

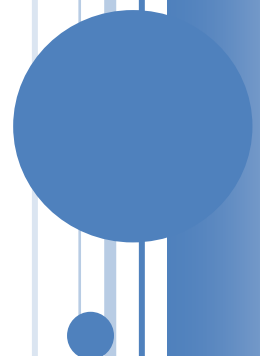
POST PROJECT

Hydrogen System

Lasse Lykkegaard

Dennis Thomsen

Knud Baastrup



PRODUCT ACCEPT

The H2 System has been deployed via deployment meetings with customer representatives for each timebox delivery and Product Accept Declarations for timebox 1-4 and timebox 5 have as well been agreed and signed by the customer representatives.

The customer representative has as well accepted that the deployment of timebox 5 were the last deployment from the Hydrogen Project, i.e. requirements that were not deployed up to and within timebox 5 (and still relevant for customer) must be part of a new contract agreement.

PRODUCT EVALUATION

ALL

The Product Evaluation will go through the major artifacts of the Hydrogen System and evaluate these parts one by one using the following checklist.

- 1) Requirements: Were the exact requirements fulfilled?
- 2) Customer Satisfaction: Did the customer get the product he wanted?
- 3) Future improvements: What could be improved in future product versions?

Artifacts	Requirements	Customer Satisfaction	Future improvements
Relay circuit (HW)	OK	OK	None
Voltage & Current Sensor (HW)	OK	OK	None
Voltage & Current Gain/Level (HW)	OK	OK	Make it less dependent on manual calibration. Get rid of the potentiometers.
Flow Gain/Level (HW)	OK	OK	None
Fuel Cell HW based on existing HW prepared for electrolyzer.	Not OK	NOT OK	Replicate the HW prepared for electrolyser and test.
FPGA ADC (Spartan 3A)	OK	OK	None
R-2R for FPGA ADC (HW)	Only support for 2 channels.		Upgrade HW to support the 8 channels available in FPGA.
Relay circuit Driver	OK	OK	Be sure the relay stays de-activated during system reset.
ADC Driver	OK	OK	None
FPGA ADC Driver	OK	OK	Correct formatting for the values retrieved from driver.

SW Architecture	OK	OK	Incorporate CAN Interface.
H2 Test Interface	OK	OK	None
CAN Interface	Not OK	Not OK	Incorporate CAN Interface
Low Fidelity Prototype	OK	OK	Realize the user interface prototype agreed with customer.
WEB Site	OK	OK	Implement feed-back from usability test.
SQL Relay	OK	OK	Use XML RPC to make it easier to pass firewalls.
Usability Test	OK	OK	Implement feed-back
EMC	OK	OK	Schedule test at Delta and claim the CE mark.

PROJECT EVALUATION

ALL

Below questions were prepared as a checklist and answered together within the project team

1) *How was the cooperation with the customer? Was it optimal?*

The involvement of primary users was limited because a lot of mandatory requirements originated from other teachers and not from the customer themselves. The expectations from the primary users were not well aligned with the mandatory requirements and as well not realizable within the PRO3 and PRO4 timeframe.

Most of the deployment sessions were for the above reason carried out with Klaus and Morten that acted as customer representatives.

2) *Did you choose the most suitable use of EUDP tools for the project? Which tools were used and which were satisfactory?*

Preproject forced us to use many EUDP tools where some ended up being quite useful such as story cards, use-cases and stakeholder analysis. Difficult to find the relevance with Rich Picture as we already had a quite good idea of the system to be.

Timeboxes for the realization worked very well and forced us to make early deployment where we realized how difficult it could be to fully deploy a set of requirements within 2 weeks. The use of timeboxes have put a more average work load and helped us keeping the focus on one timebox at a time. However, the split into timeboxes will make it more difficult to find the red line because some designs has been updated during several timeboxes.

Next time we need to provide better documentation for the product versions delivered by each timebox, i.e. what is exactly included in terms of SW and HW versions!

Class diagram and subsystem design created during Launch were very useful during realization and forced us to make a proper Object Oriented implementation.

3) *Was the project finished on time?*

Timebox 1-3 completed according to deployment plan. In timebox 4 the new requirements from WEB2, EMC, EMB HW and IDE were formalized and the scope were adjusted to both fit the extended scope and to allow time for unsolved issues from prior timeboxes.

The last Timebox 5 was not fully finalized – still some errors to be corrected and tests to be completed.

4) *The extent of the project. Did you experience work and time pressure?*

The fact that we managed to get the scope adjusted gave us an acceptable work and time pressure.

5) *Did the customer change some of his/her demands in the process and how was it handled?*

More time should have been used during startup of PRO4 to get the new requirements better formalized and to re-negotiate the deployment plan.

6) *Did the customer get what he wanted or even more?*

The customer representatives accepted timebox 5 as the last deployment.

7) *Did you make use of sub-suppliers? How was the cooperation with these?*

Yes, we have relied on a Communication protocol from Team Hub and a CAN driver identified by Team User Interface. We lacked some overall coordination and as well some backup plans to account for possible late deliveries from the sub suppliers.

8) *What do you think needs to be changed in your next project compared to this project?*

Launch should be better prepared for the timebox ways of working, e.g. requirements should be on a more detailed level and the product acceptance test should support the early deployments.

We would have liked one person to define the overall project and coordinate the overall requirements from EMC, WEB2, EMB HW and IDE and take care of contradictory demands.

9) *Are you satisfied with the project as a whole?*

Yes, but we used a lot of time in Launch to specify something that were kind of wasted due to the many changes introduced during startup of realization.

Despite some functionality not fully in place, we are generally happy about the outcome.