

P&ID Exchange for NOAKA

A DEXPI Application
in the Oil & Gas Industry

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ProcessNet Arbeitsausschuss

„Digitale Technologien in Anlagenbau,
Betrieb und Service“



www.plants-and-bytes.de

NOAKA

- oil and gas field in the Norwegian North Sea
- development and operation licensed to
 - Aker BP (Operator South)
 - Equinor (Operator North)
 - LOTOS Exploration and Production Norge
- synergies through common facilities
 - ⇒ common planning required
 - ⇒ e.g., **common P&IDs required**

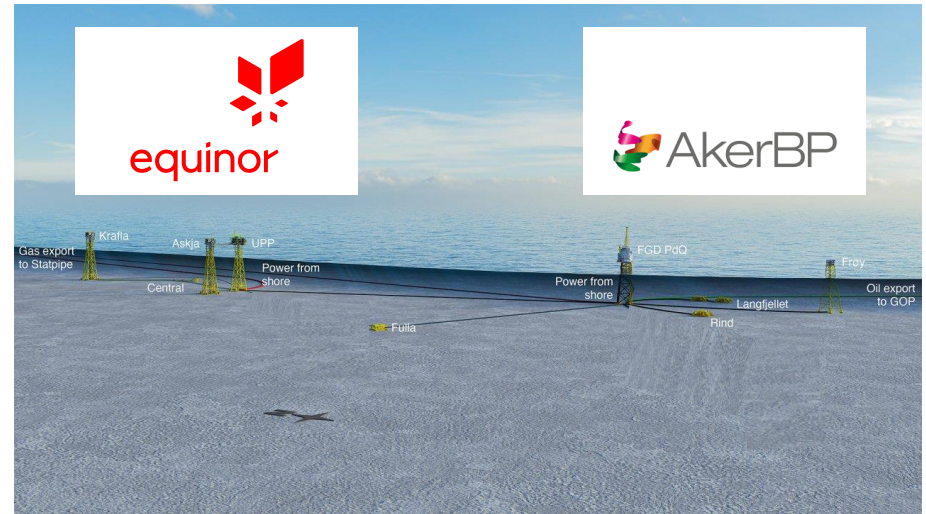
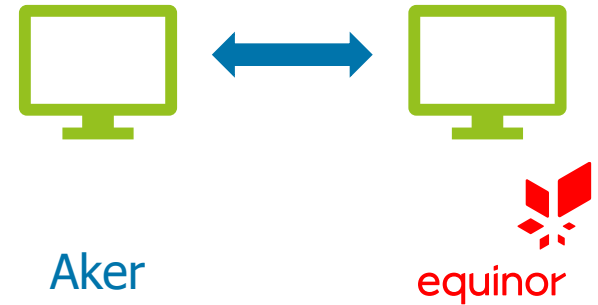


image source:

<https://www.equinor.com/no/news/2020-06-11-krafla-fulla-north-alvheim.html>

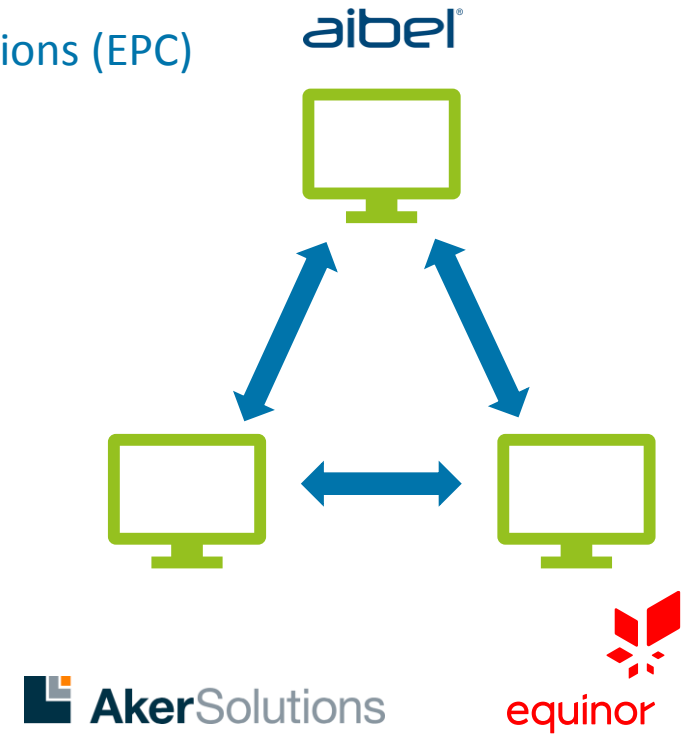
Requirements for P&ID exchange in NOAKA project

