

P&ID exchange in stormy seas – DEXPI shows profile

R&I-Austausch auf
stürmischer See –
DEXPI zeigt Profil

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Jahrestreffen PAAT

DECHEMA-Haus, Frankfurt am Main



www.plants-and-bytes.de

NOAKA Collaboration

- 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**

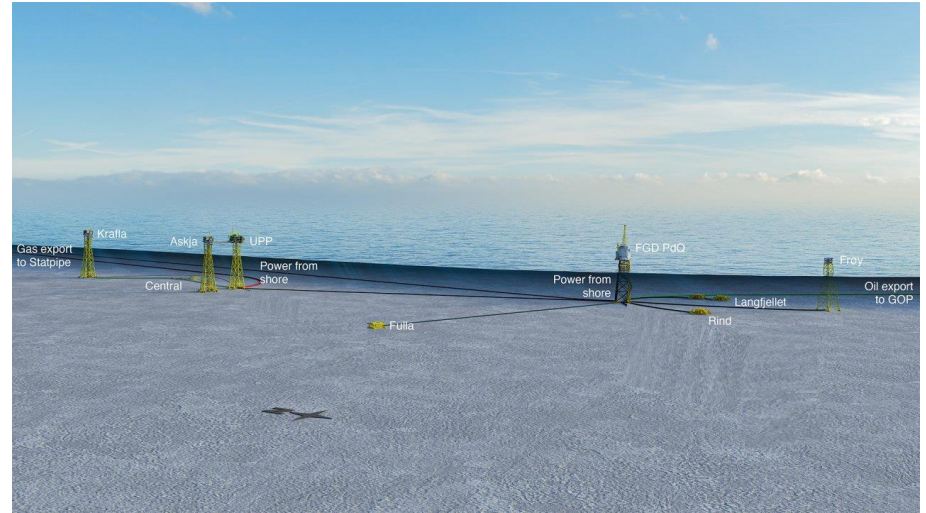


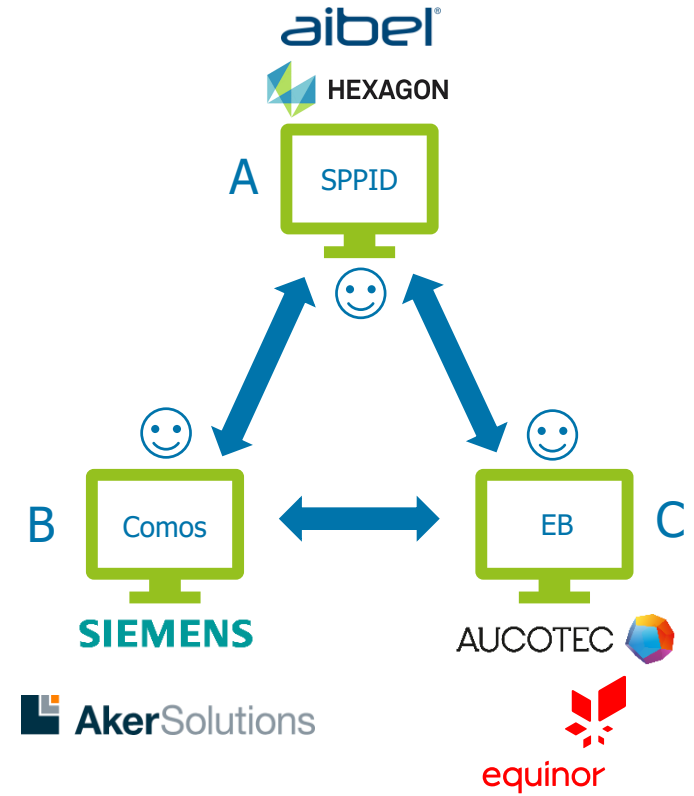
image source:

