HydroCen

HydroCen

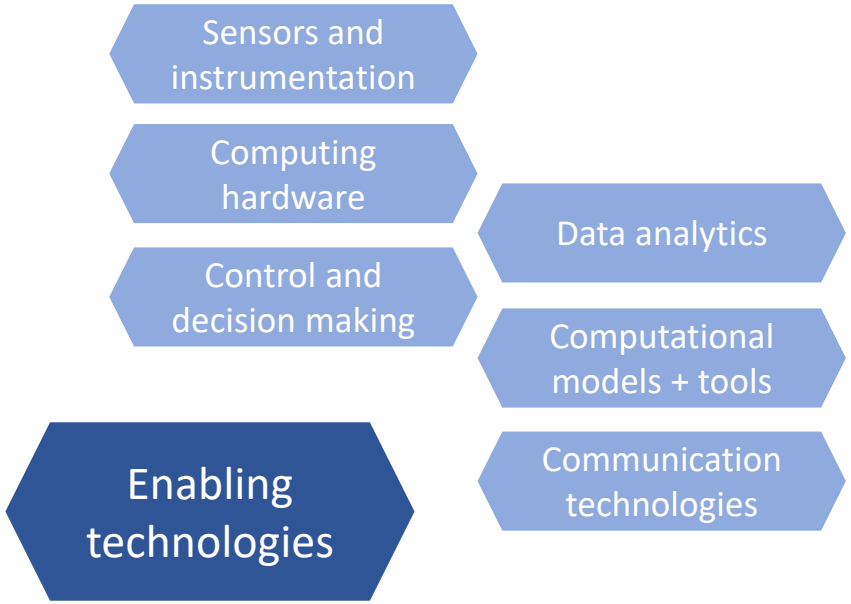
NORWEGIAN RESEARCH CENTRE FOR HYDROPOWER TECHNOLOGY

