DISC DEXPI Project

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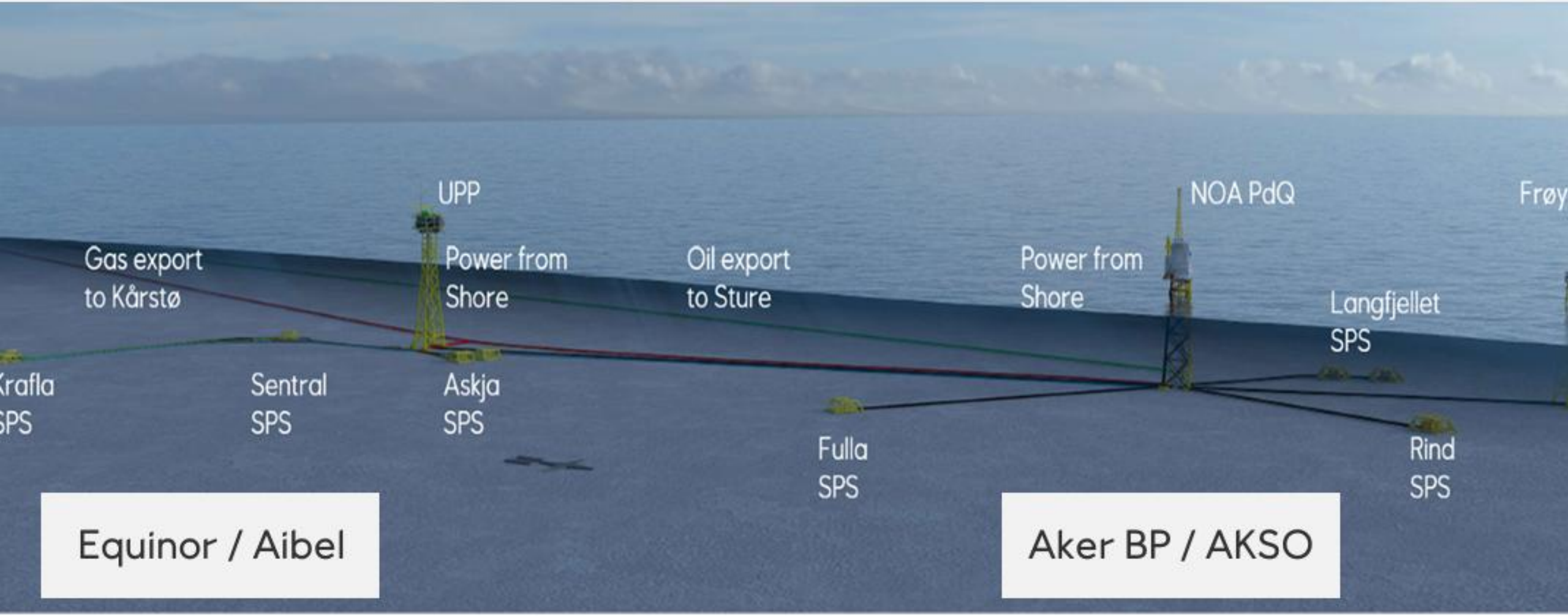
Draga.no

Presentation

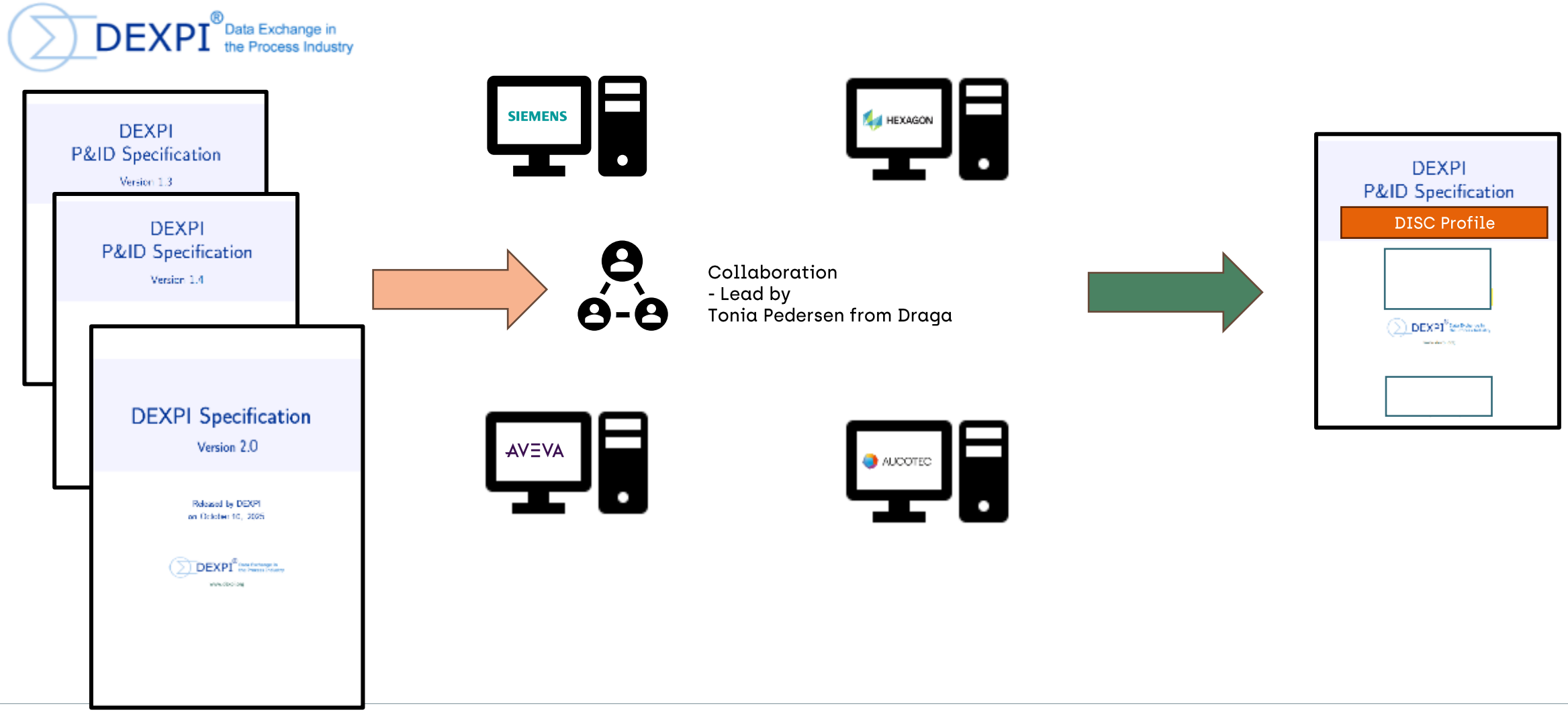
- DISC DEXPI Project
  - DISC Collaboration
  - DISC DEXPI Profile
    - Why a profile ?
    - Key decisions
    - Where are we now ?
    - Verification
    - Further work