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

Requirements for P&ID exchange in NOAKA project

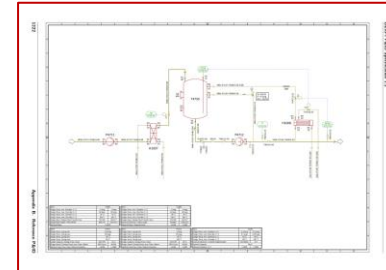
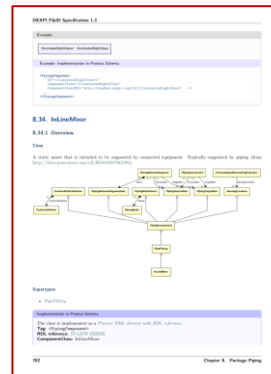
- between Aker Solutions (EPC), Aibel (EPC), Equinor
- between different CAE systems with specific configurations
- “high quality seamless integration”
 - imported P&IDs not distinguishable from native P&IDs w.r.t. data & graphics
 - integrated roundtrip, e.g., $A \rightarrow B \rightarrow C \rightarrow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

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

NOAKA reference P&ID

symbols not according to ISO 10628

instrumentation based on ISA 5.1

other types for equipment, pipe fittings, etc. than in DEXPI

"imported P&IDs not distinguishable from native P&IDs w.r.t. data & graphics"

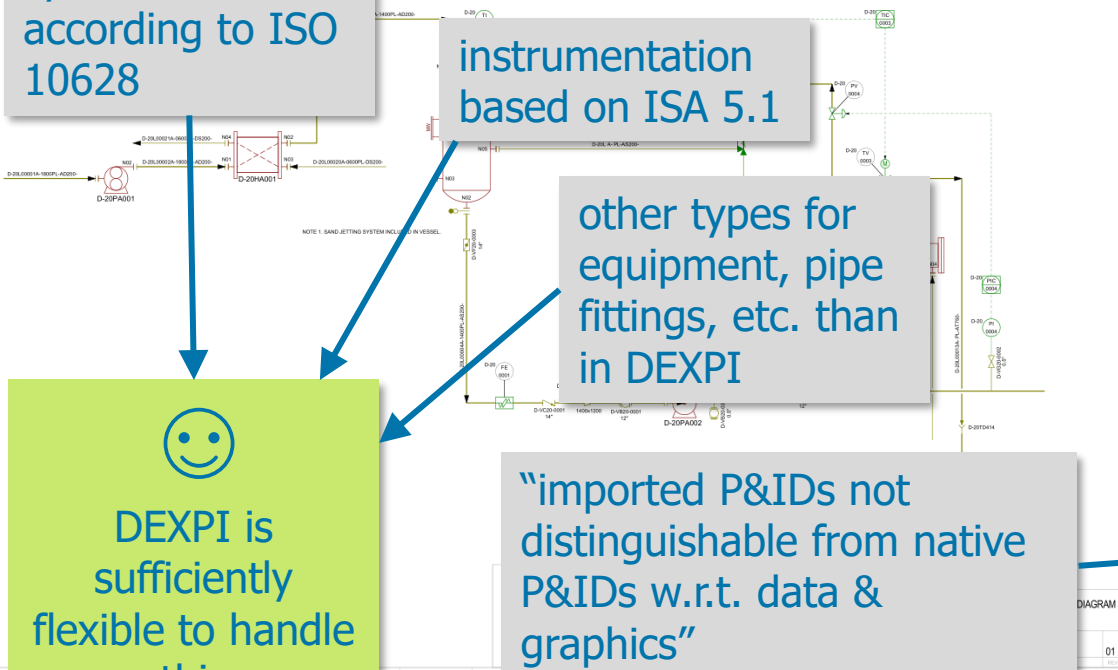
- based on DEXPI reference P&ID
- contains relevant NOAKA content



