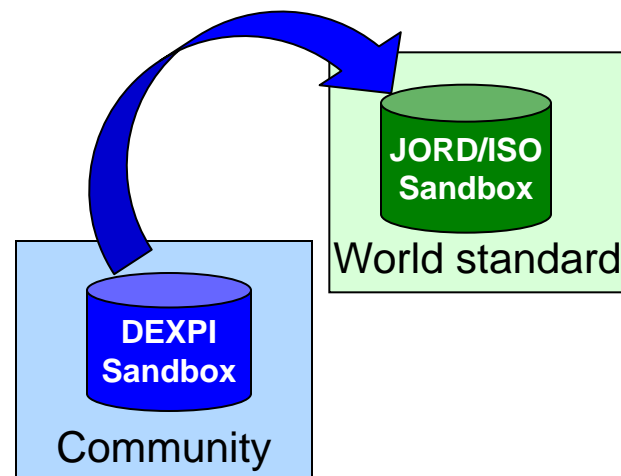
Use case P&ID exchange –
CAE vendor results

CAE Vendor	Support of DEXPI P&ID model according	Status 2013-03-22
Autodesk®	Proteus / XMpLant schema 3.3.3	☑
AVEVA CONTINUAL PROGRESSION	Proteus / XMpLant schema 3.3.3	☑
Bentley Sustaining Infrastructure	ISO Part 7/8 OWL	☑ (*)
INTERGRAPH®	Proteus / XMpLant schema 3.3.3	☑
SIEMENS	Proteus / XMpLant schema 3.3.3	☑

(*) graphic part is well under way

- **P&ID import of EQP examples**
- **P&ID export and import of**
  - **E&I**
    - objects and data
    - symbols and labels
    - topology
  - **Piping**
    - objects and data
    - symbols and labels
    - topology

Next steps – DEXPI timeline

EQP, E&I and Piping
in P&ID example:
import and export
2013-12

additional
Engineering data:
export and import
2015-12

2013-03
EQP in P&ID
example: export

2014-12
complete P&IDs:
export and import

t

SusChem DEUTSCHLAND

Roadmap agreement

Success factors – benefits

Common benefits for the process industry:

- Interoperability between CAE-Systems reduces time and costs for
  - operator-operator
  - engineering
  - site service
  - contractor and vendor
- coexistence of different systems in rapidly changing organizations / companies

Common benefits for the CAE industry:

- Large new market
- CAE instead of CAD
- CAE instead of paper
- basis for new functions and applications
  - semantic data consolidation
  - technical and economic evaluation of changes

Success factors – one crossover team

- **Owner / Operator: one team with same requirements**

- **Contractors: important additional point of view**

- **Universities and research institutions : best modeling approaches**

- **CAE vendors: good and open discussion about technology**

- **All together:**

  DEXPI ISO 15926 – a concept and a team

  to improve doing business

DEXPI