NOAKA field – NOrth of Alvheim field and the Krafla/Askja field

DISC Equinor / Aker BP / Aker Solutions / Aibel

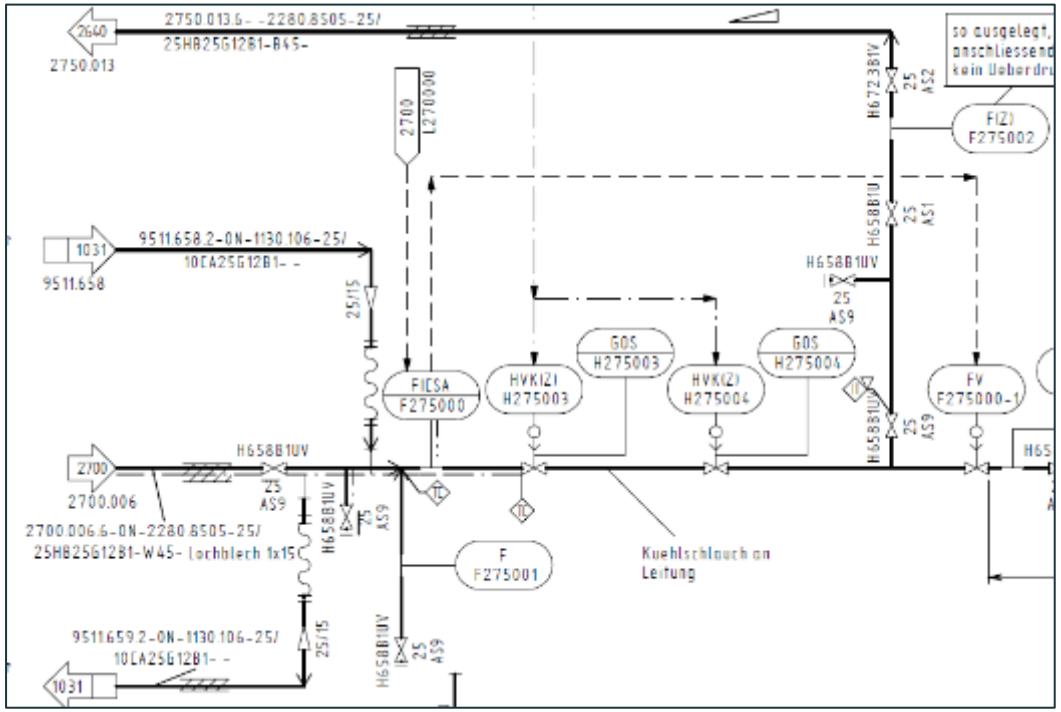


DEXPI Implementation at the Norwegian O&G



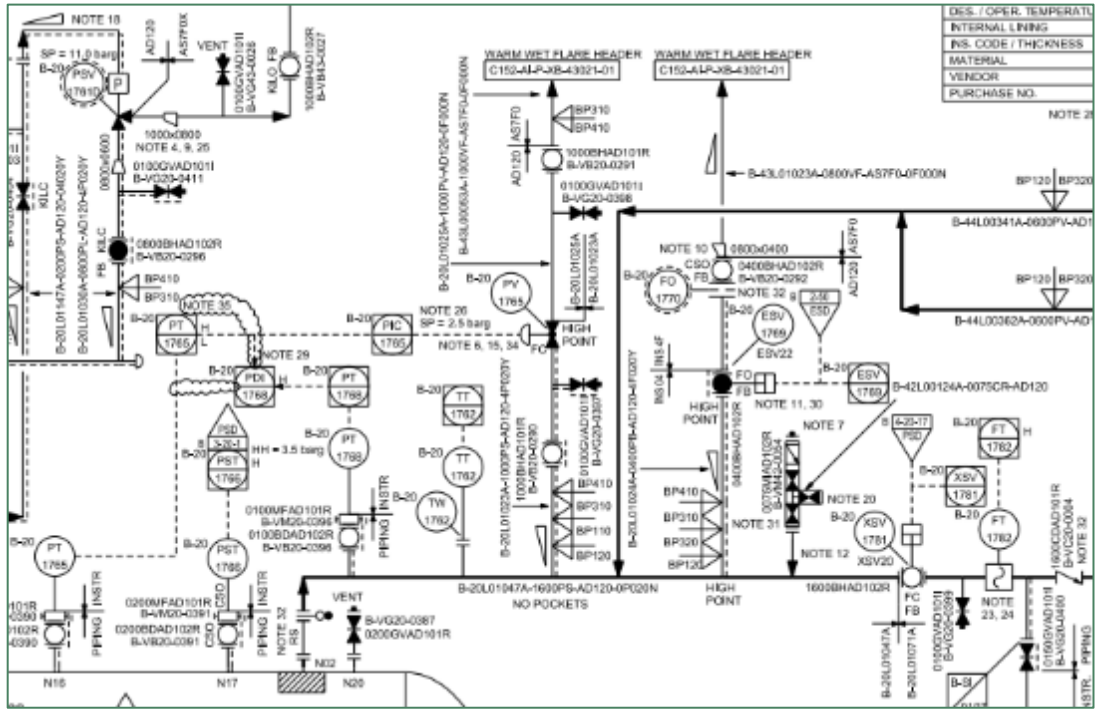
P&ID standards
German Chemical Industry

- ISO 10628 / IEC 62424



Norwegian Oil & Gas Industry

- ISO 3511 (Withdrawn)/ NORSOK Z-004



Symbols are a key component in the DISC DEXPI Profile.

Key Decisions

- Transfer the information that is shown on the P&ID (and any necessary supporting attributes)
  - Look at extending to include other attributes as required
- NORSOK Z-004 /TR1970 Symbol library and element definition as project symbol reference ID list
  - Transfer Symbol Reference ID instead of primitive graphical elements
- Missing DEXPI class/attributes shall be defined using ISO 15926-4 (PCA RDL) references by use case
  - transfer via DEXPI custom class/attribute elements.
- DISC Profile (developed by PnB) shall provide for DISC custom class/attribute definitions and rulesets
