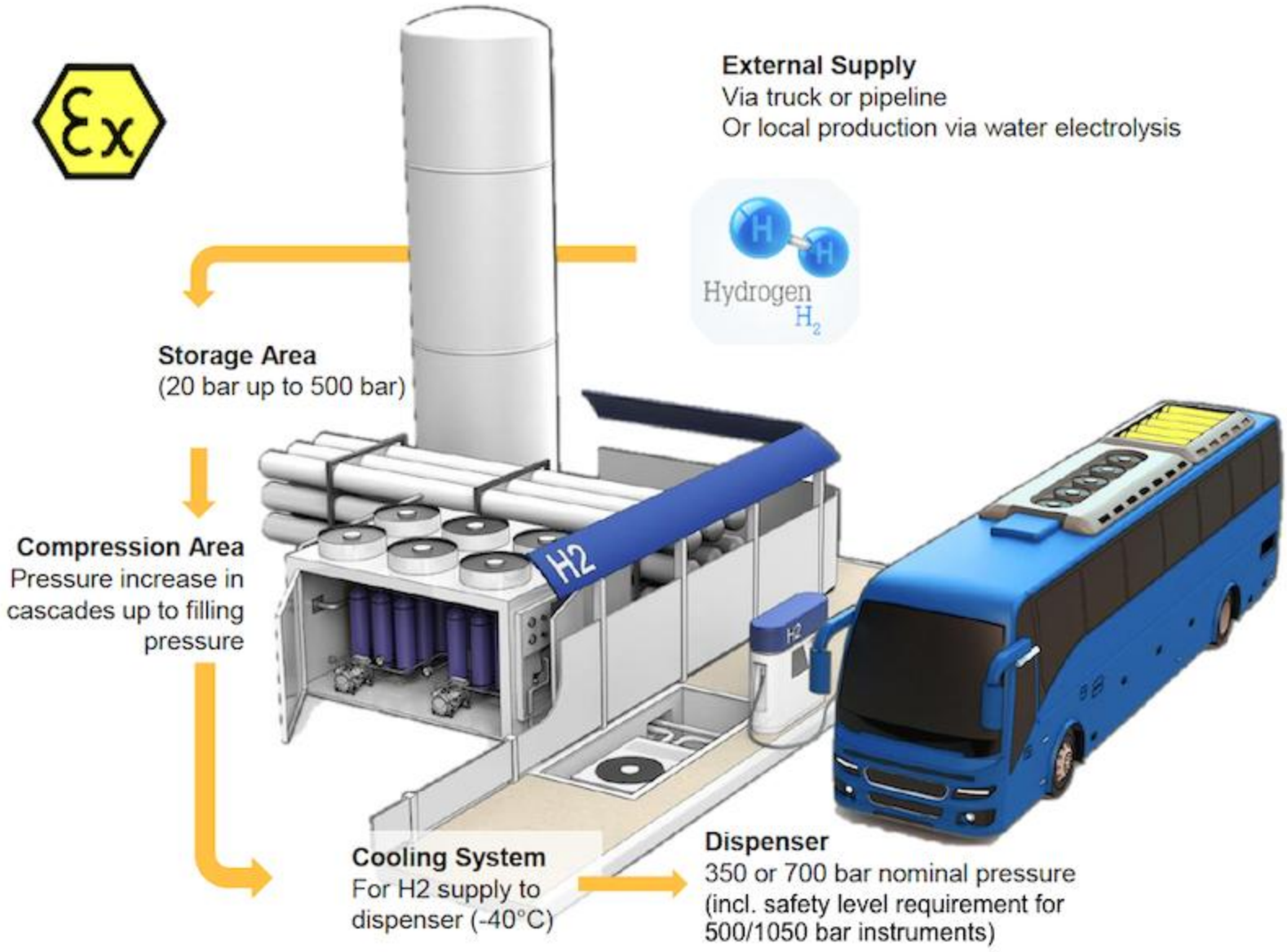
