GT European Roadshow in the UK

Hydrogen Refuelling Station modelling using GT-SUITE

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Technology

The challenges

Design a hydrogen refuelling station that…

- Meets the functional requirements of daily throughput and peak performance
- With reasonable investment of hardware
- In order to minimise the cost of dispensed H2

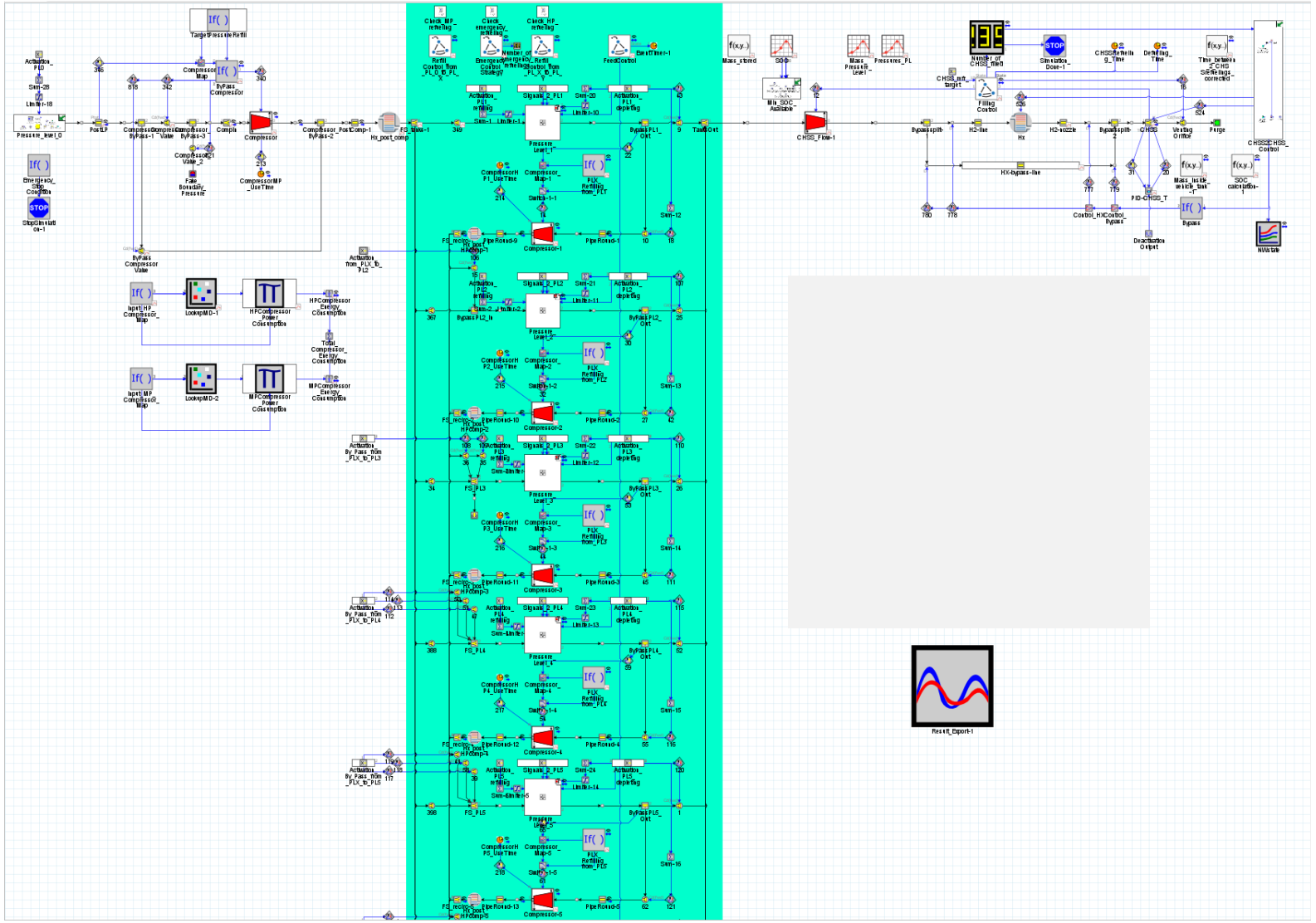
… for each application scenario.