  - Profile used in conjunction with the DEXPI standard definitions used during verification
- PCA to host DISC digital symbol library
  - Management of detailed symbols in machine readable format

AkerBP
AkerSolutions
aibel
HEXAGON
AVEVA
SIEMENS
AUCOTEC

DISC profile for DEXPI

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

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

AkerBP
AkerSolutions
aibel
HEXAGON
AVEVA
SIEMENS
AUCOTEC

DEXPI P&ID Specification	DISC Profile
Plant model standard /information transport model	**DISC (NCS) rule set overlay** see https://github.com/ToniaPedersen/DISCDEXPI_2026Pack for publicly available content

definition of exchange format for DISC P&IDs

Industry Participants in DISC DEXPI Profile project

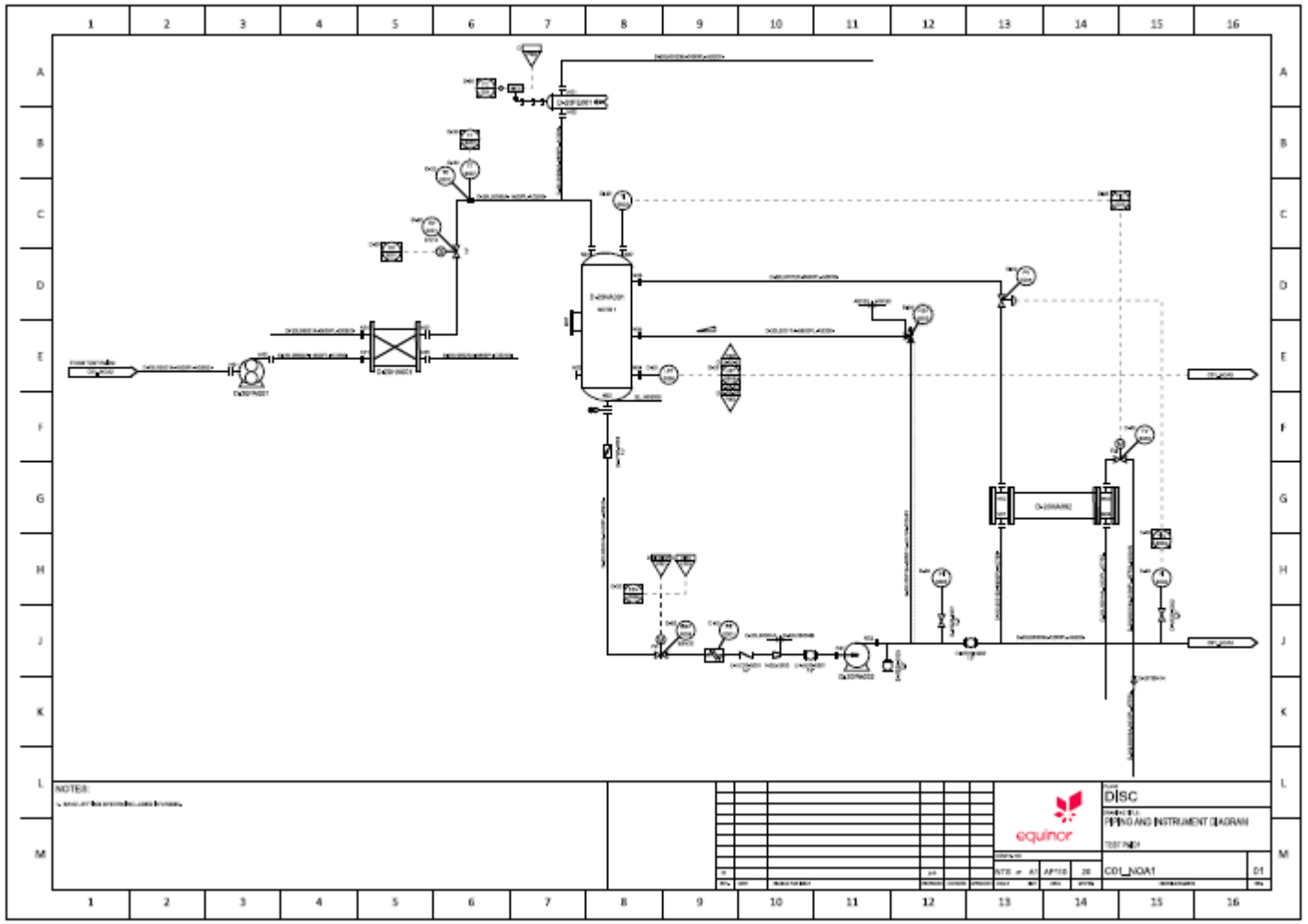
Operators & EPCs
***Equinor** – Provided process engineering input & pilot driver*
***AkerBP** – Operator partner contributing domain requirements*
***Aker Solutions** – Technical engineering partner and domain expertise*
***Aibel** – Provided process engineers and practical P&ID expertise*