FoU-prosjektet TwinLab

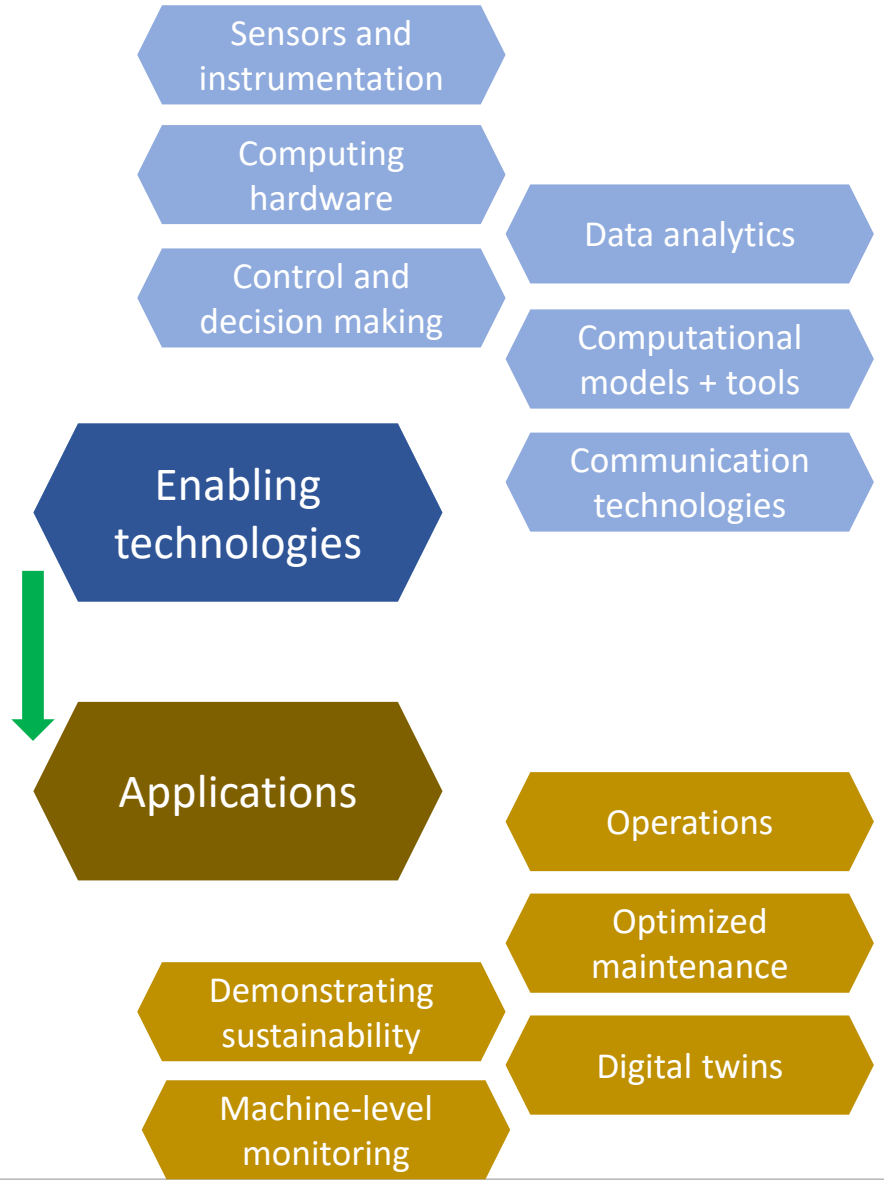
Hans Ivar Skjelbred, 04.10.2022

NTNU SINTEF NINA Norsk institutt for naturforskning NVKS NORSK VANNKRAFTSENTER

Digitalisering i praksis

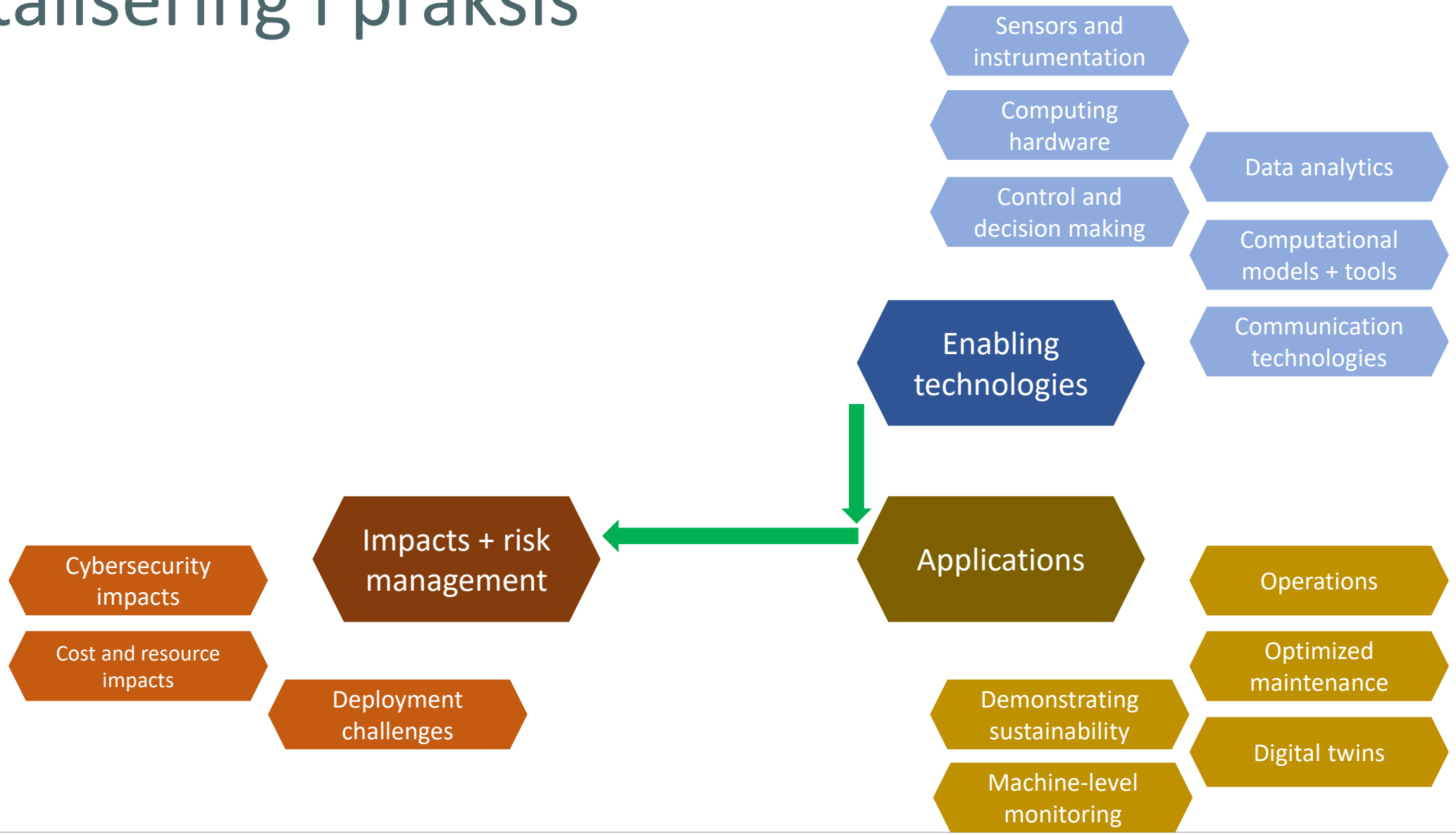


Digitalisering i praksis



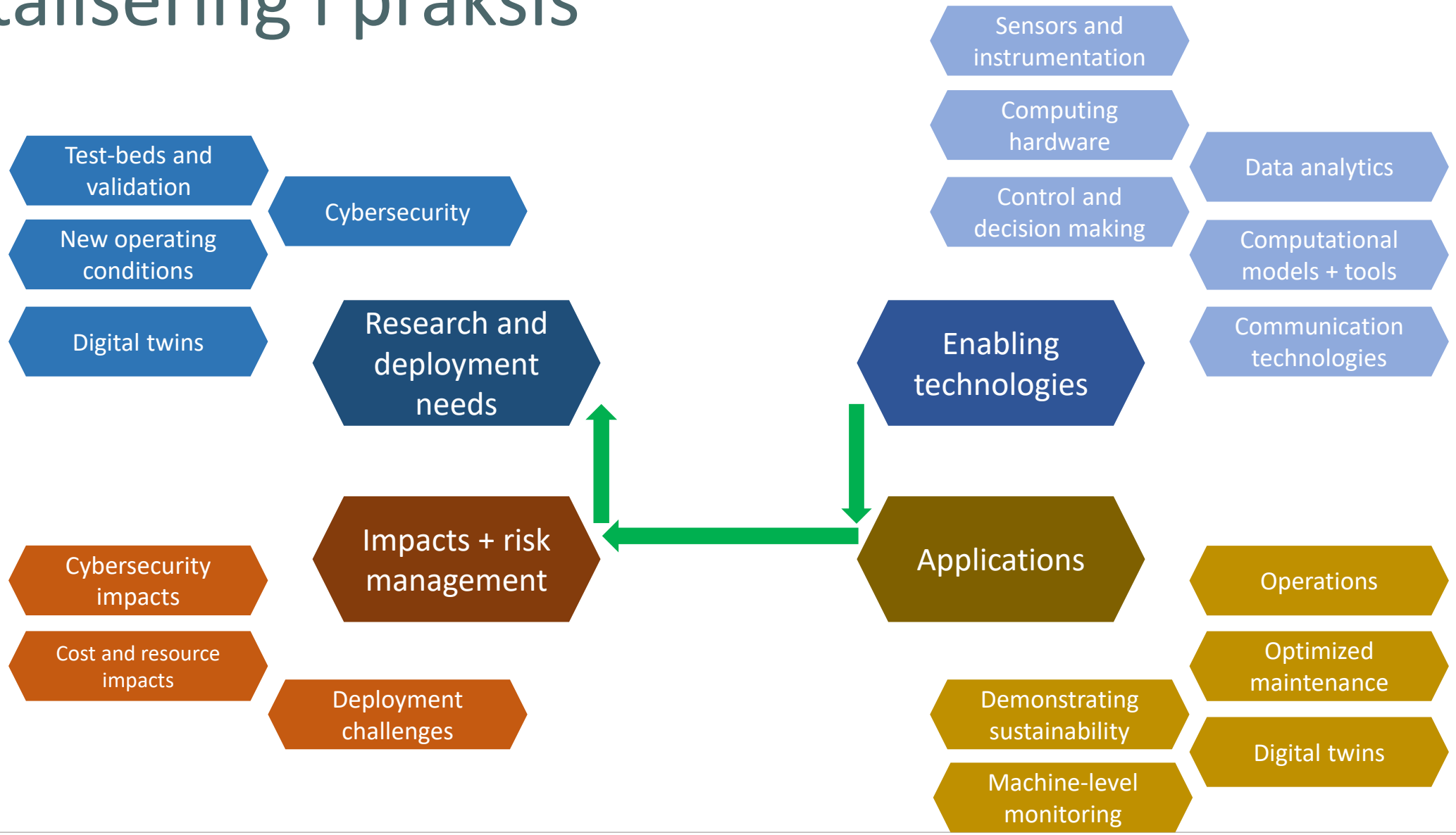
HydroCen

Digitalisering i praksis



