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

DEXPI - Data **EX**change **P**rocess **I**ndustry

* ProcessNet – an Initiative of DECHEMA and VDI-GVC

DEXPI (Data EXchange Process Industry) Based on ISO 15926 – Status of the P&ID Project

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G. Pilatzki, ThyssenKrupp Uhde, Dortmund;
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M. Wiedau, RWTH Aachen, Aachen;

PAAT
18th and 19th of November 2013, Bruchsal

Working party DEXPI ISO 15926

- Review
- Milestones 2013: Use case P&ID exchange
- Next steps in 2014
- Success factors
- Summary

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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

BASF The Chemical Company

BAYER

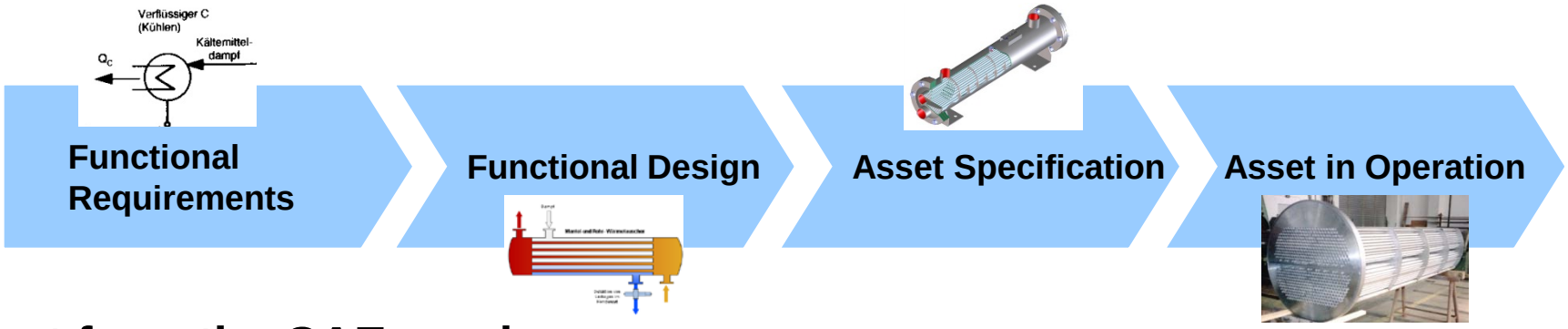
EVONIK INDUSTRIES

ThyssenKrupp Uhde
Engineering with ideas

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



Input from the CAE vendors:

- general exchange standard for graphics
- export and import functions based on the new information model and graphics standard

DEXPI proof of concept ISO 15926 – PAAT Fulda 2011

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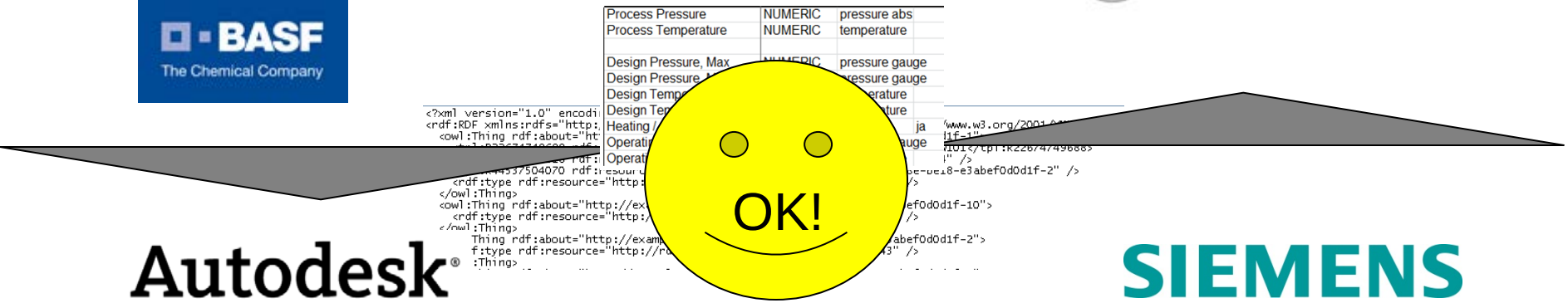
some equipment properties as ISO 15926 OWL format

