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Development of a Hardware-In-the-Loop (HIL) simulation system for a 3000L/h helium liquefier

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ABSTRACT: A 3000L/h Helium Liquefier has been designed and is being assembled in China by the Technical Institute of Physics and Chemistry, CAS. A dynamic simulation of this helium liquefier has been performed to evaluate the heat transient performance. To verify the control system program before the commissioning of this liquefier, a Hardware-In-the-Loop (HIL) Simulation System has been developed. This HIL simulation system consists of three parts, namely, simulation model of this helium liquefier performed by EcosimPro, NI Veristand to deploy the encapsulated simulation model, a real PLC control system to run control program and human machine interface. Control signals from real PLC and process parameters from simulation model have been interchanged between PLC hardware and simulation model through NI inputs and outputs hardware. The performance of this HIL simulation system proves that this HILS improves and verifies the control system design and will reduce the time for system commissioning on site.

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