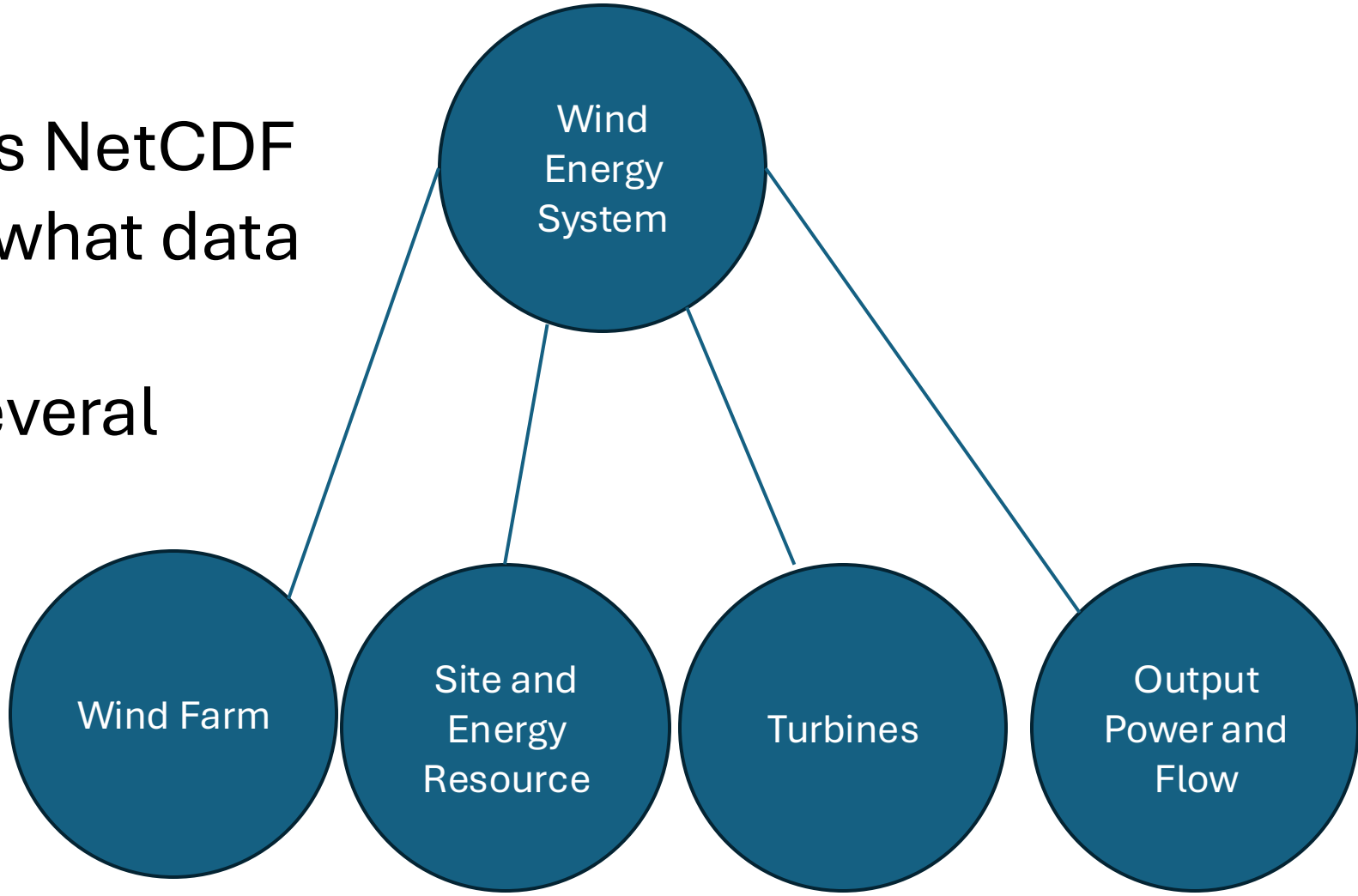
WindIO Plant Updates

WindIO

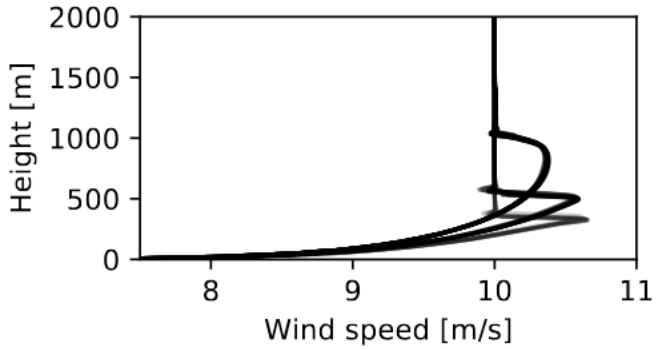
- JSON schema connects NetCDF files to a "blueprint" of what data looks like
- Unified definition for several datasets
- Developed in collaboration with IEA Wind Task 55, TUM, DTU, and NREL