DEXPI is sufficiently flexible to handle this



not a question of exchange format, but of configuration



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

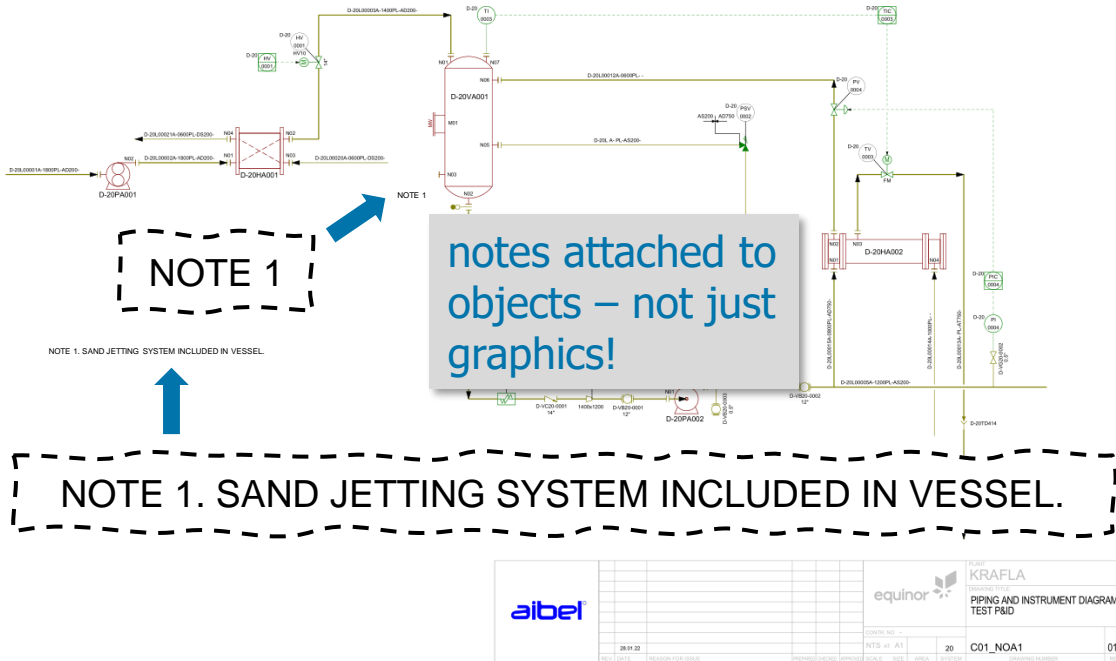
symbol IDs		DEXPI classes				
PE010A		Equipment	Exch. Plate	PlateHeatExchanger	http://sandbox.dexpi.org/rdl/PlateHeatExchanger	
PE018A		ConnectedEquipment	Drive Electric Motor	Motor	http://data.posccaesar.org/rdl/RDS7191198	
PE037A		Equipment	Exch. Shell and Fuced Tube	CustomHeatExchanger	http://sandbox.dexpi.org/rdl/CustomHeatExchanger	http://data.posccaesar.org/rdl/RDS4190840
PE042A		Equipment	Heater Electrical	CustomHeater	http://sandbox.dexpi.org/rdl/CustomHeater	http://data.posccaesar.org/rdl/RDS14070475
PF015A		In-Line Instrument	Flow T. Orifice Plate	CustomInlinePrimaryElement	http://sandbox.dexpi.org/rdl/CustomInlinePrimaryElement	http://data.posccaesar.org/rdl/RDS418364
PP001A		Pump	Pump Centrifugal	CentrifugalPump	http://data.posccaesar.org/rdl/RDS416834	

definition of symbols –
incl. size, origo, label positions, ...

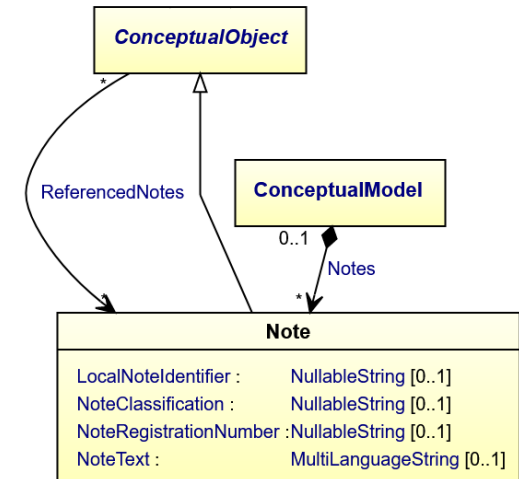
class identifiers to be
used in exchange files