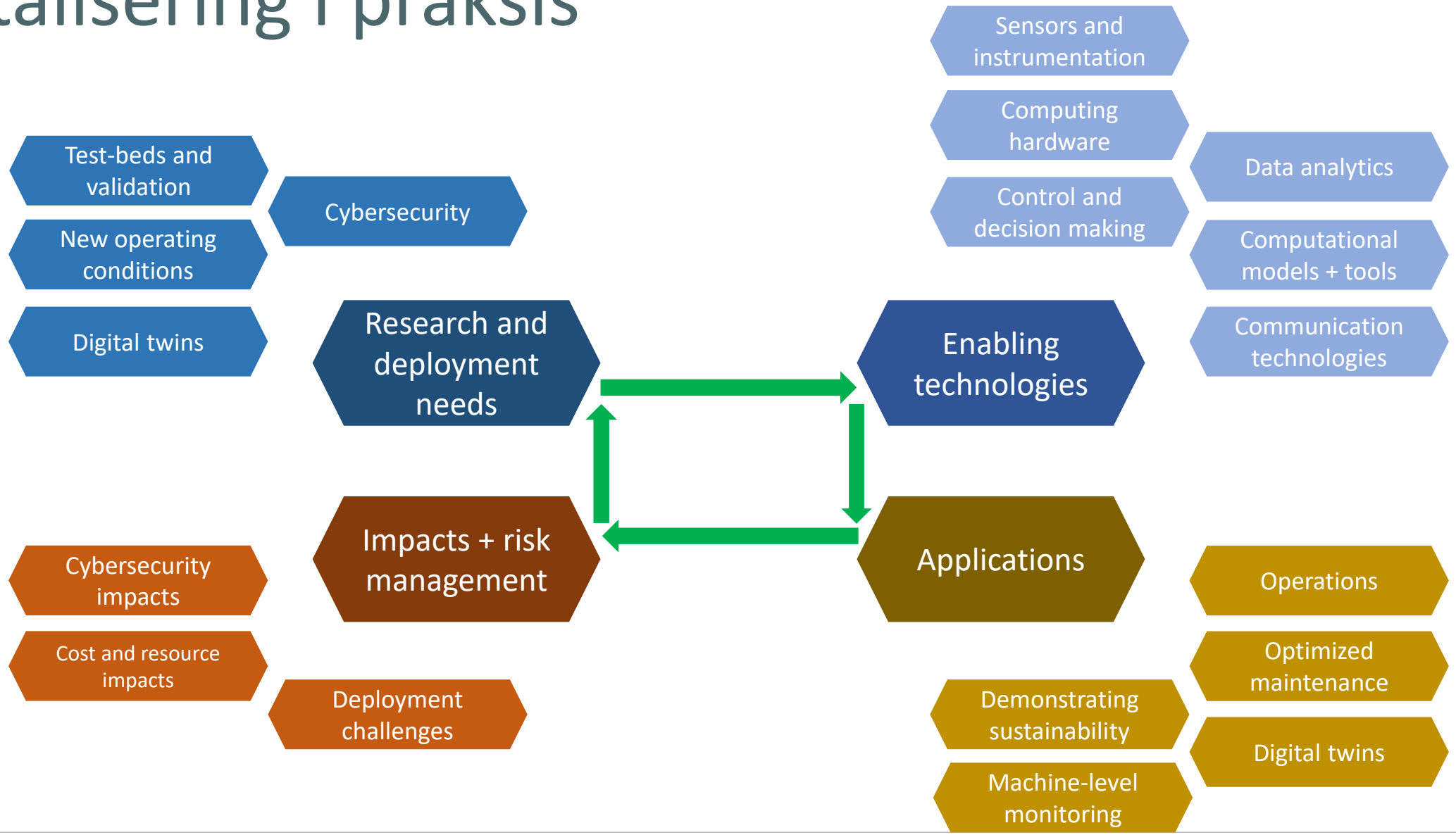
HydroCen

Digitalisering i praksis



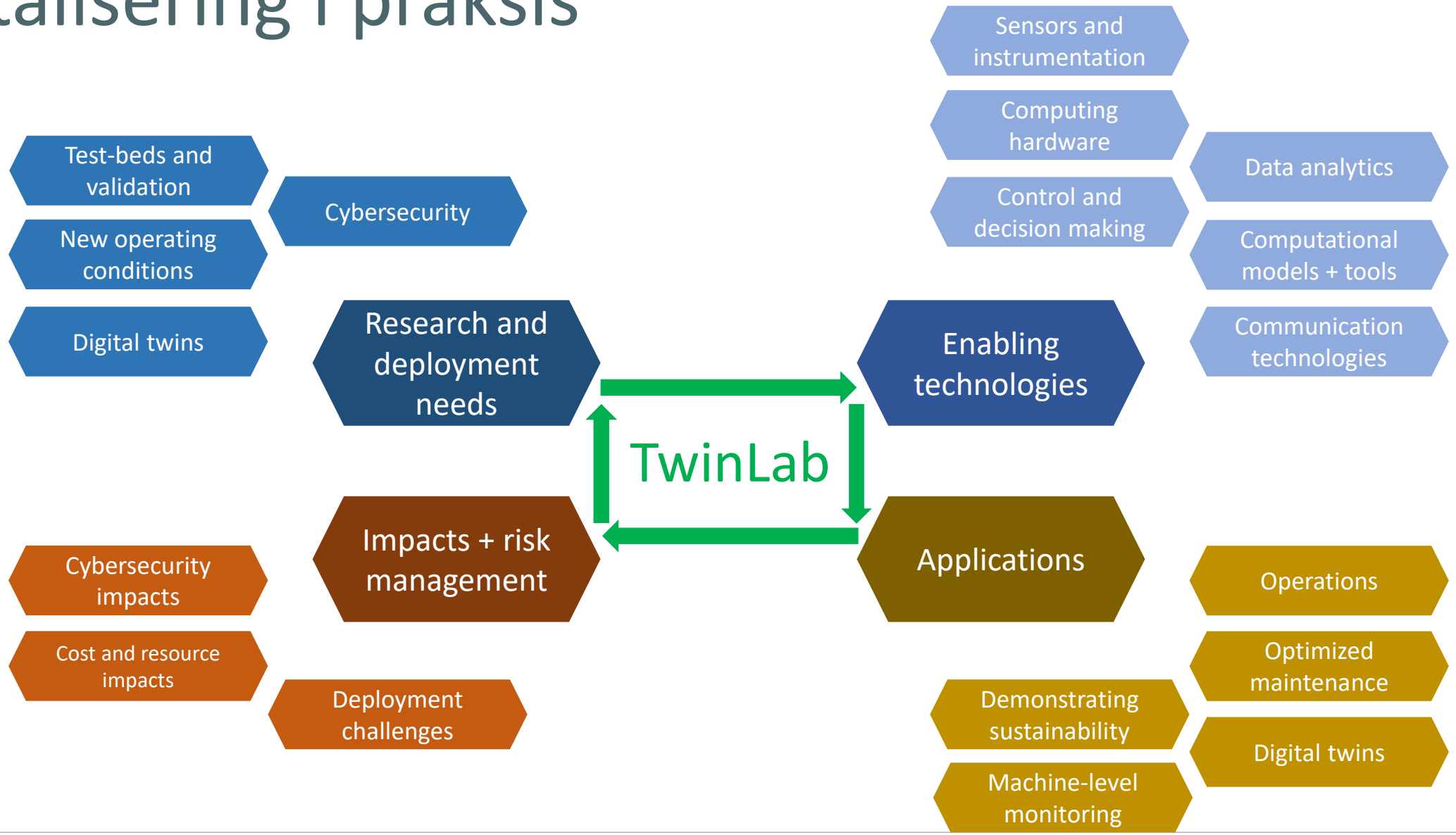
HydroCen

Digitalisering i praksis



HydroCen

Digitalisering i praksis



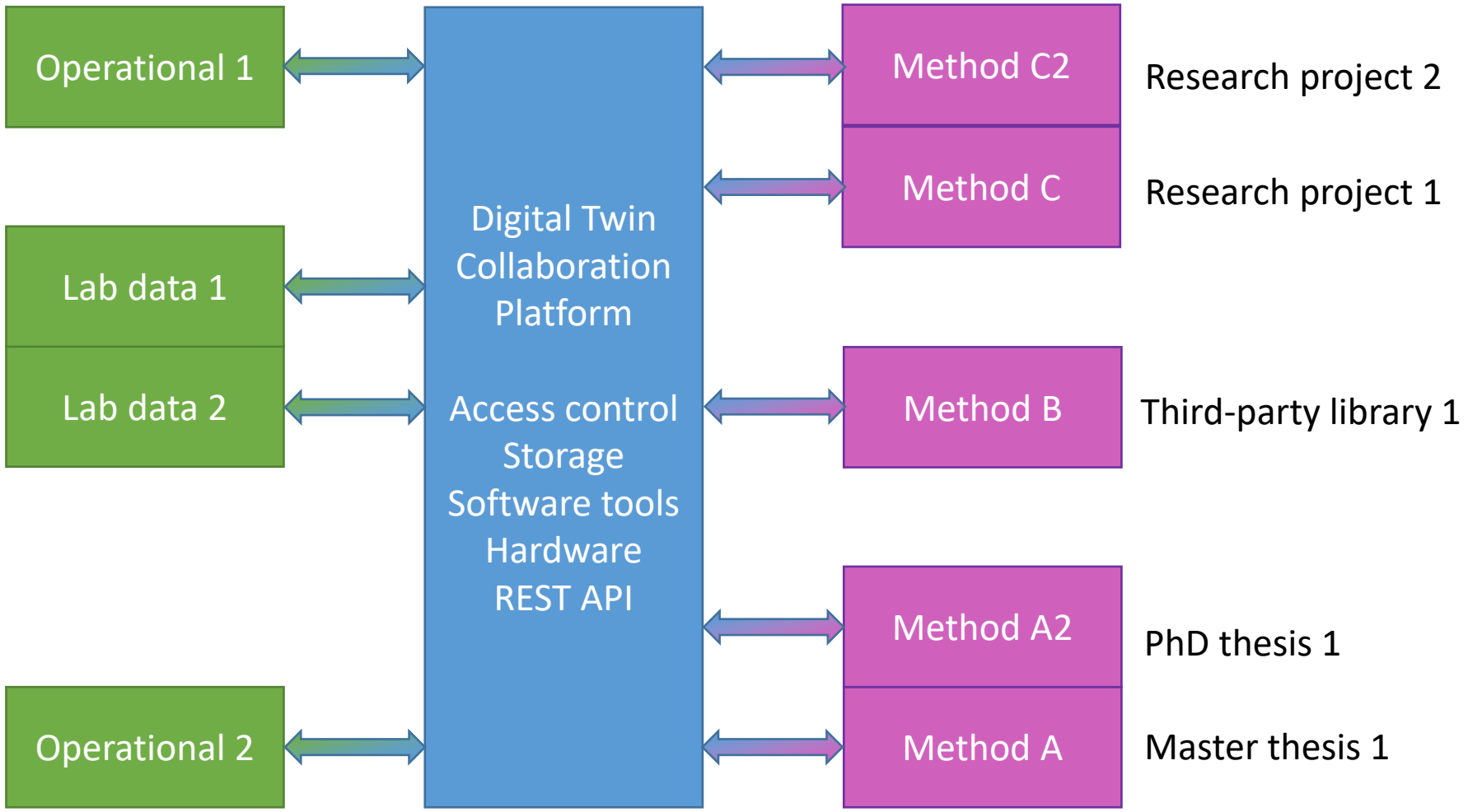
HydroCen

Exchange of data

Lab sensors

Inlet temperature
Inlet pipe flow
Inlet pipe pressure
Differential pressure inlet-outlet
Generator torque
Friction torque
Runner speed
Runner angular position
Guide vane position
Barometer

Inlet spiral casing
Upper turbine cover
Vaneless space
Vaneless space
Vaneless space
Draft tube cone, upper plane
Draft tube cone, upper plane
Draft tube cone, lower plane
Draft tube cone, lower plane
Turbine bearing (radial direction)
Turbine bearing (axial direction)
Guide vane shaft



HydroCen

TwinLab – Digital Twin Laboratory for Hydropower

- Digitalt laboratorium for forskere, bransjepartnere og studenter
- Åpent samarbeid om metoder og data for digitale tvillinger og maskinlæring
- Tverrfaglig tema innenfor HydroCen
  - Vannveier
  - Turbin
  - Generator
  - Marked
  - Elvemiljø
- Use-case med live data fra
- operasjonelt kraftverk