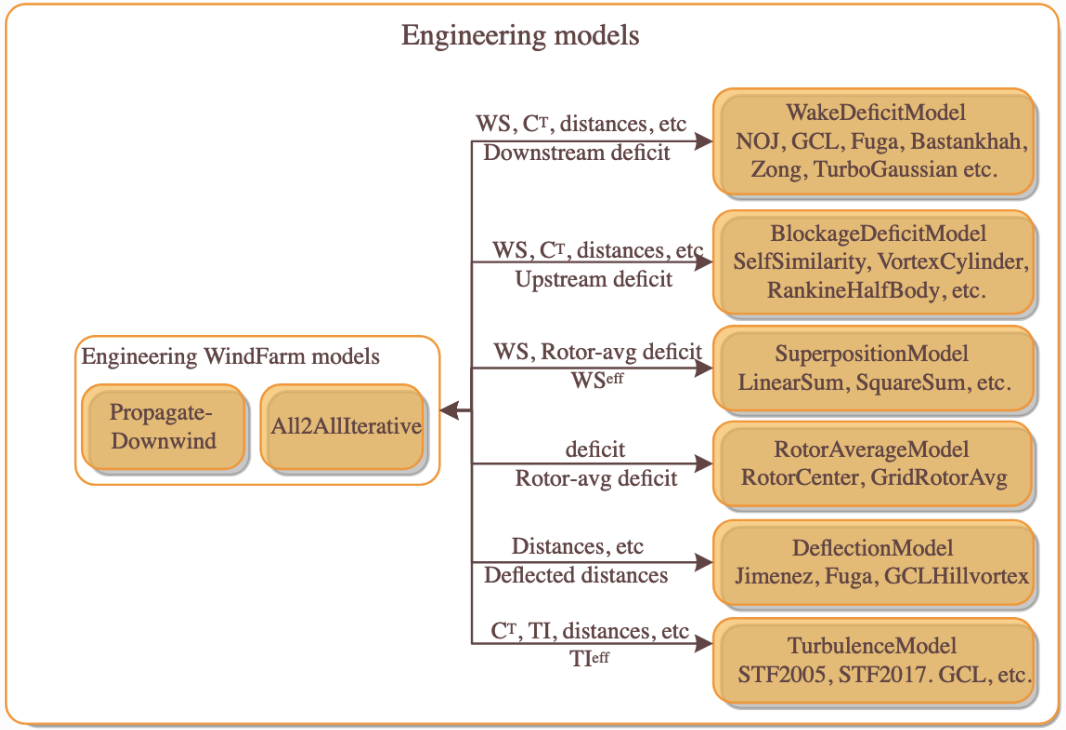



```
from windIO.utils.yml_utils import validate_yaml, load_yaml
from windIO.utils import plant_schemas_path
validate_yaml('cases/windio_4turbines/wind_energy_system/system.yaml', plant_schemas_path + 'wind_energy_system.yaml')
```