identifiers for
custom classes

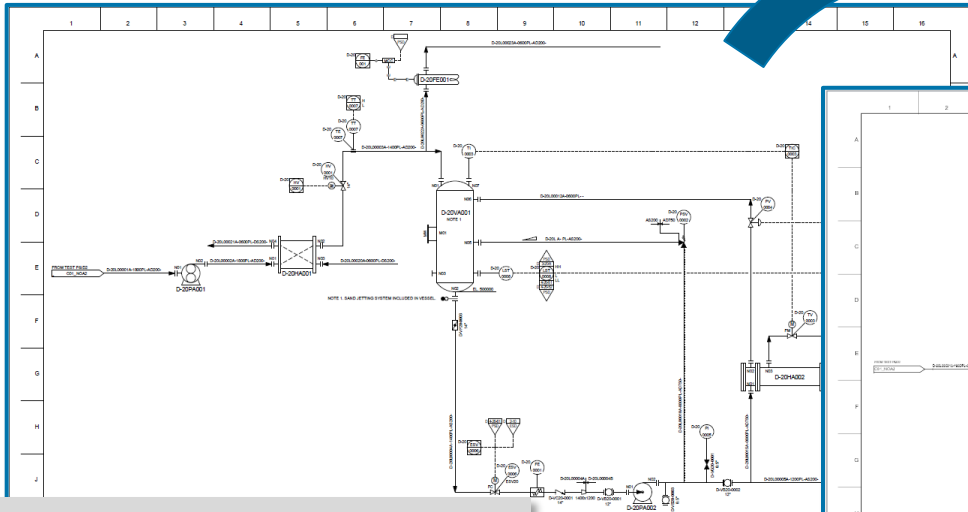
Contributions to DEXPI Standard



- DEXPI 1.4 (WIP):
e.g., extension for notes



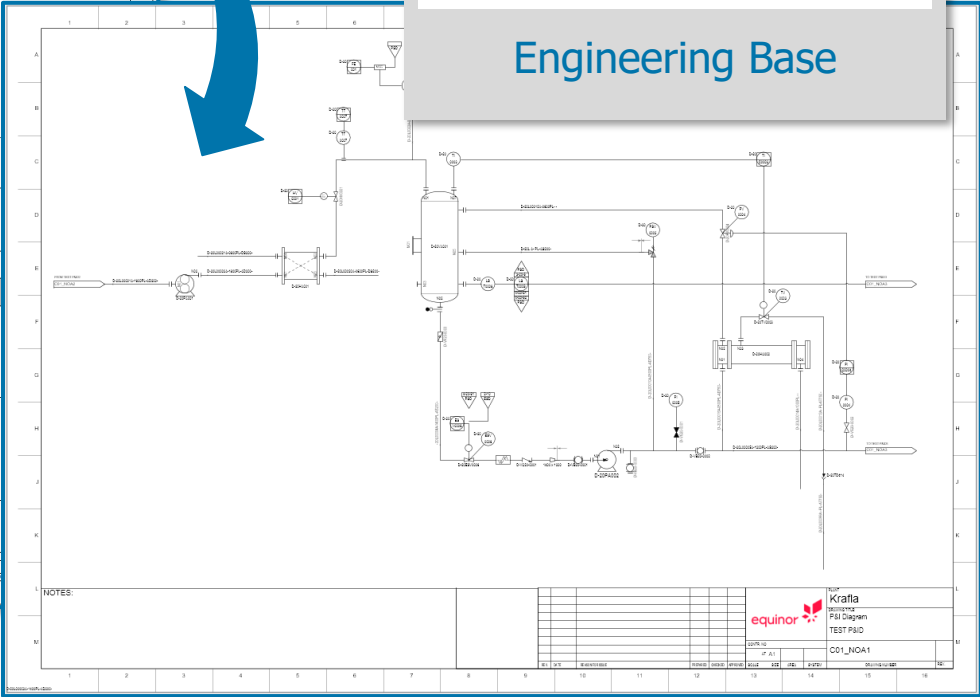
It works!



HEXAGON
SPPID

equinor	
DATE	20
REV	1
DESCRIPTION	
DESIGNED BY	
CHECKED BY	
APPROVED BY	

AUCOTEC
Engineering Base



NOTES:

equinor	
DATE	20
REV	1
DESCRIPTION	
DESIGNED BY	
CHECKED BY	
APPROVED BY	

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 methodology that is currently discussed in the DEXPI Initiative
 - possible outcome: an exchange format for tool configuration 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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Elaboration of NOAKA Profile and Requirements

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