EVONIK INDUSTRIES

Process Pressure	NUMERIC	pressure abs
Process Temperature	NUMERIC	temperature
Design Pressure, Max	NUMERIC	pressure gauge
Design Pressure		ressure gauge
Design Temp		erature
Design Ten		ature
Heating		ja
Operati		auge
Operat		



Autodesk®

SIEMENS

AVEVA CONTINUAL PROGRESSION

INTERGRAPH®

Bentley Sustaining Infrastructure

DEXPI timeline
with prime focus on P&ID

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2013-03
EQP in P&ID example: export

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

2014-12
complete P&IDs: export and import

additional Engineering data: export and import 2015-12

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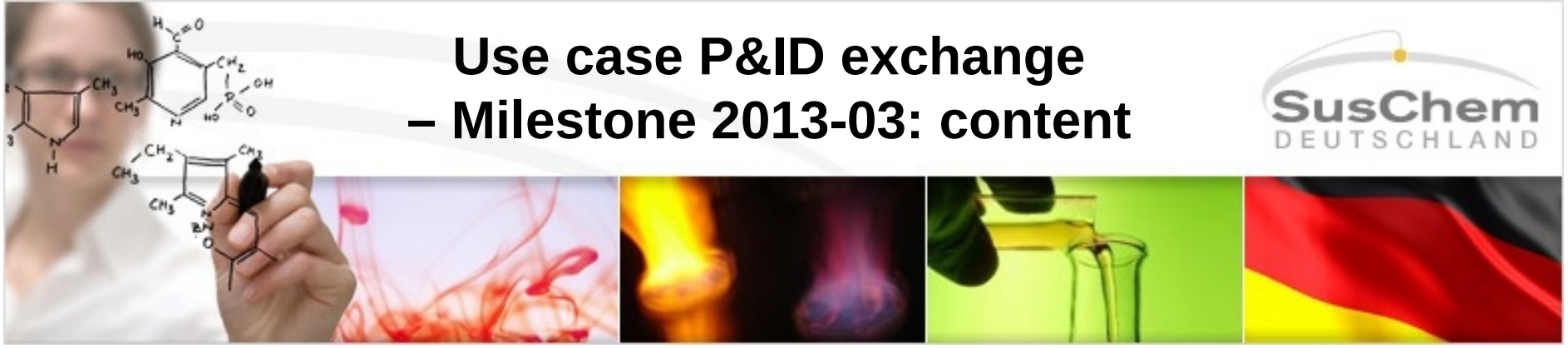
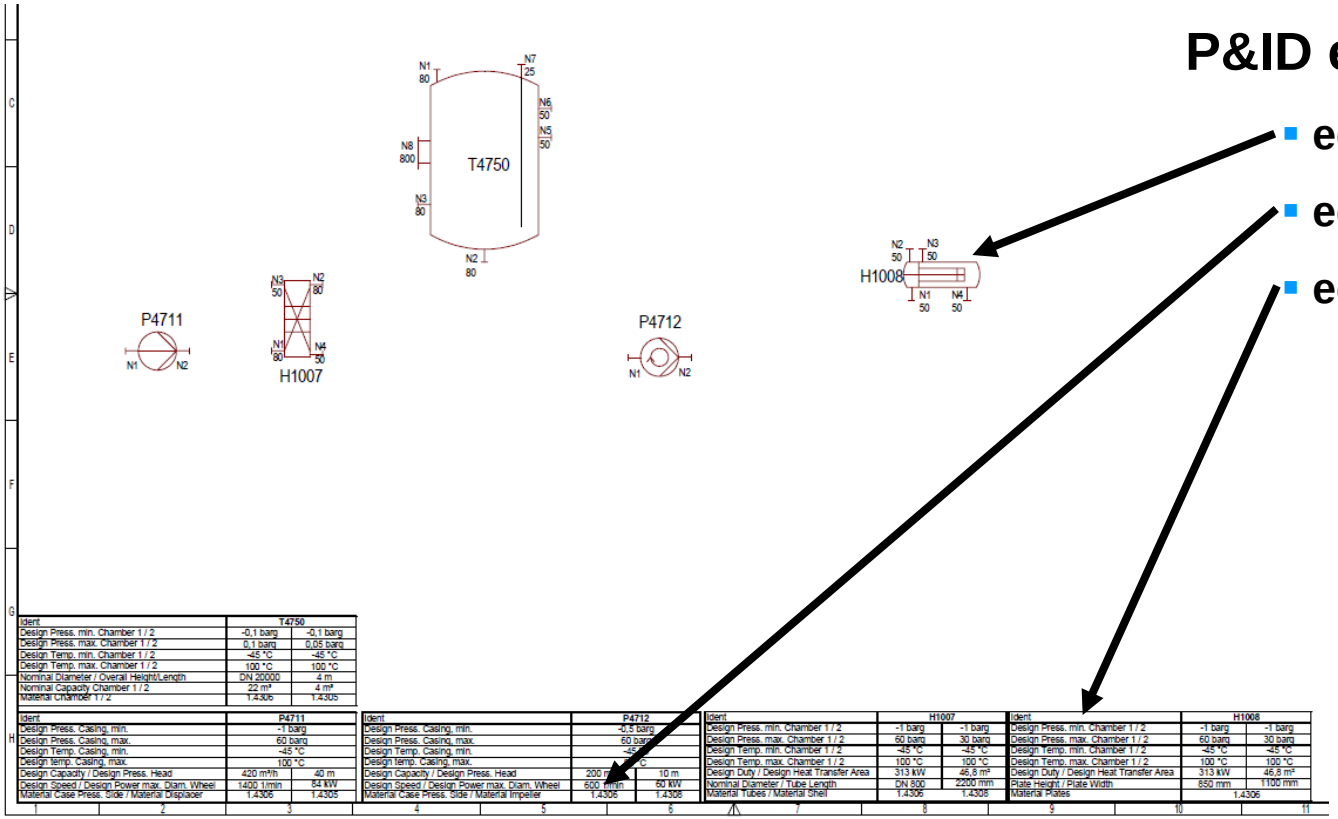
Use case P&ID exchange – Milestone 2013-03: content