A digital twin for gaseous HRS

Built on GT-SUITE

Key features:

- 0-D hydrogen
- 1-D heat transfer
- High configurability for:
  - material properties
  - vessel geometries
  - buffer storage setup
  - H2 supply
  - demand profiles
- Control strategies
- Thermal models for all H2 vessels
- Multi-day station performance prediction



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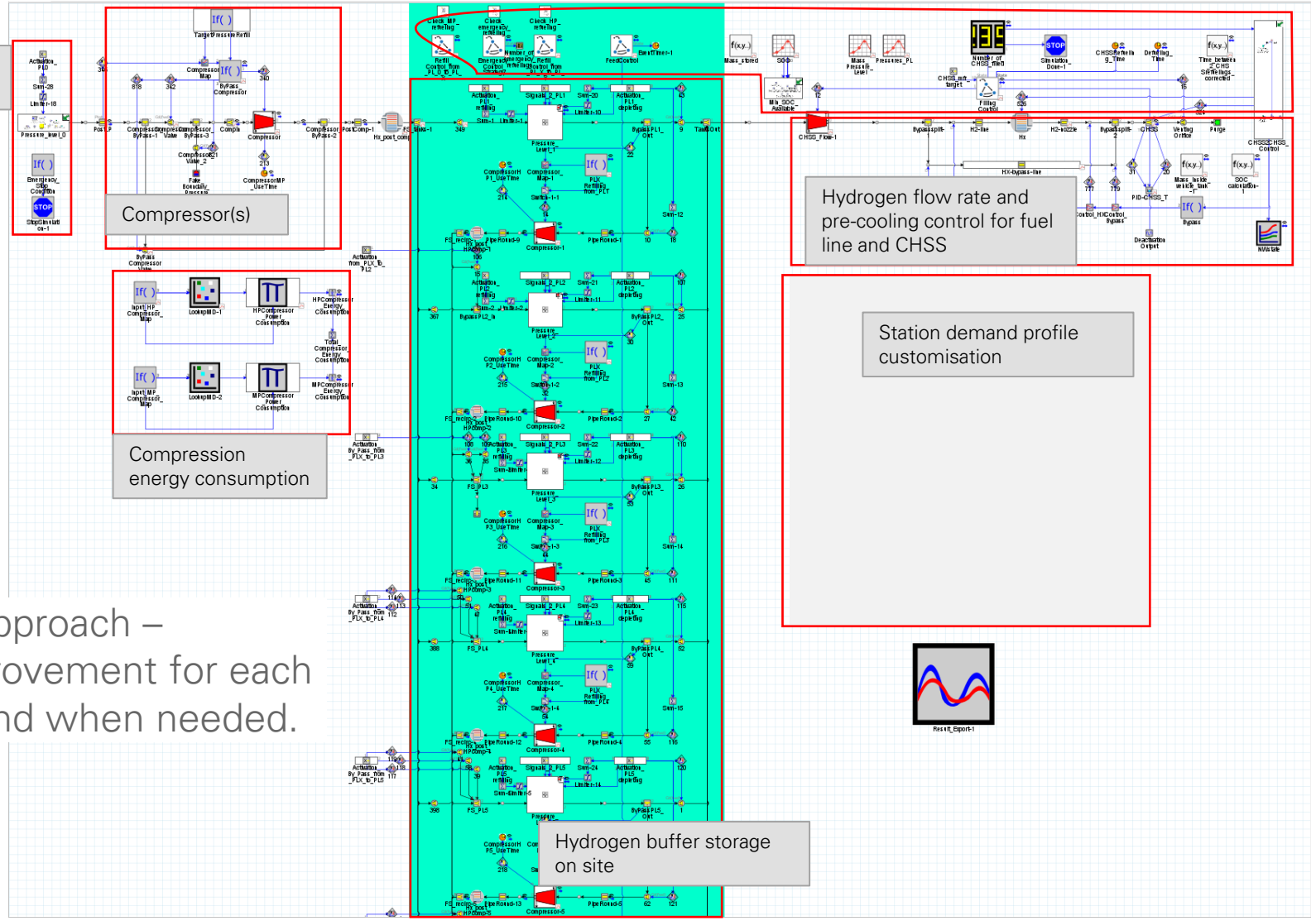

A highly modular design approach –
it enables continuous improvement for each section of the station as and when needed.

