Introduction to laboratory facilities

Kimmo Kauhanemi
Technobothnia

- Joint laboratory of three educational institutes:
  - University of Vaasa
  - Vaasa University of Applied Sciences
  - Novia University of Applied Sciences
Laboratories at Technobothnia

- Total area around 8000 m²
- Almost 20 laboratories

Smart Grid lab
PAC laboratory

- protection
- automation
- communication

- IEC 61850 enables seamless integration of devices from different vendors

- Projects:
  - DEMVE (2011-2014)
  - eDEMVE (2015-2016)
Living lab site: Sundom Smart Grid

- On-line measurements:
  - One HV/MV substation (all feeders)
  - Three secondary substations (MV/LV)
- Total 20 measurement points
  - IEC 61850-9-2 stream with current and voltage measurements, 80 samples/cycle
  - Power, RMS voltages and currents etc. measurements with lower sampling rate (GOOSE)
Real time simulator

- Hardware: OPAL-RT OP5600
- Software: eMEGAsim, ePHASORsim
- Data and signal exchange:
  - communication protocols: IEC 61850, DNP3, IEC104, CAN, ModBus, C37.118...
  - analog output and input (16 channels)
  - digital output and input (32 channels)

Omicron CMS356 amplifiers

Power electronics (coming)
Technobothnia laboratory tour
Coffee break and Technobothnia tour

- Coffee is served at Technobothnia
- Free to visit our SmartGrid lab
- Tour of other Technobothnia facilities
Groups for Technobothnia tour

Group 1 at 15.05
Petri Hovila
George Kasparian
Heidi Krohs-Välimäki
Stefan Strandberg
Seppo Borenius
Aswini Manoharan
Fabian Hohn
Maciej Grebla
Mohamed Abdelfattah

Group 2 at 15.20
Jianping Wang
Jani Vainionpää
Mika Loukkalahti
Hans Kr. Høidalen
Prof N. Rajkumar
Chen Cheng
Nathaniel Taylor
Zakaria Habib
Prince Safo