- between Aker BP, Equinor



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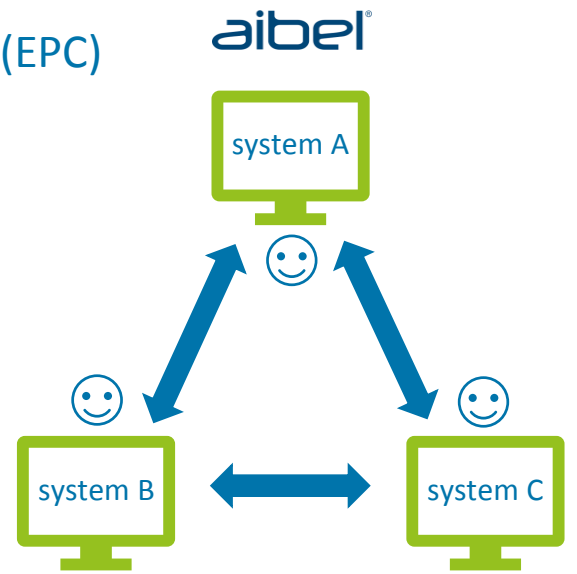
- between Aker BP, Equinor, Aibel (EPC), Aker Solutions (EPC)



Requirements for P&ID exchange in NOAKA project

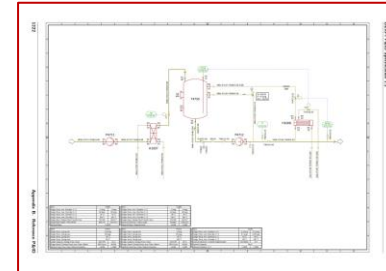
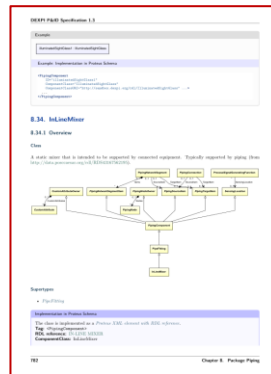
- between Aker BP, Equinor, Aibel (EPC), Aker Solutions (EPC)
- between different CAE systems with specific configurations
- “high quality seamless integration”
 - imported P&IDs not distinguishable from native P&IDs w.r.t. data & graphics
 - integrated roundtrip, e.g., $A \rightarrow C \rightarrow A$

Let's use DEXPI!



DEXPI – Data Exchange in the Process Industry

- Working Party of ProcessNet
- goal: general data exchange standard for the process industry
- current focus: exchange of P&IDs
- DEXPI P&ID Specification 1.3, see www.dexpi.org



DEXPI exchange format for P&IDs

DEXPI specifies an **exchange format**

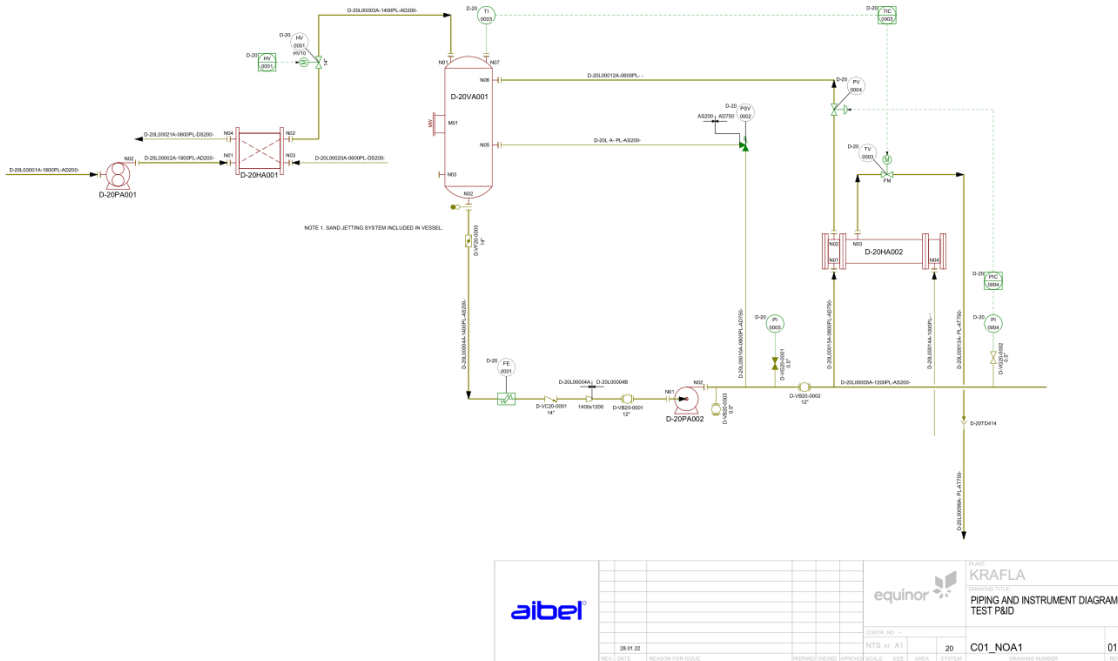
- a standardized way to transfer the information that is available in one system to another system

DEXPI

- is **not** a drawing standard
- does **not** prescribe the amount of information to be transferred
- does **not** prescribe the level of formalization to be transferred