Ident	T4750	
Design Press. min. Chamber 1 / 2	-0,1 barg	-0,1 barg
Design Press. max. Chamber 1 / 2	0,1 barg	0,05 barg
Design Temp. min. Chamber 1 / 2	-45 °C	-45 °C
Design Temp. max. Chamber 1 / 2	100 °C	100 °C
Nominal Diameter / Overall Height/Length	DN 20000	4 m
Nominal Capacity Chamber 1 / 2	22 m³	4 m³
Material Chamber 1 / 2	1.4306	1.4305

Ident	P4711	
Design Press. Casing, min.	-1 barg	
Design Press. Casing, max.	60 barg	
Design Temp. Casing, min.	-45 °C	
Design temp. Casing, max.	100 °C	
Design Capacity / Design Press. Head	420 m³/h	40 m
Design Speed / Design Power max. Diam. Wheel	1400 1/min	84 kW
Material Case Press. Side / Material Displacer	1.4306	1.4305

Ident	P4712	
Design Press. Casing, min.	-0,5 barg	
Design Press. Casing, max.	60 barg	
Design Temp. Casing, min.	-45 °C	
Design temp. Casing, max.	100 °C	
Design Capacity / Design Press. Head	200 m³/h	10 m
Design Speed / Design Power max. Diam. Wheel	500 1/min	60 kW
Material Case Press. Side / Material Impeller	1.4306	1.4308

Ident	H1007	
Design Press. min. Chamber 1 / 2	-1 barg	-1 barg
Design Press. max. Chamber 1 / 2	60 barg	30 barg
Design Temp. min. Chamber 1 / 2	-45 °C	-45 °C
Design Temp. max. Chamber 1 / 2	100 °C	100 °C
Design Duty / Design Heat Transfer Area	313 kW	46,8 m²
Nominal Diameter / Tube Length	DN 800	2200 mm
Material Tubes / Material Shell	1.4306	1.4308

Ident	H1008	
Design Press. min. Chamber 1 / 2	-1 barg	-1 barg
Design Press. max. Chamber 1 / 2	60 barg	30 barg
Design Temp. min. Chamber 1 / 2	-45 °C	-45 °C
Design Temp. max. Chamber 1 / 2	100 °C	100 °C
Design Duty / Design Heat Transfer Area	313 kW	46,8 m²
Plate Height / Plate Width	850 mm	1100 mm
Material Plates	1.4306	