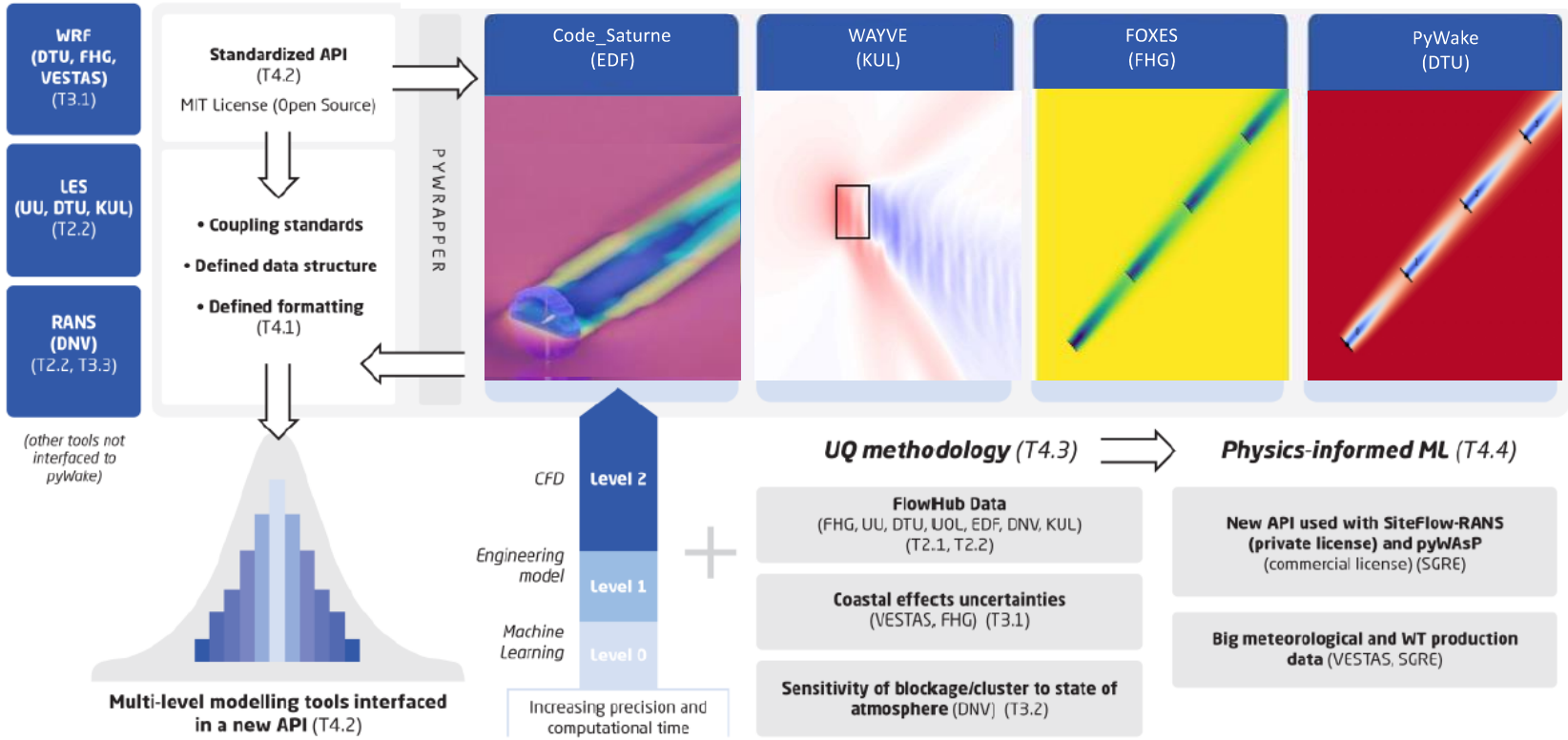
Recent Developments in Plant WindIO

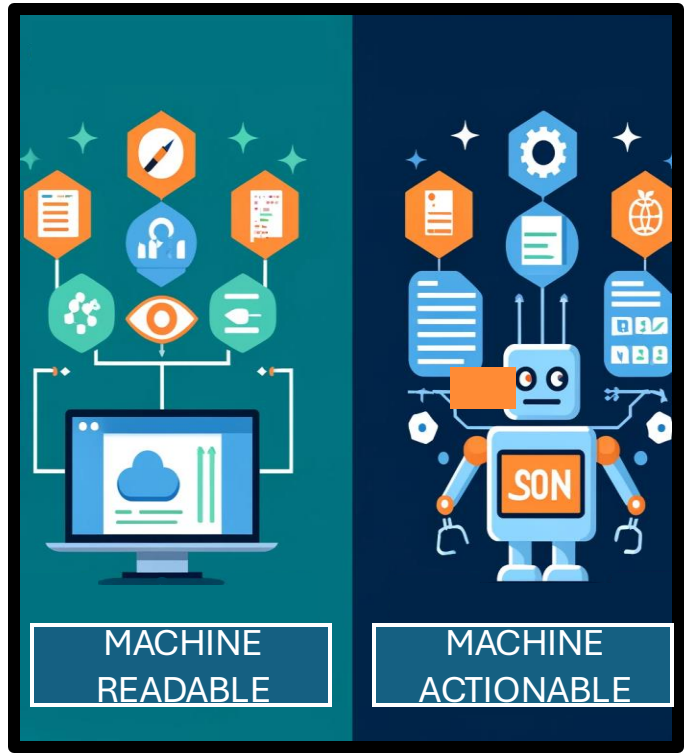
- Energy Resource and Output Timeseries
  - Temperature profiles, veer/shear, large scale atmospheric structures
  - Represents “long-term” variation, can represent separate flow/simulation cases
  - Realistic representation of SCADA data
  - Flexible connections to NetCDF data
- Wake Model Ontology
  - Worked with IWES, DTU, and NREL to develop comprehensive engineering wake model ontology