Software & Vendor Contributors
***Hexagon** – CAE tool implementation and P&ID modelling expertise*
***Autotec** – CAE tool implementation and P&ID modelling expertise*
***Siemens (COMOS)** – CAE tool implementation and P&ID modelling expertise*
***Aveva** – CAE tool implementation and P&ID modelling expertise*
***Plants and Bytes (pnb)** – DEXPI tooling, verifiers, and pilot workflows*

***Project Lead; Draga** - Migration project management expertise*

Participation through:
Periods of development 1) 2021 to 2023 and 2) 2025
Weekly technical meetings
6 off 2 day on-site at Equinor Fornebu hackatons/workshops
3) 2026 move to DEXPI 2.0 and extend symbol library

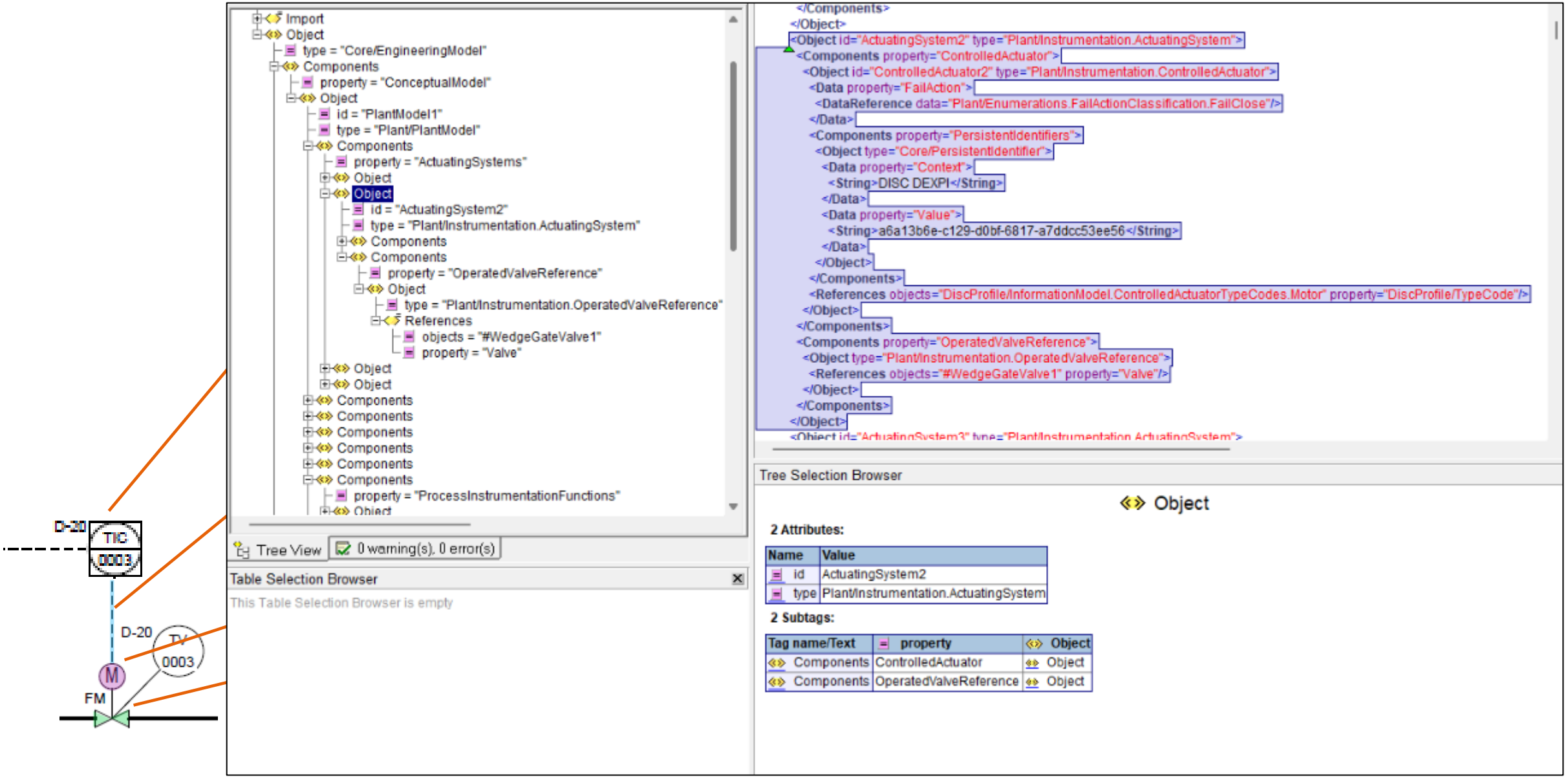
DISC DEXPI test cases



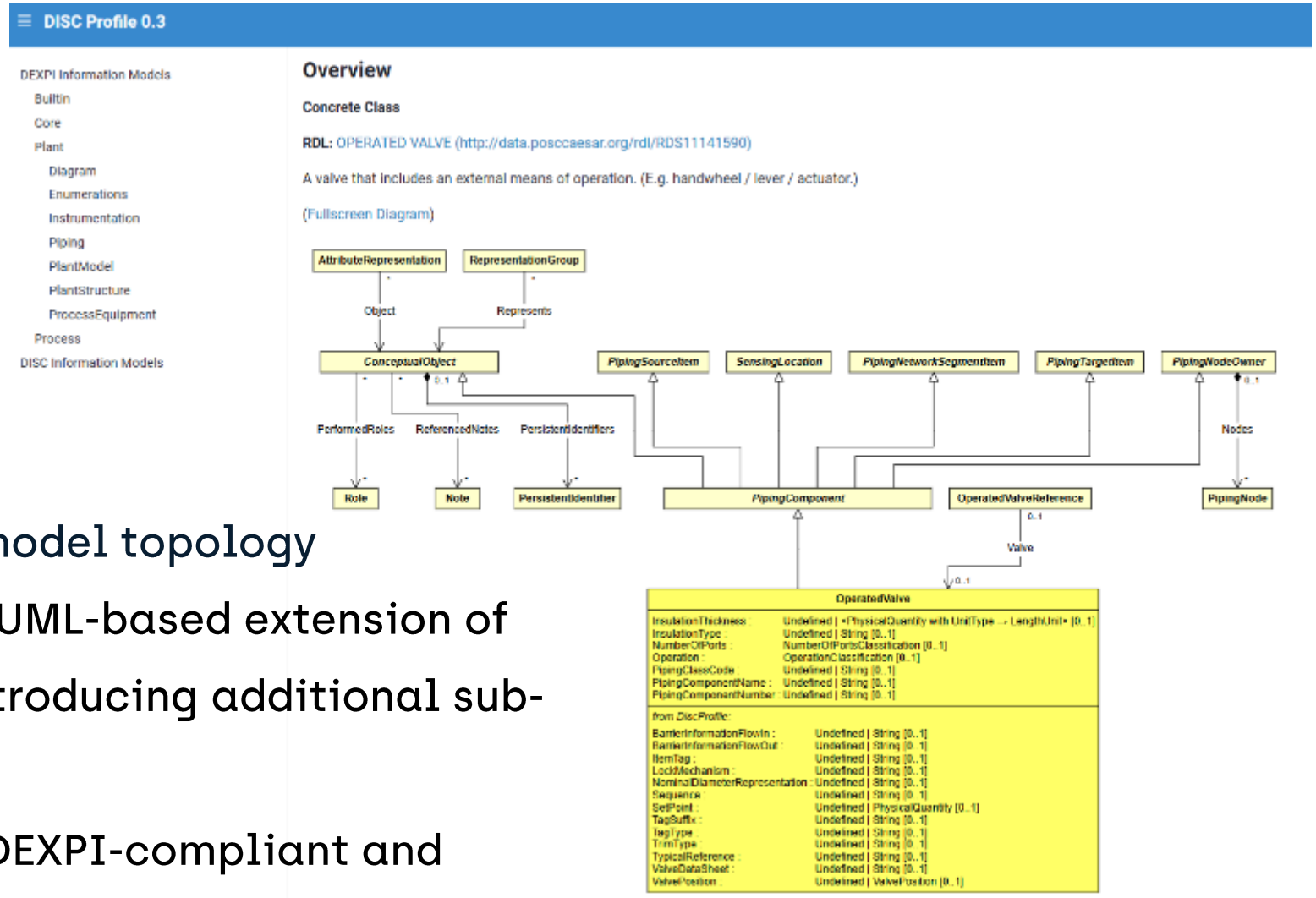
Includes:

- Main equipment
- Actuated valves
- Piping components
- In-line instrument
- Off-line instrument
- Signal lines & line styles
- Property Breaks
- Title block
- Intelligent Valve Symbol usage
- Clamp-on
- OPC
- Electrical ‘instrument’ MCC
- Annotation
- Pipe slope
- Elevation
- Alarms
- Heat tracing
- Symbol resizing /rotation / mirroring
- Persistent ID
- Revision cases