P&ID export of

- equipment symbols
- equipment data
- equipment label

Use case P&ID exchange – Milestone 2013-03: technology

Technology – Proteus / XMpLant schema to bridge the gap for P&IDs

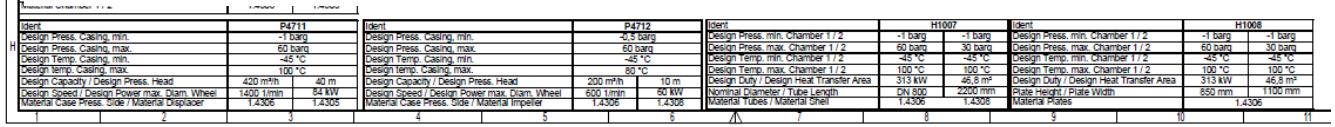
No or poor data exchange

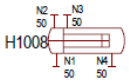
to bridge the gap

ISO 15926 Part4 XMpLant

ISO 15926 Part7/Part8

Data part OK, but graphic part is only well under way





DEXPI Sandbox

Community

JORD RDL Sandbox

World standard

Current step – DEXPI milestone 2013-12

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

Use case P&ID exchange – CAE vendor results

CAE Vendor	Support of DEXPI P&ID model according to	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

DEXPI milestone 2013-12 P&ID - General requirements

Engineers may have

- **old fashion P&IDs**
- **up-to-date P&IDs**
- **P&IDs with**
  - **different regional standards**
  - **incomplete or generic information, e.g. in early project phases**
  - **inconsistent information**

➢ **wide bandwidth to be covered**

DEXPI milestone 2013-12 P&ID - General requirements

P&IDs as instances with different depth, quality, information

Therefore the information model

- **is not a P&ID rule set**
- **is a model which allows P&ID transports between applications without information loss**

It is a model about process plant objects

- **to transport data and graphic representation**
- **where the depth of information is defined by a common set called P&ID**

Working party DEXPI ISO 15926 - Split of work

O/O, C
- coordination
- requirements

Research
- conceptual model
- best practice file
- validator
- home page
- spec documentation

CAE vendors
- XMpLant know-how
- ISO know-how
- implementation

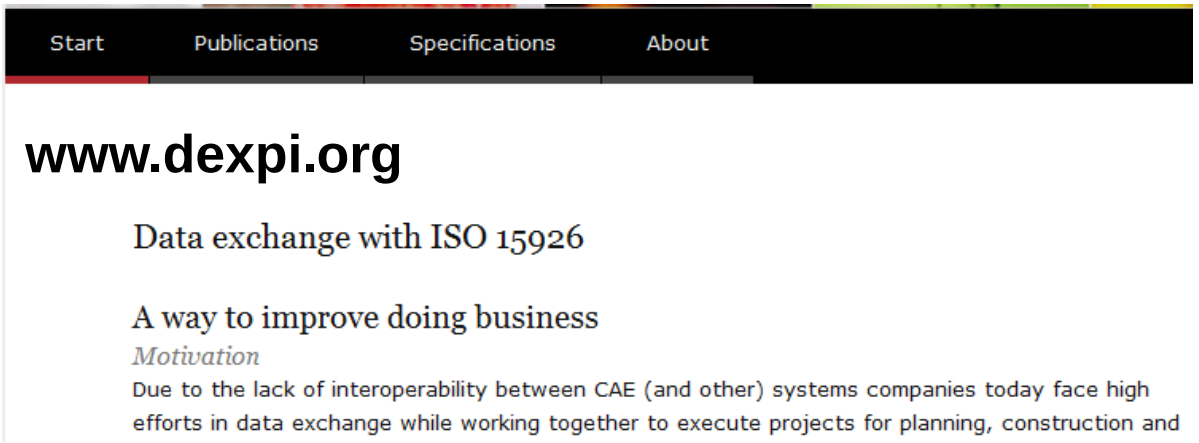
ISO-Community
- model support
- model extension

DEXPI milestone 2013-12
- Topics and solutions

EQP	+
Piping	+
Instrumentation	under discussion
Engineering content	+
Topology	+
Symbols	+
Labels	+

DEXPI milestone 2013-12
- Topics and solutions

- **best known version XMpLant file** **+**
- **validator and viewer** **+**
- **file specification** **under preparation**
- **DEXPI home page** **+**



DEXPI
- Communication 2013

DEXPI presentations

- IDA (Integrierte Digitale Anlagenplanung), 2013-03, Frankfurt
- Semantic Days (POSC Caesar ISO 15926 annual meeting), 2013-05, Stavanger, Norway
- Fiatech European Advisory Council Meeting, 2013-07, London
- Digital Plant Kongress, 2013-10, Würzburg