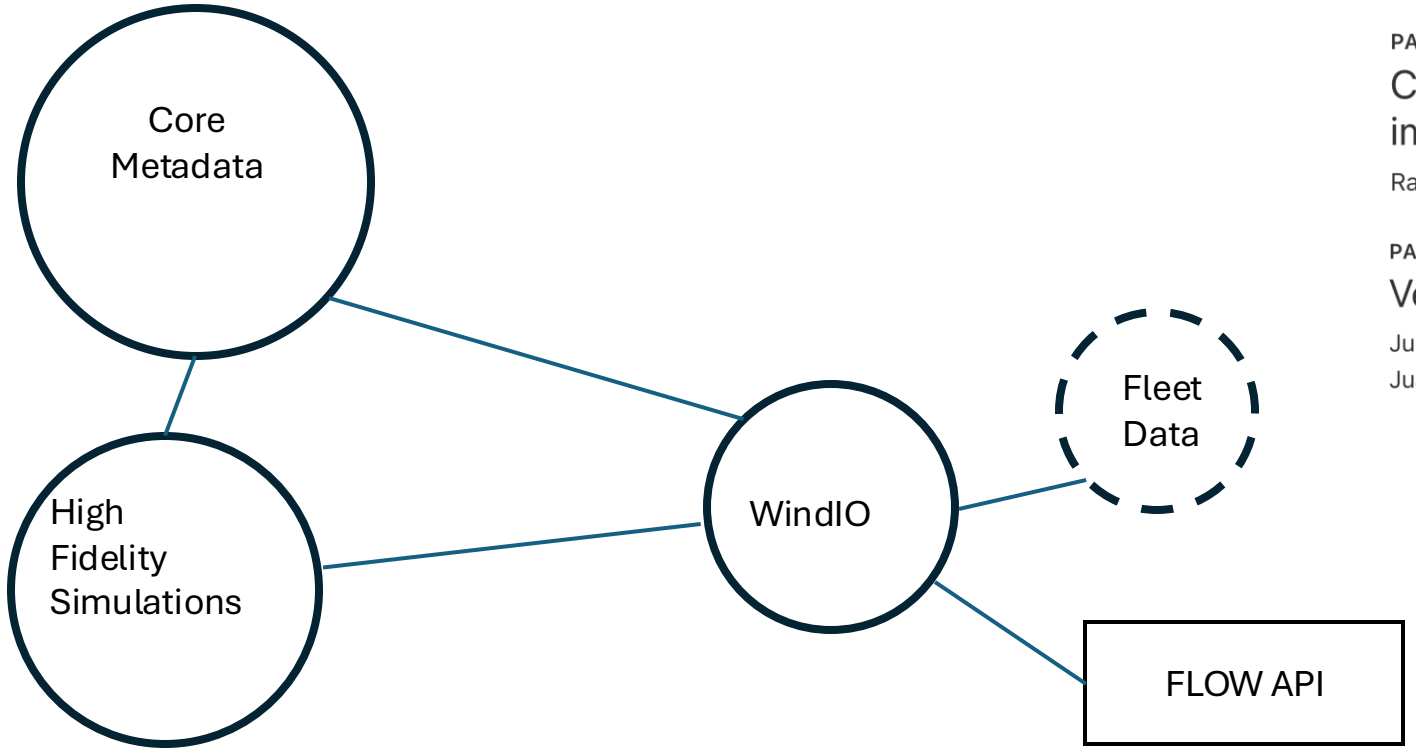
WindIO Enables Machine-Actionable Data





Use-Case: Massive Validation Campaign

- In the FLOW project, we are using WindIO for automation of verification and validation campaigns



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Comparison of steady-state analytical wake models implemented in wind farm analysis software

Rafael Mudafort[1], Julian Quick[2] and Jonas Schulte[3]

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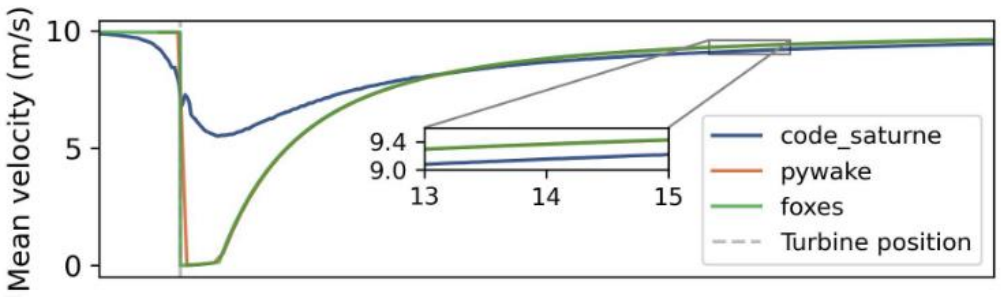
Verification and Validation of Wind Farm Flow Models

Julian Quick[1], Rem-Sophia Mouradi[2,3], Koen Devesse[4], Antoine Mathieu[2,3], M. Paul Van Der Laan[1], Juan Pablo Murcia Leon[1] and Jonas Schulte[5]



Use-Case: Digitalization of Wind Tunnel Data

- In the MERIDIONAL project, we are using WindIO as a standard format to record wind tunnel observations