Resultatmål

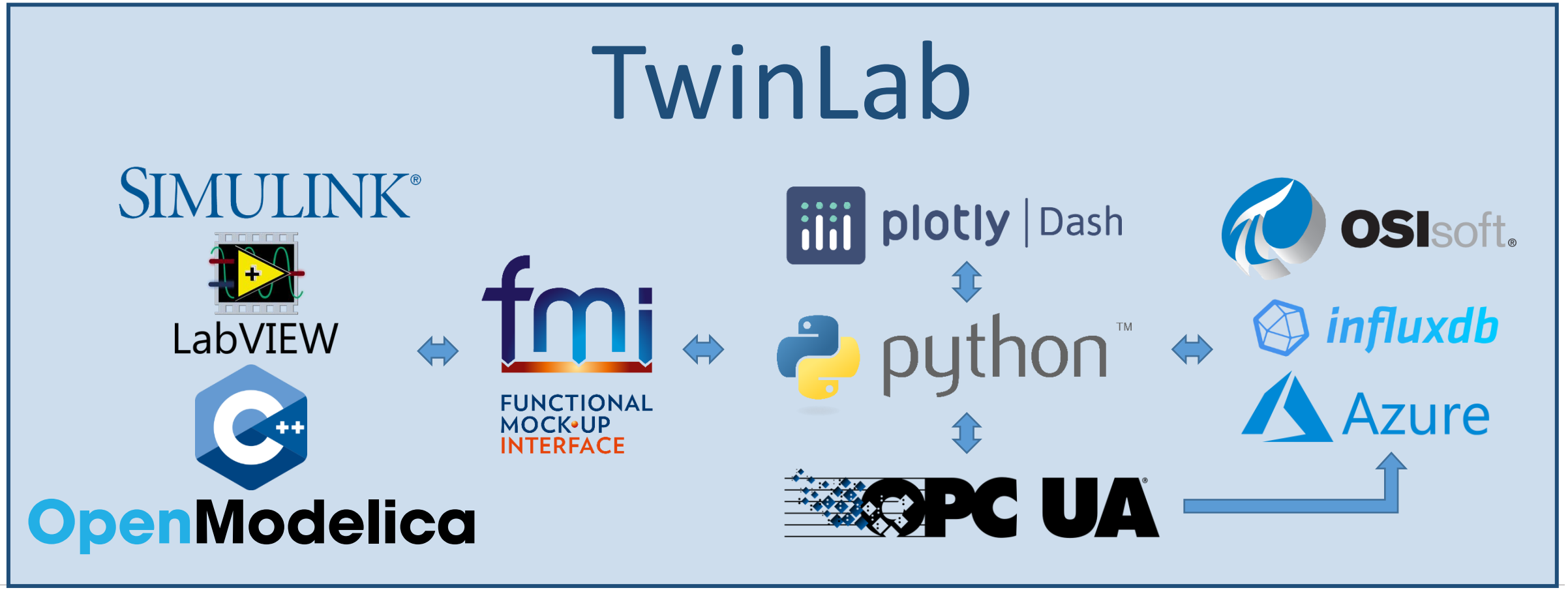
Forbedret arbeidsflyt

Verifisering av algoritmer

Direkte overføringsverdi til industrien

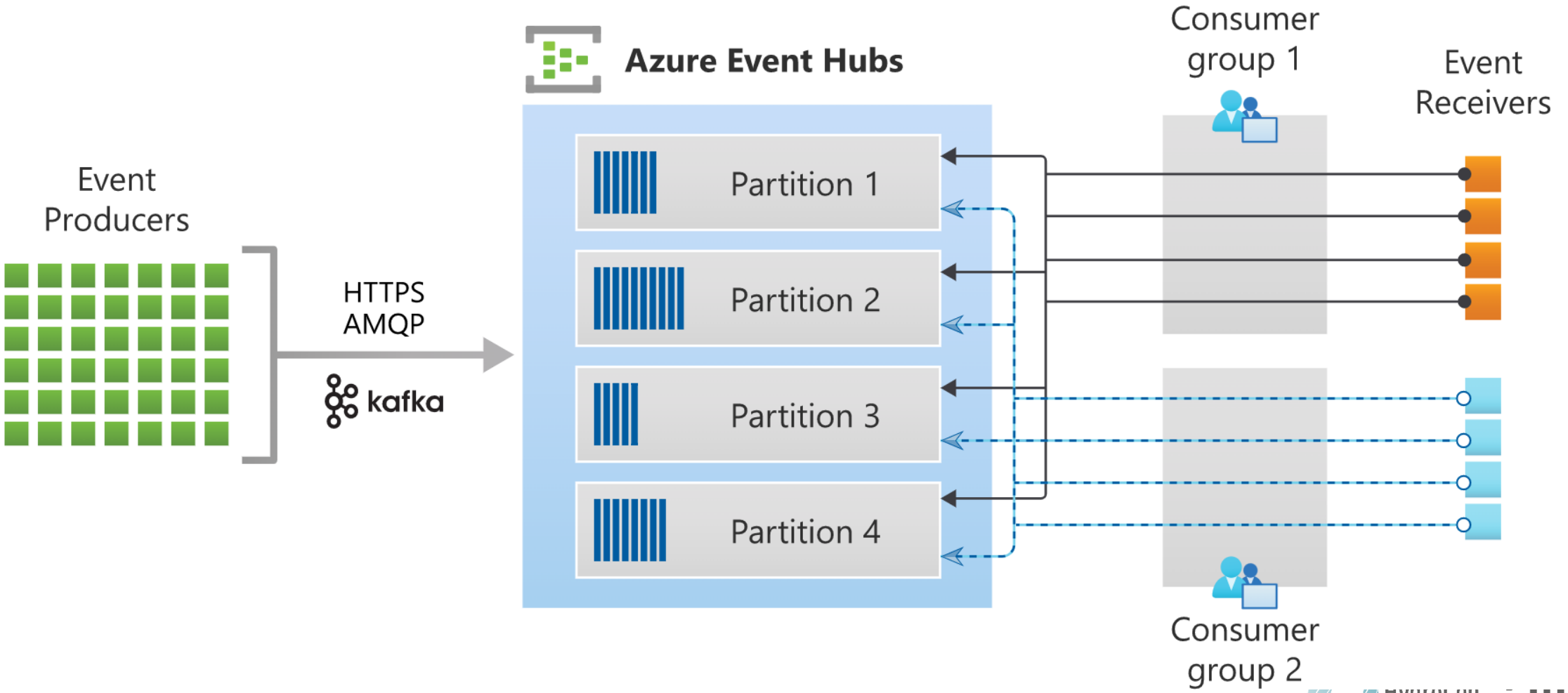
TwinLab – byggeklosser og arkitektur

Tverrfaglig laboratorium bygget på åpen kildekode

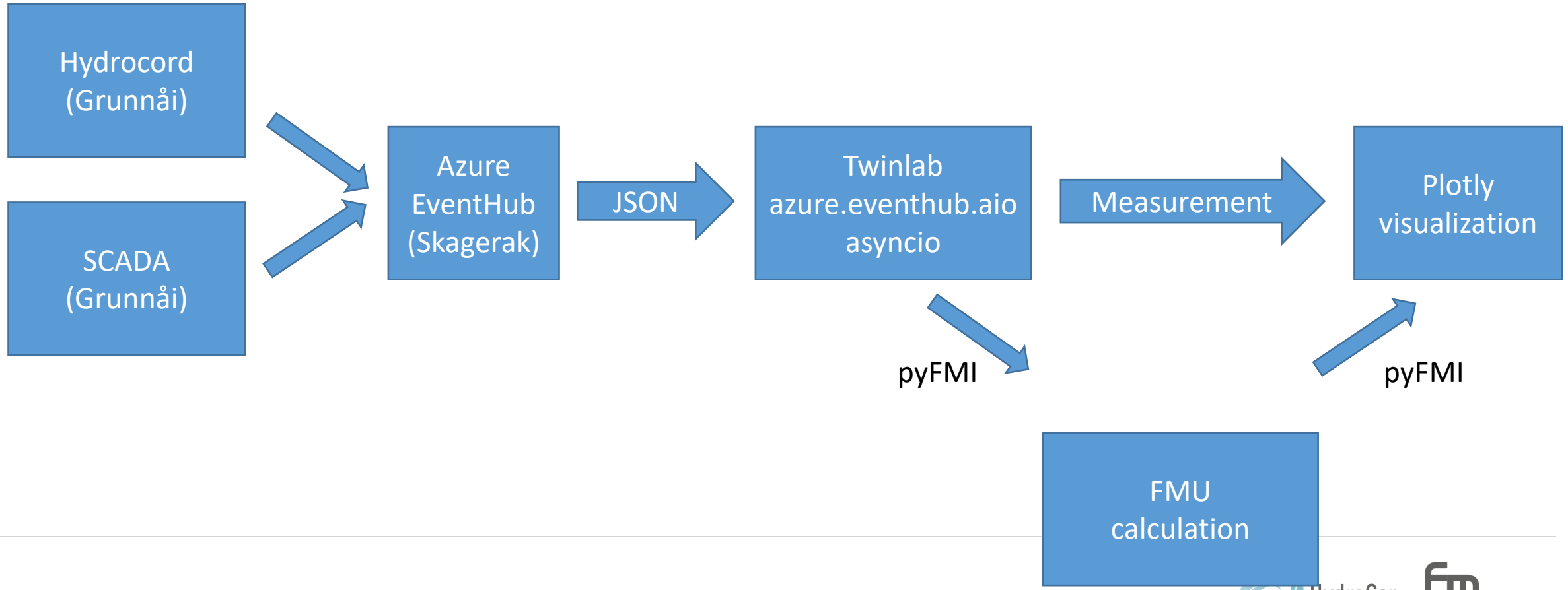


HydroCen

Azure Event Hub



Data flow Grunnåi -> Twinlab

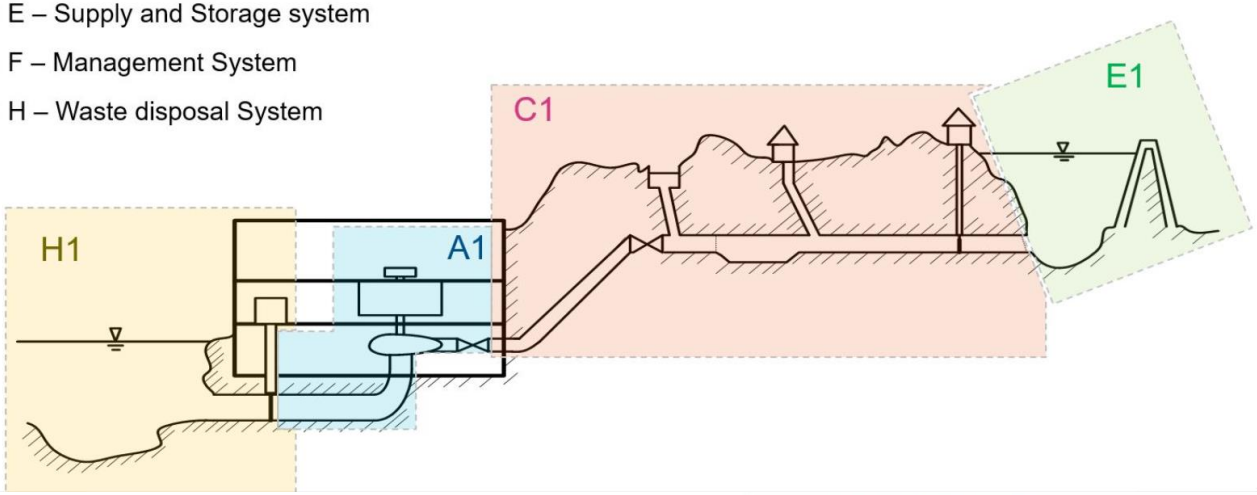