DEXPI
- Modeling groups 2013

DEXPI participates in

- IIMM (ISO 15926 Information Models and Proteus Mappings)
  - P&ID and 3D
  - ISO 15926 Part 4, 7 and XMpLant Schemata
  - geometric and non-geometric data
- MMT (PCA Modeling, Methods and Technology)
  - general models, templates, etc.
  - currently working on cleaning up template catalogue

DEXPI
- Contacts 2013

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DEXPI contacts

- PIP (Process Industry Practices, North America)
  - exchange of experiences
- additional international contractor
  - new DEXPI member
- additional CAE vendors
  - new DEXPI members:

    AUCOTEC and DASSAULT SYSTEMES

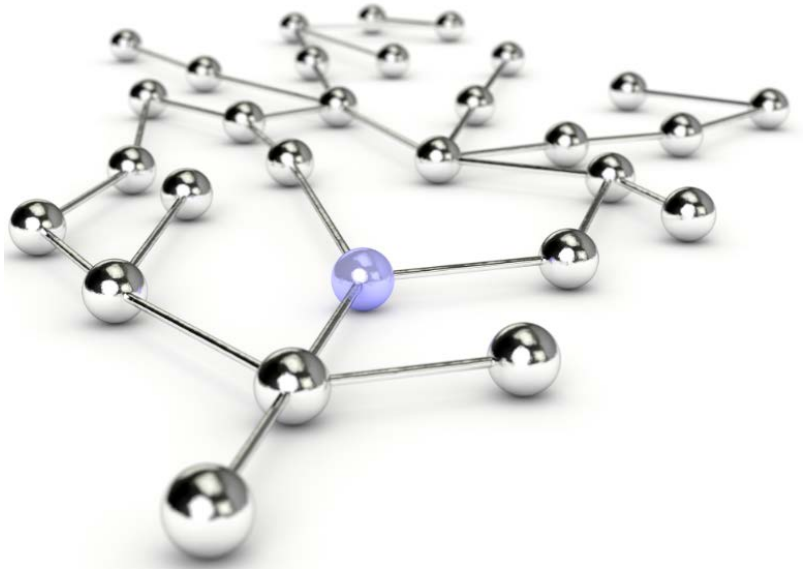
DEXPI Roadmap 2014 - Topics

Full P&ID scope of

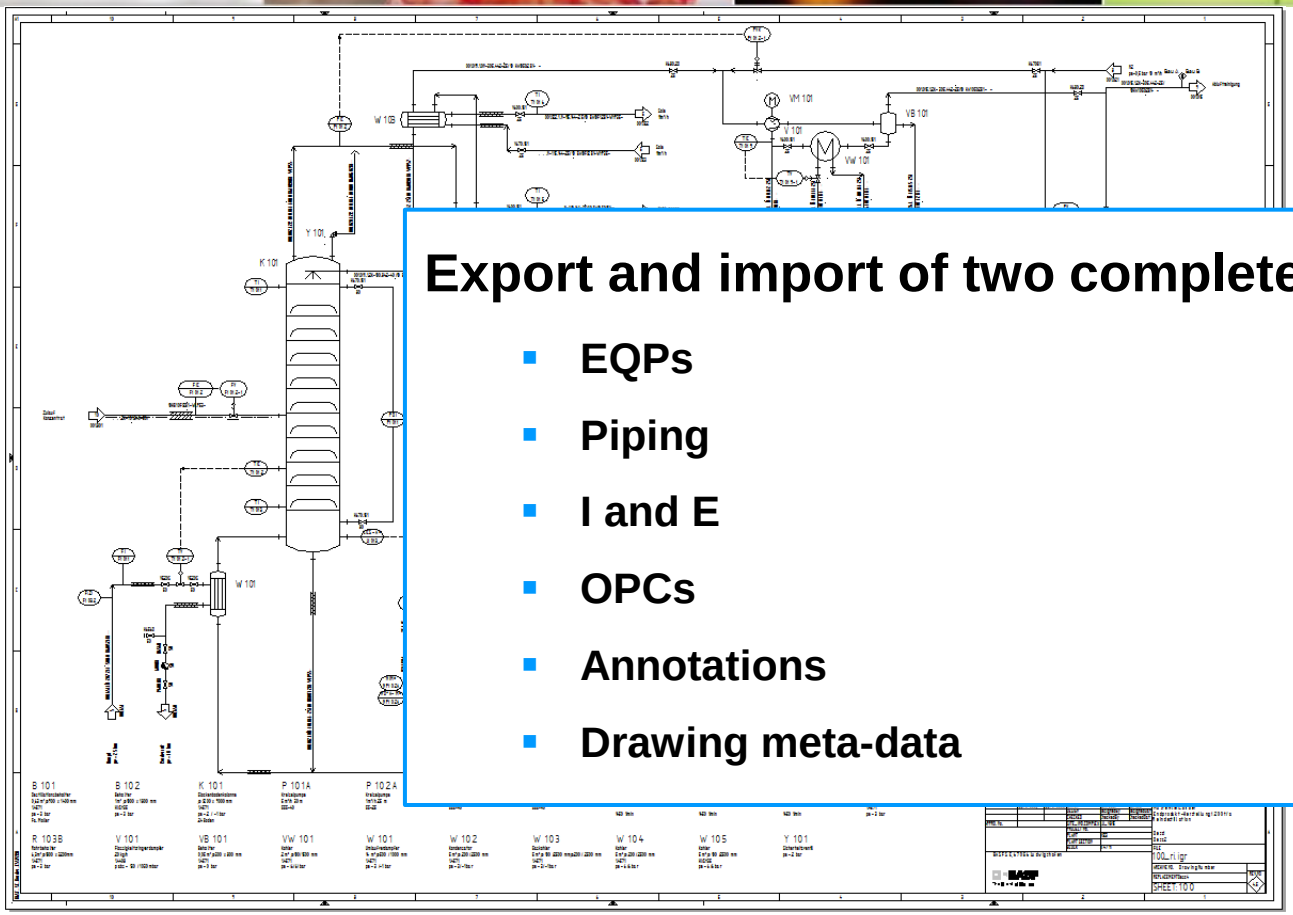
- Electrical and instrumentation
- EQP (attributes and equipment types)
- Piping
- Off page connectors
- Annotations
- Drawing meta-data (title block)
- Redlining (?)
- Revisioning (?)