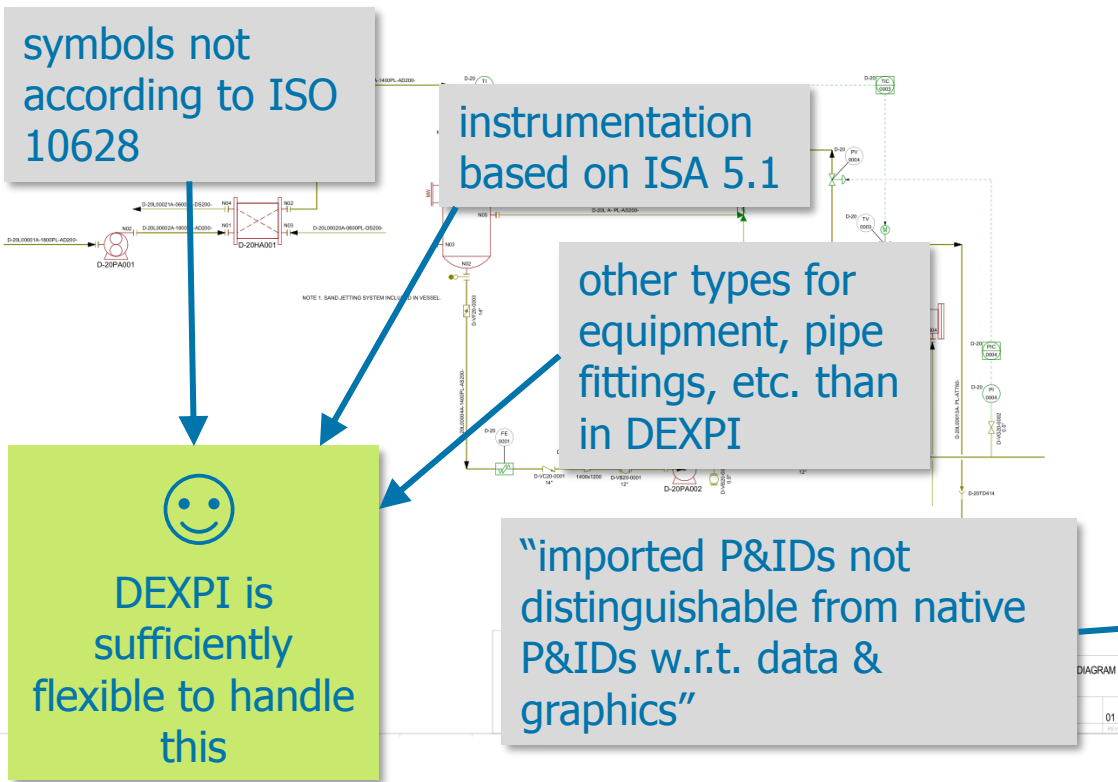
because this would disable its use for many application areas

DEXPI reference P&ID – NOAKA version



- first NOAKA milestone until March 2022: transfer NOAKA version of DEXPI reference P&ID
- later: milestones with real NOAKA P&IDs

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NOAKA profile for DEXPI

Idea: Define requirements for NOAKA, e.g.,

- exact appearance of symbols
- which classes and attributes to use
- mandatory amount of information using the DEXPI vocabulary.

NOAKA Profile

which information to
transport

<https://github.com/equinor/NOAKADEXPI>



DEXPI P&ID
Specification

how to transport this
information








exchange format
for NOAKA P&IDs

Excerpt from NOAKA profile

symbol IDs

DEXPI classes

DEXPI ID	Graphic	Grouping	Description	DEXPI Class	Type Name for Custom Class	Type URI for Custom
145 PV004A		Valve	Valve Four Way	CustomOperatedValve	FOUR WAY VALVE	http://data.posccaesar.org/rdl/RDS6689411
146 PD012A		Drilling	Rotary Valve	CustomOperatedValve	ROTARY VALVE	http://data.posccaesar.org/rdl/RDS7018814
147 PP017A		Equipment	Agitator	Agitator	AGITATOR	http://data.posccaesar.org/rdl/RDS16045622
148 ND0012		Valve	Wedge Gate Valve	CustomOperatedValve	WEDGE GATE VALVE	http://data.posccaesar.org/rdl/RDS851579
149 PS003A		In-line component	Spade	PipeFlangeSpade	PIPE FLANGE SPADE	http://data.posccaesar.org/rdl/RDS472679

definition of symbols –
details such as size, origo, label
positions in separate files

class identifiers to be used in
exchange files

Status of NOAKA project

- first milestone in March 2022:
a recent Hackathon has shown that we are on a good way
- elaboration of complete profile and further requirements in progress

Lessons learnt for DEXPI

- DEXPI can handle various types of P&IDs (oil & gas, chemical, ...)
- flexibility thanks to “custom classes” and “custom attributes”
- for certain use cases, additional conventions are required → “profiles”
 - NOAKA is the first project to elaborate a profile
 - NOAKA provides input for the definition of a general profile methodology that is currently discussed in the DEXPI Working Group
 - possible outcome: an exchange format for profiles that enables the automatic setup of CAE tools for a certain use case
- suggestions for DEXPI Information Model
 - notes, “custom associations”, ...

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