Excerpt from DISC DEXPI requirements document



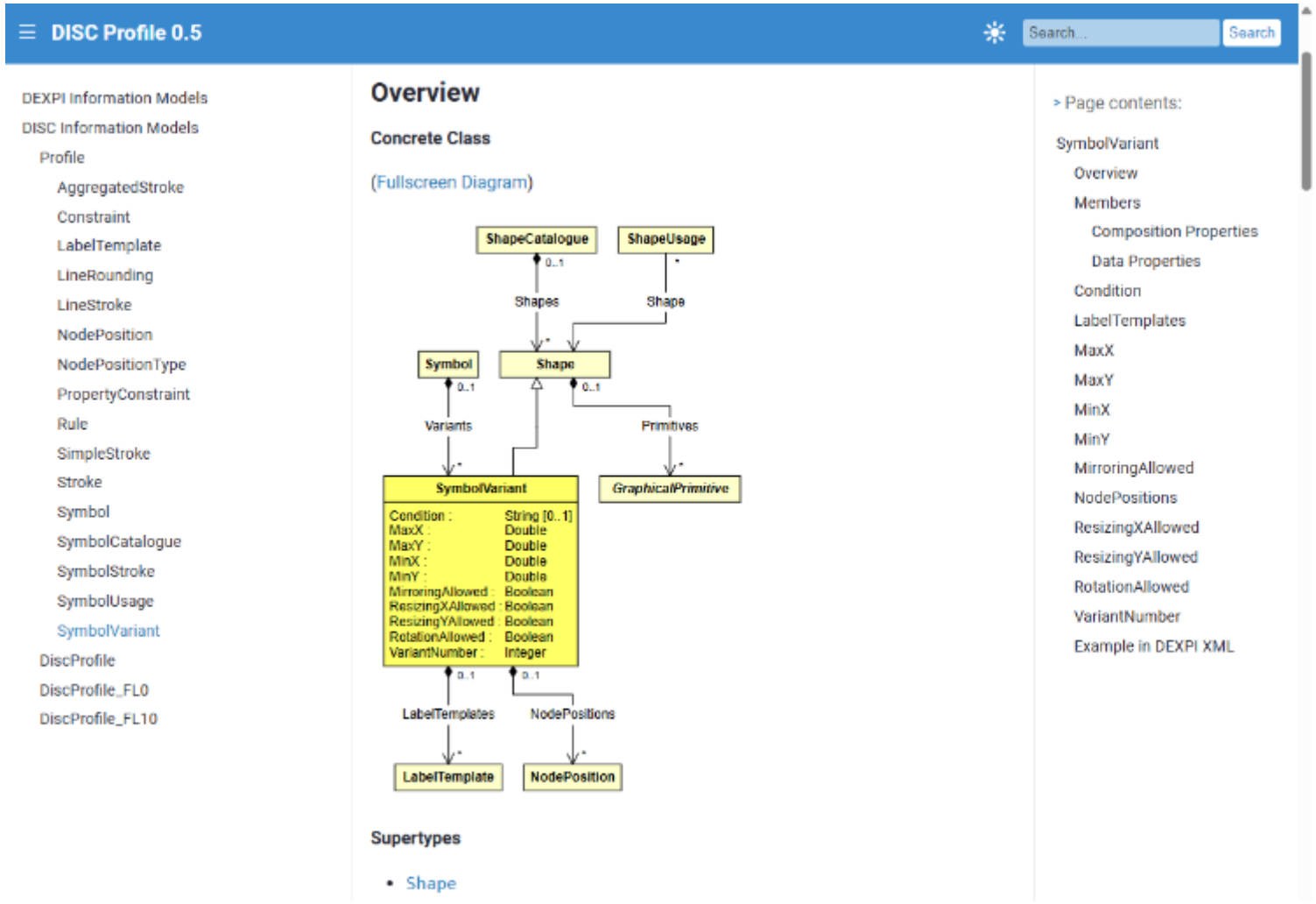
Example of DEXPI Profile Topology Model



- DEXPI defines the plant object model topology
- The DISC profile is defined as a UML-based extension of the DEXPI information model, introducing additional sub-types, symbols and rules.
- Together they form a complete DEXPI-compliant and verifiable topology for DISC

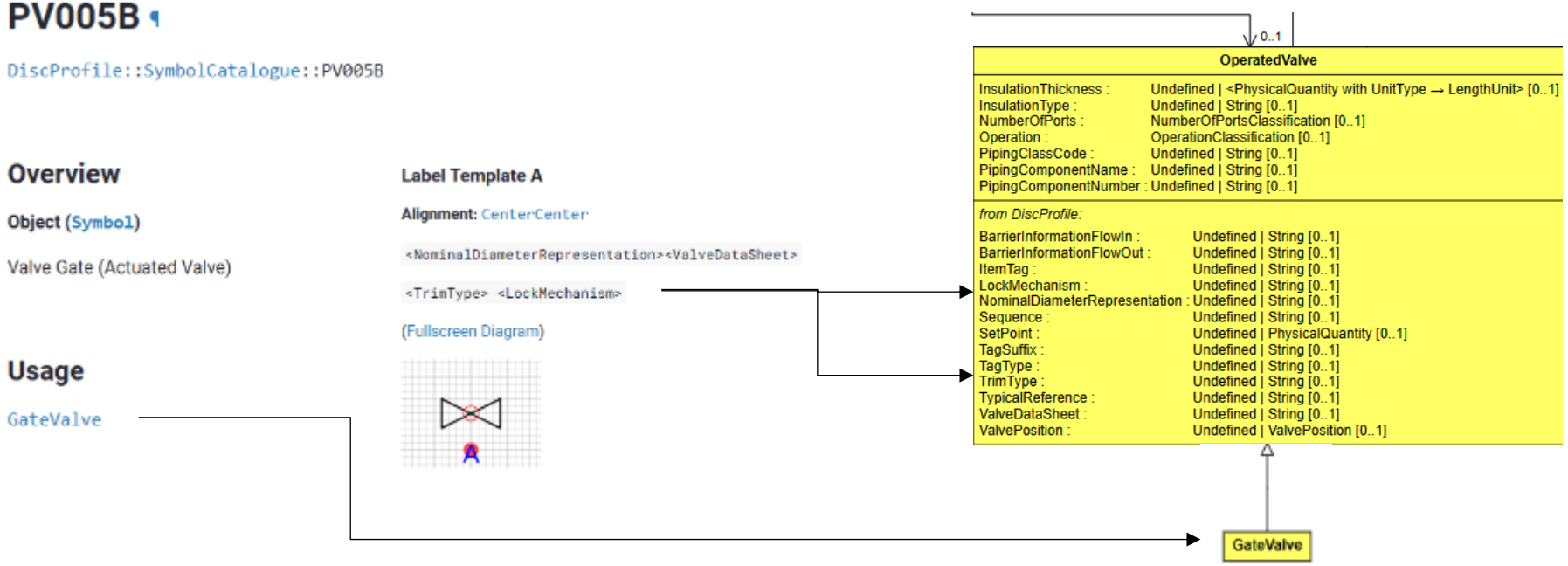
Profile meta model: Visualization, Connectivity, Rule definitions