DEXPI Roadmap 2014
- Community and communication

- continue the communication with IIMM
  (ISO 15926 and Proteus XMpLant)
- start the process:
  DEXPI sandbox to PCA sandbox
- get in closer contact with USPI
  (ISO 15926 group, Netherland)
- extend the DEXPI group with
  - owners / operators
  - contractors
  - CAE vendors



DEXPI – PAAT 2014



Export and import of two complete P&IDs including

- **EQPs**
- **Piping**
- **I and E**
- **OPCs**
- **Annotations**
- **Drawing meta-data**

DEXPI – Roadmap agreement 2014

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Roadmap agreement

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☑

SIEMENS

AVEVA
CONTINUAL PROGRESSION

(INTERGRAPH®)

Bentley®
Sustaining Infrastructure

Success factors – one crossover team

- **Owner / Operator: one team with clear requirements**
- **Contractors: important additional point of view**
- **Universities and research institutions: best modeling approaches**
- **CAE vendors: good and open discussion about technology**
- **ISO 15926 modeling projects: extension of the ISO 15926 standard**
- **All together: DEXPI ISO 15926 – a concept and a team to improve doing business**

Success factors – CAE market

Opportunities for the CAE industry:

- large new market: operation
- CAE instead of CAD and paper
- Migration / handover services
- basis for new functions and applications
  - semantic data consolidation
  - technical, economic and ecological evaluation of changes
  - augmented reality
  - virtual startup
  - mobile devices
  - and many others

Success factors – Benefits process industry

Common benefits for the process industry:

- interoperability between CAE-Systems reduces time and costs for
  - engineering
  - contractors and vendors
  - owners and operators
  - site services
- coexistence of different systems in rapidly changing organizations / companies

DEXPI
Summary

- In 2013 many P&ID exchange topics were solved!
- First implementations were made by the CAE vendors!
- DEXPI is by now a well-known member of the ISO 15926 community!
- The next step in 2014 will be the full P&ID exchange!
- More international communication is required!
- DEXPI will be successful!
- Some more speed would be good!
- New DEXPI members are always welcome!

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CAE vendor solutions

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Next session: CAE vendor presentations

- *M. Elo* — *Siemens*
- *R. Engels* — *Bentley*
- *J. Muelhens* — *Intergraph*
- *R. Meyer-Rössl* — *Autodesk*
- *M. Herrmann* — *Aveva*