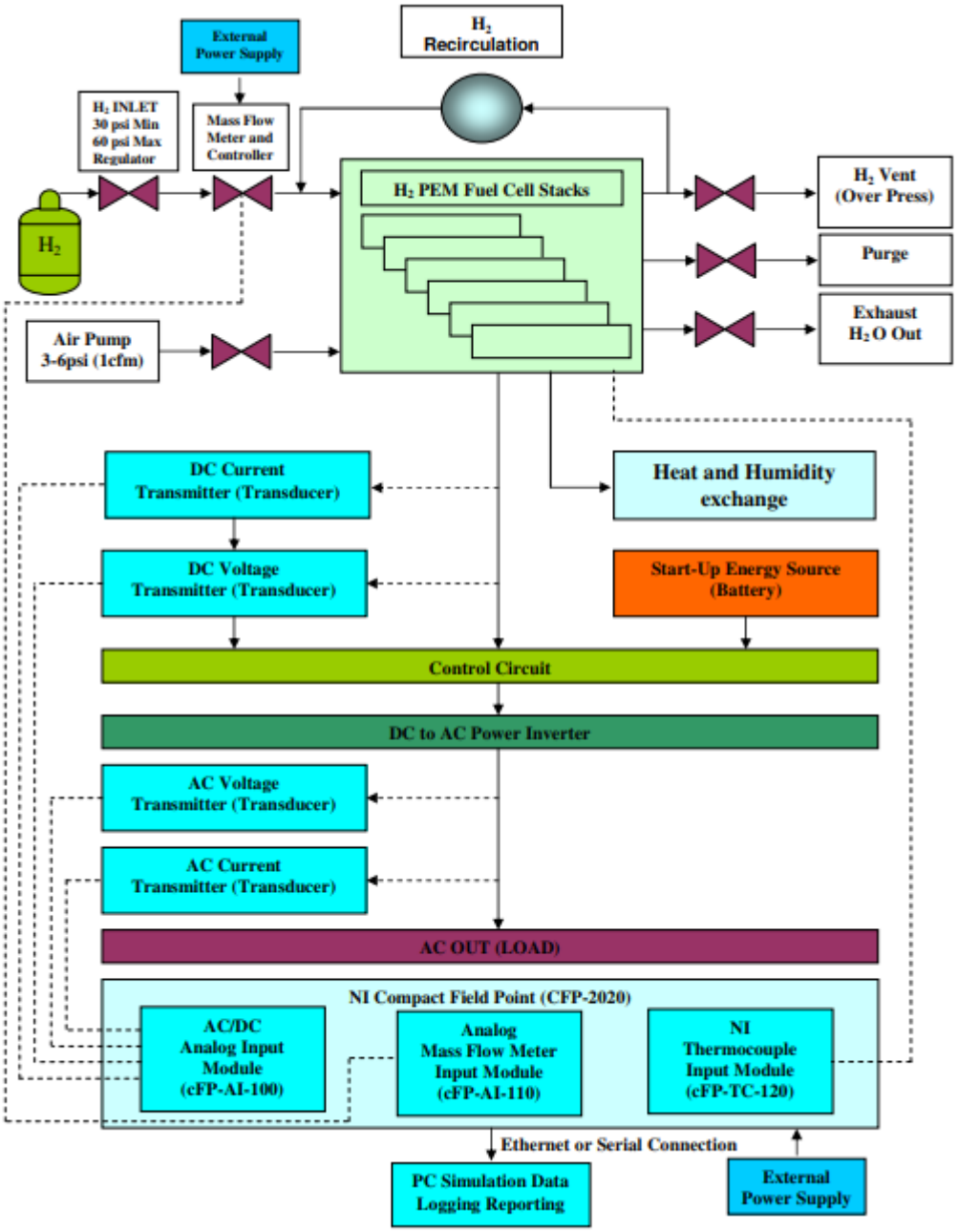
Final project