- Complex line model definition
- Symbol definitions
  - Usage rules per class
  - Label
  - Variants
  - Nodes
- Constraints
  - Property constraints overlay
- Rule model definition



Example of DEXPI Profile : Visualization, Connectivity, Labelling Rules

- Symbol mapping for DEXPI classes
- Defined connection points and connection types
- Enforced topology and connectivity rules through the DEXPI model
- Standardized symbol labelling
- Machine-verifiable consistency



Example of DEXPI Profile – Blueprint file

PV005B

DiscProfile::SymbolCatalogue::PV005B

Overview

Object (Symbol)

Valve Gate (Actuated Valve)

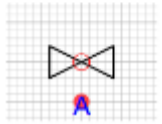
Label Template A

Alignment: CenterCenter

<NominalDiameterRepresentation><ValveDataSheet>

<TrimType> <LockMechanism>

(Fullscreen Diagram)



Usage

GateValve

```
<Object id="GateValve1" type="Plant/Piping.GateValve">
  <Data property="DiscProfile/ItemTag">
    <String>D-20HV0001</String>
  </Data>
  <Components property="Nodes">
  <Data property="DiscProfile/NominalDiameterRepresentation">
  <Components property="PersistentIdentifiers">
  <Data property="DiscProfile/Sequence">
  <Data property="DiscProfile/TagType">
  <Data property="DiscProfile/TypicalReference">
</Object>
```

```
<Object type="Core/Diagram.RepresentationGroup">
  <Components property="Groups">
    <Object type="Core/Diagram.Static">
      <Components property="Elements">
        <Object type="Profile/SymbolUsage">
          <Data property="IsMirrored">
          <Data property="Position">
          <Data property="Rotation">
          <Data property="ScaleX">
          <Data property="ScaleY">
          <References objects="DiscProfile/PV005B" property="Symbol"/>
        </Object>
      </Components>
    </Object>
    <Object type="Core/Diagram.Label">
    <Object type="Core/Diagram.RepresentationGroup">
    <Object type="Core/Diagram.RepresentationGroup">
  </Components>
  <References objects="#GateValve1" property="Represents"/>
</Object>
```

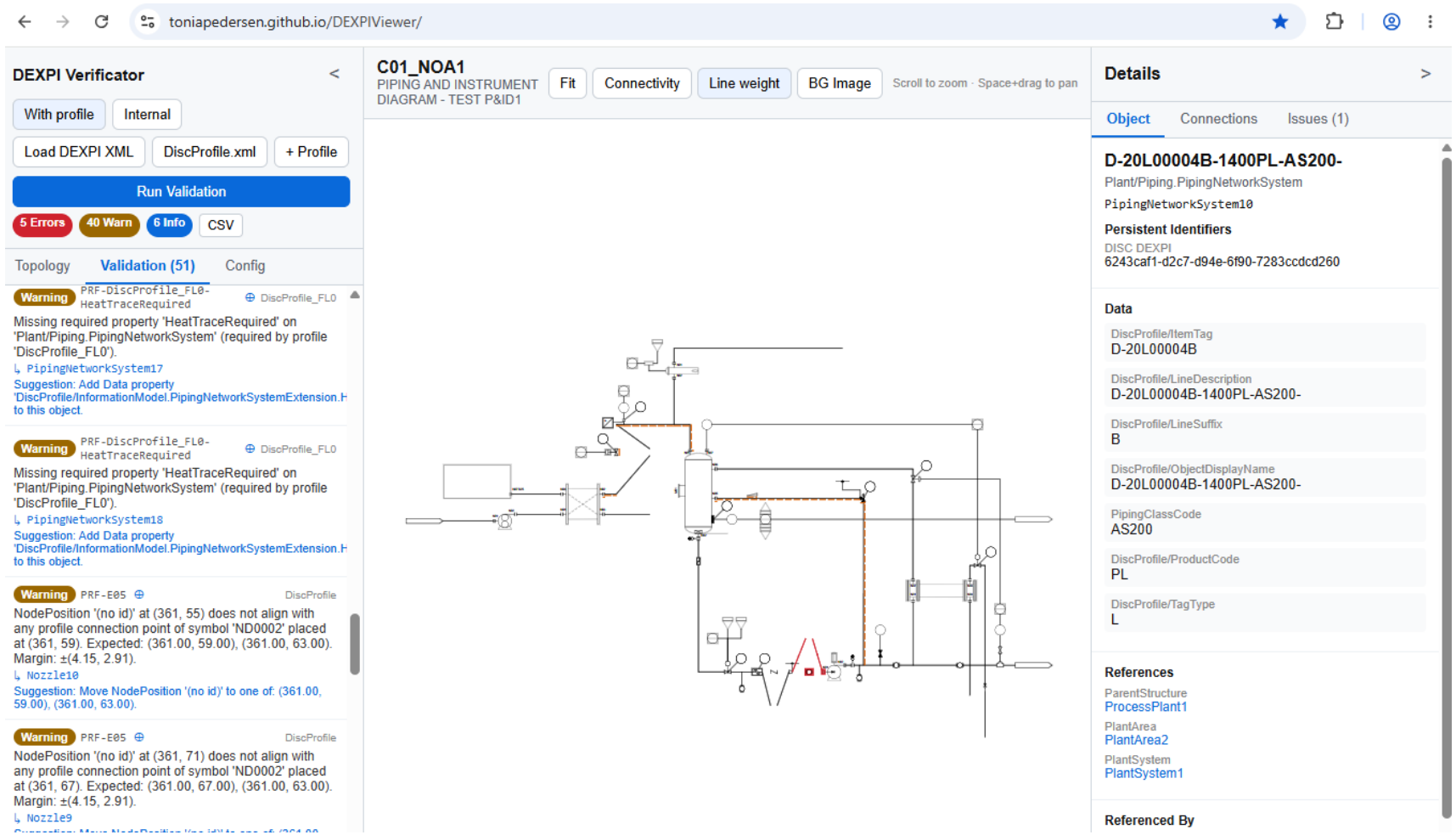
- DEXPI defines the plant object and topology
- DISC profile defines symbols, labels, and connection rules
- Graphical representation is directly linked to the overall data model (DEXPI + DISC Profile) and is machine-verifiable for consistency