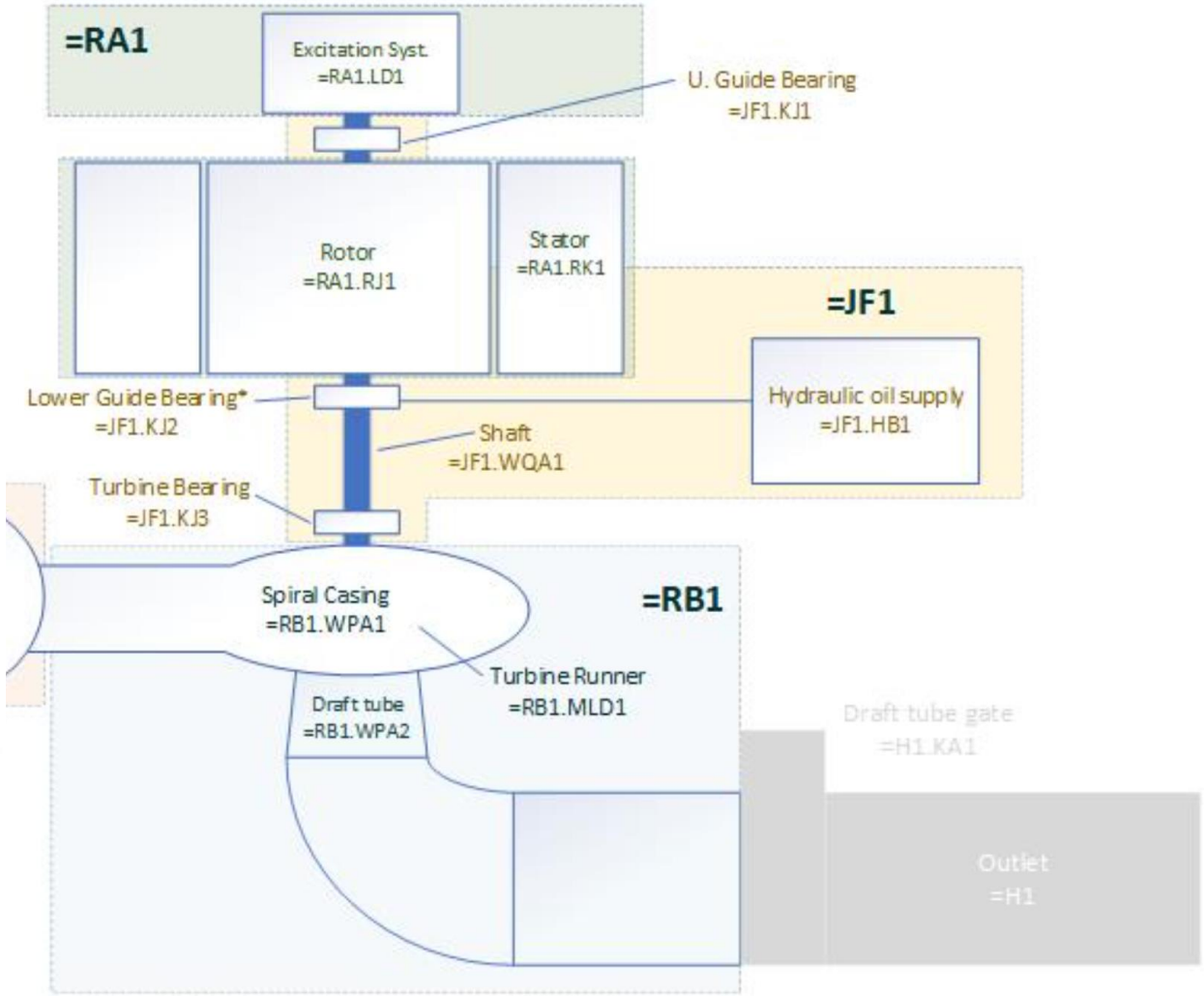
HydroCen

Standardisering og API'er

=RA1 Generator System
=JF1 Shaft System
=KA1 Main Inlet Valve S.
=RB1 Turbine System
=PG1 Protection System

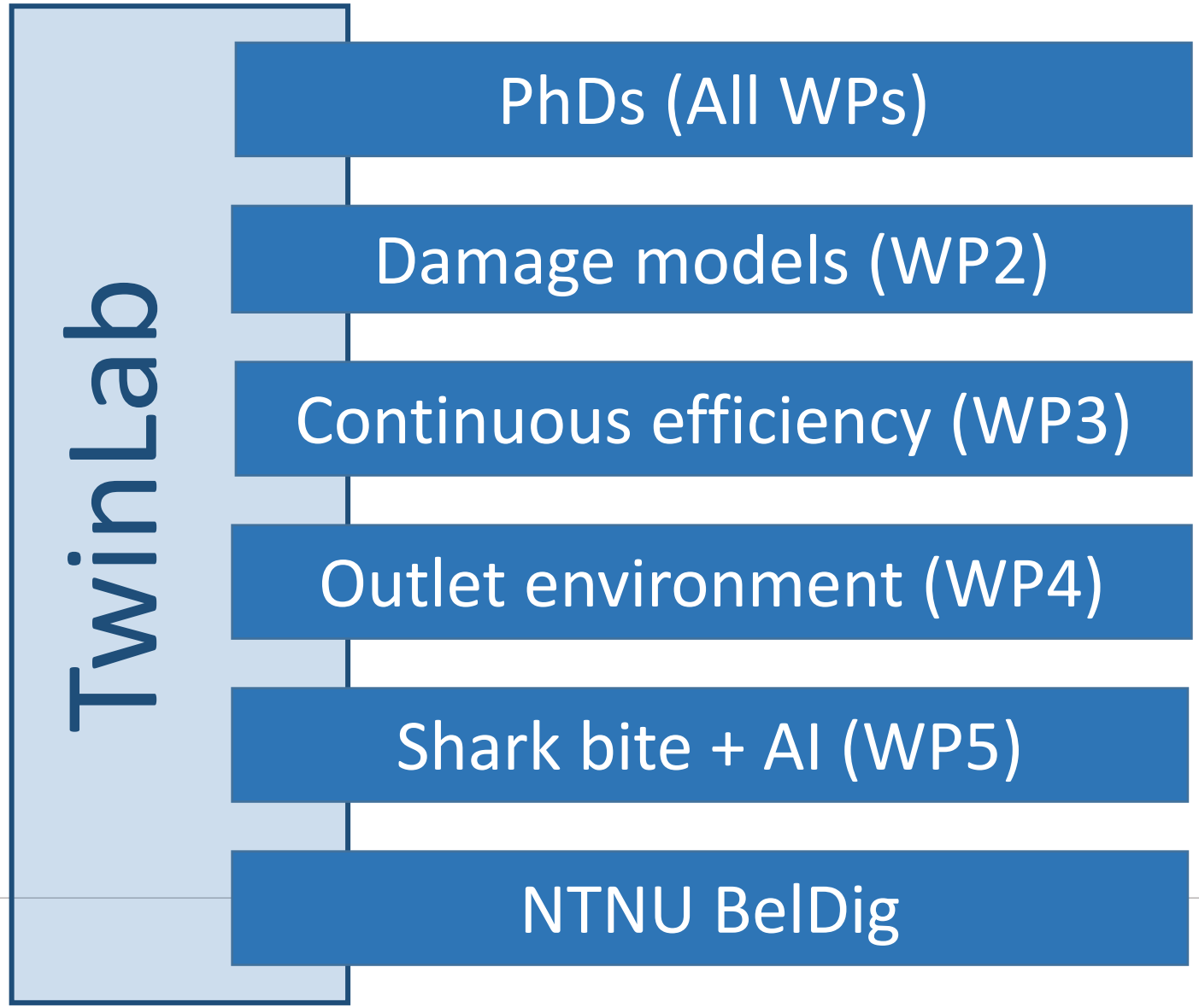
- A – Transforming system
- B – Electricity transport system
- C – Energy Transport system
- D – Support system
- E – Supply and Storage system
- F – Management System
- H – Waste disposal System





HydroCen

Videre anvendelser av TwinLab



Results

Improved workflow

Verification of algorithms

Direct transfer value to the industry

HydroCen

HydroCen

www.hydrocen.no
Twitter: @FMEHydroCen
LinkedIn: HydroCen
Flickr: HydroCen

Kontor:
Vannkraftlaboratoriet, NTNU
Alfred Getz vei 4
Gløshaugen, Trondheim

NTNU SINTEF NINA Norsk institutt for naturforskning NVKS NORSK VANNKRAFTSENTER