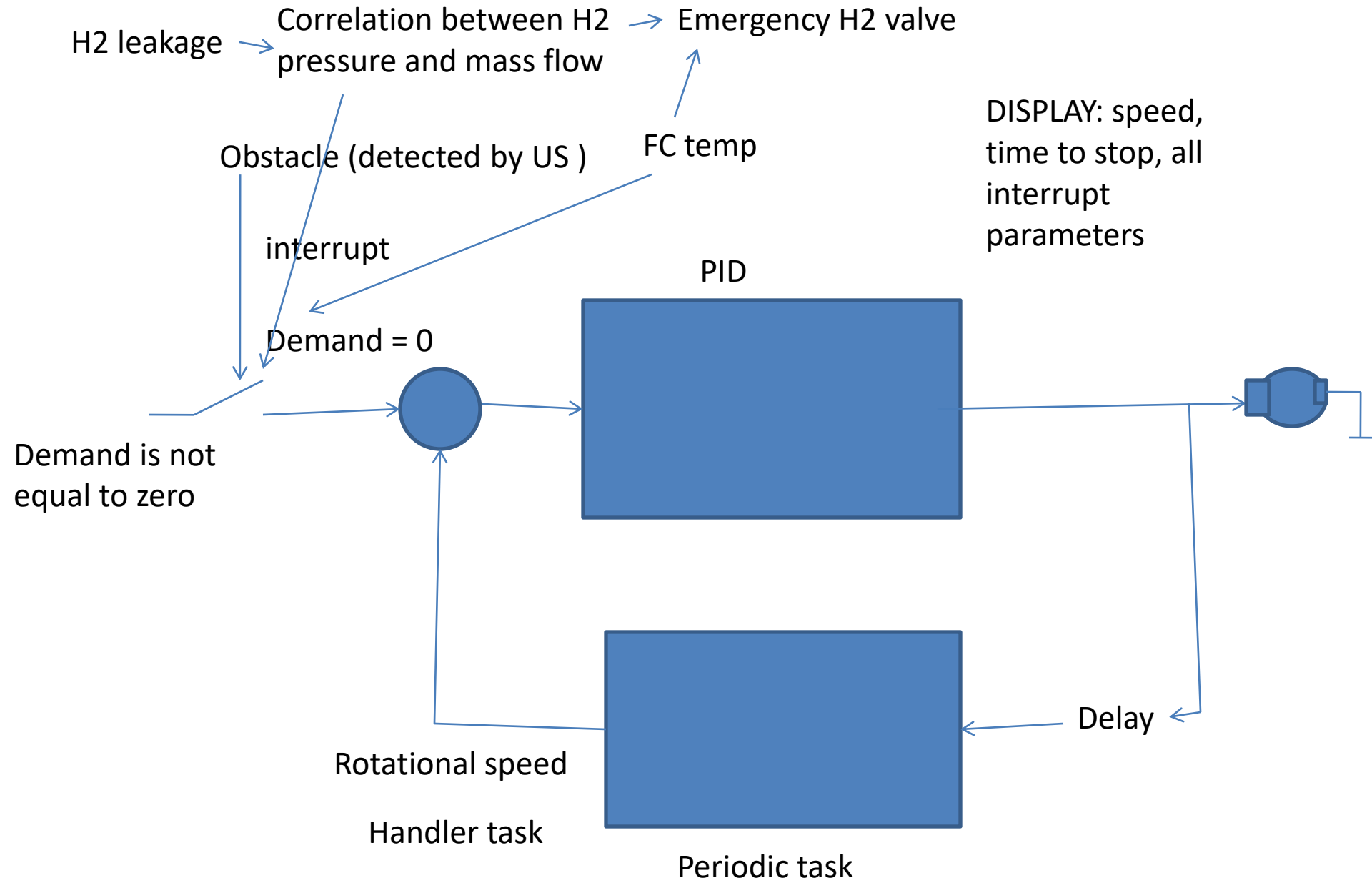
- Rotation speed measurement using encoder and rotation speed control using real time operating system (including hardware interrupt for emergency).
- Application:


External Supply
Via truck or pipeline
Or local production via water electrolysis
Hydrogen
H_2
Storage Area
(20 bar up to 500 bar)
Compression Area
Pressure increase in cascades up to filling pressure
H2
Cooling System
For H2 supply to dispenser (-40°C)
Dispenser
350 or 700 bar nominal pressure
(incl. safety level requirement for 500/1050 bar instruments)



Proton-exchange or Polymer Electrolyte Membrane (PEM) fuel cell

- Correlation between H2 pressure and mass flow – base for software simulation
- Correlation between mass flow and produces DC electric current + temperature (for Fuel Cell – type EPAC-500 Hydrogen fuel cell) – base for software simulation
- Software speed simulation of 2 motors
- Speed control using PID control algorithm, demand from user entry


H2 leakage
Correlation between H2 pressure and mass flow
Emergency H2 valve
Obstacle (detected by US)
FC temp
DISPLAY: speed, time to stop, all interrupt parameters
interrupt
PID
Demand = 0
Demand is not equal to zero
Delay
Rotational speed
Handler task
Periodic task

$$Q = k * (P_{in} - P_{out})$$