Example of DEXPI Profile – Validation

Validate for:

- Symbol/class usage
- Property fill
- Node x,y graphical connections
- Visualize intelligent symbols – match with driving property

…



https://toniapedersen.github.io/DEXPIViewer/

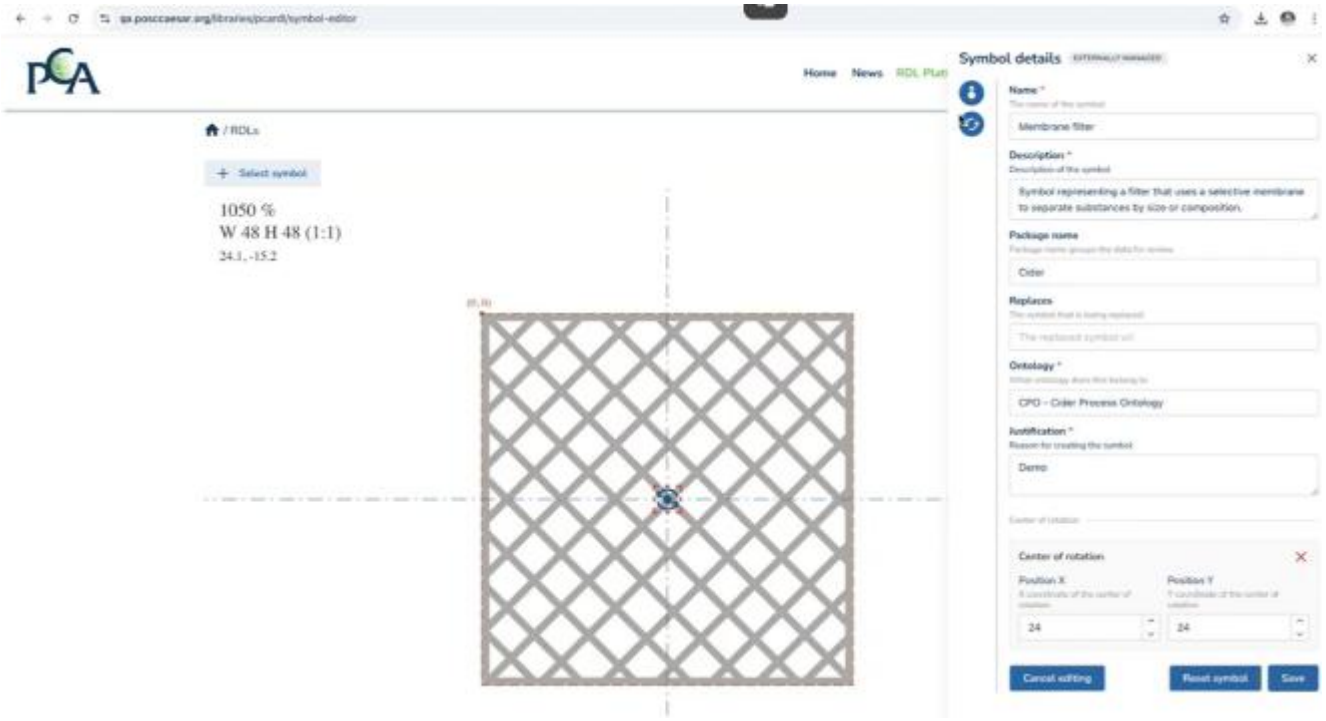
Further work:

DEXPI.org

- Meta model for Profile
- Ongoing work with line styles
- Support for NCS instrumentation model

Reference library work PCA:

- Symbol/line-style library
- RDL class/attribute references




Any Questions?