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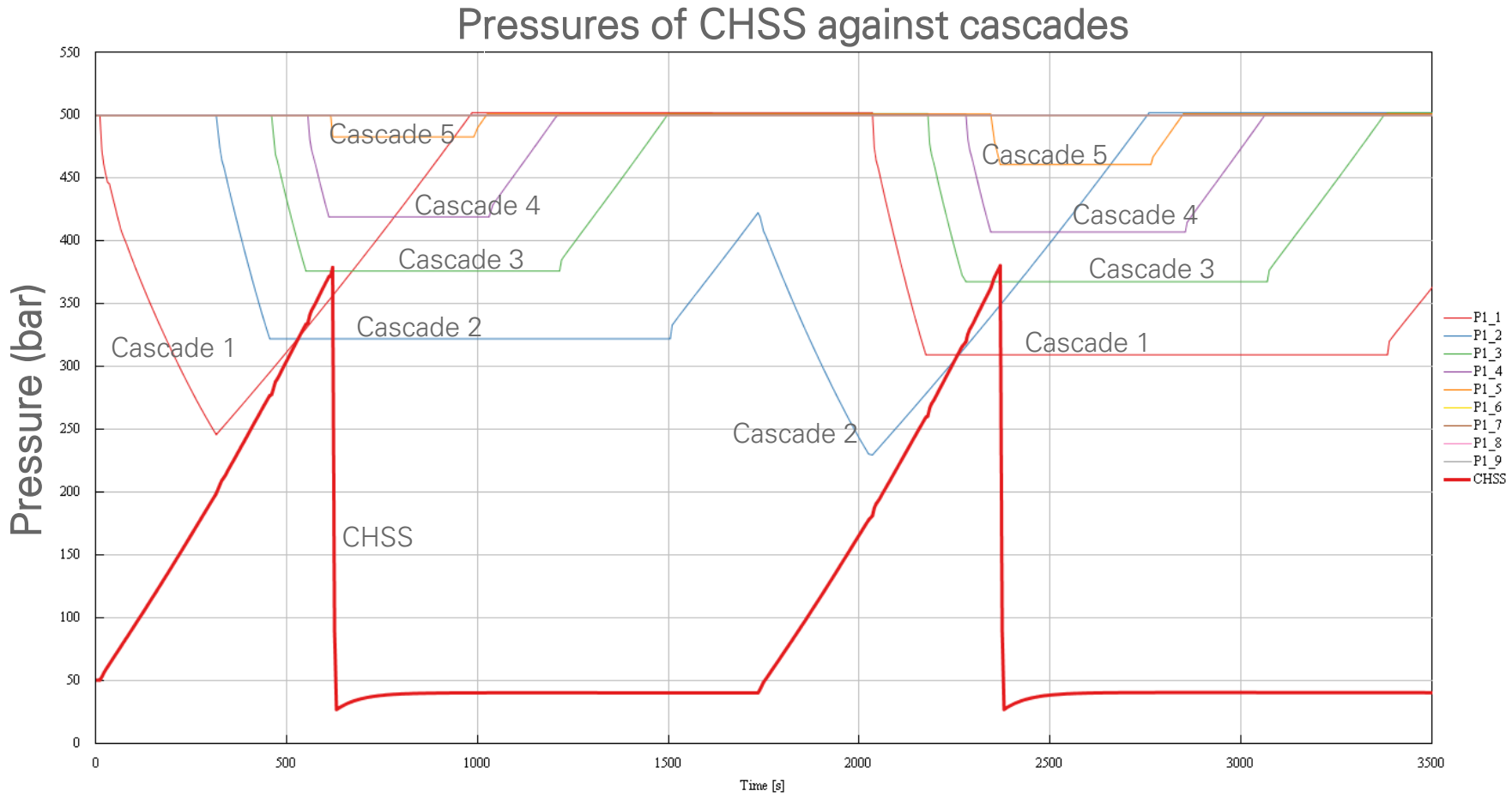
A digital twin for gaseous HRS

Example result formats



- REFPROP integration for H2
- Robust thermal and fluid dynamics models in GT-SUITE
- Modular design that allows continuous improvement

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A virtual test ground

That enables optimisation and innovation in…

- Component sizing
- Benefits of various cascade filling configurations
- Operational choices and insights
- And many more…

… with different supply and demand profiles, climate seasonality and so on

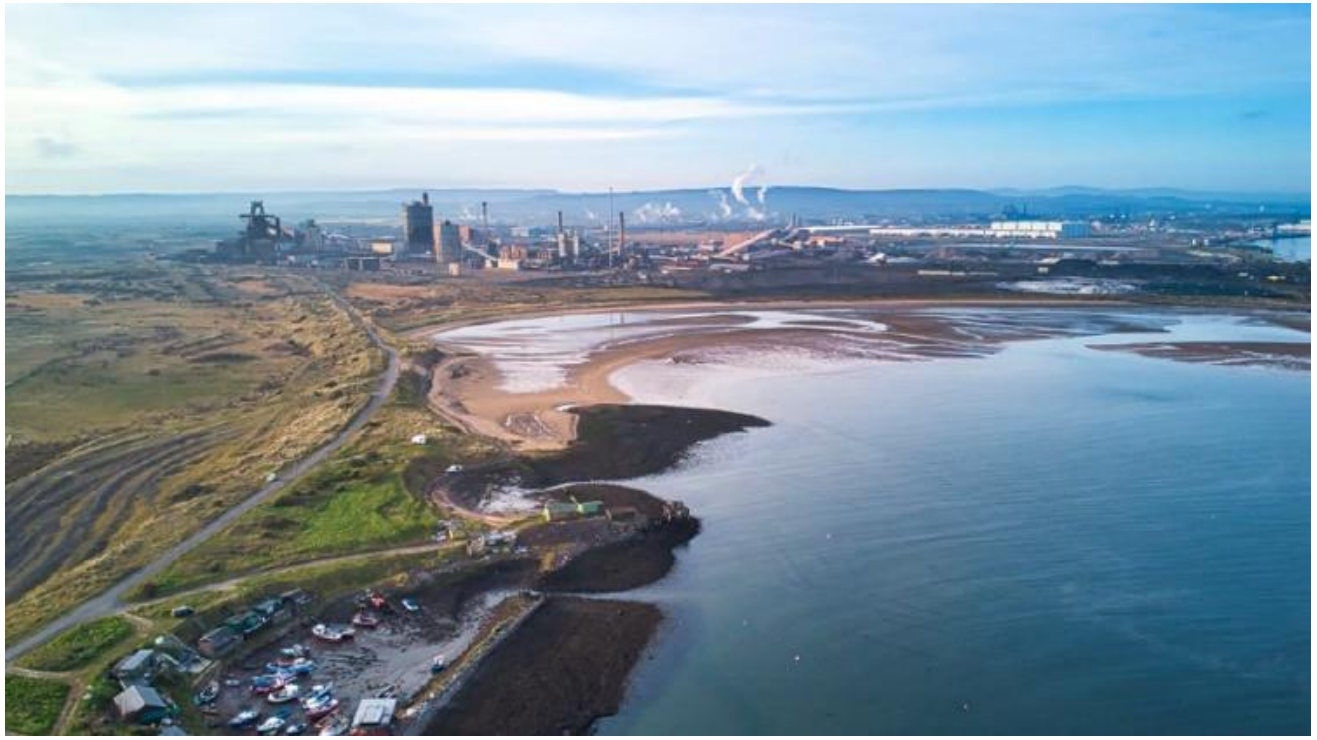
Ongoing works

Testing, validation and beyond

0-D bulk fluid and 1-D hydrogen vessel simulations have been validated against industrially recognised tools.

Test programmes are scheduled to tune and validate pipework models and transient responses.

Further validation into the high-flow regime are to be explored.



Teesside landscape

Thank you