

Progress of the Project

Overview

Thomas Jordan, KIT

Telephone / Video Conference on 30 March 2020



Pre-normative REsearch for Safe use of Liquid HYdrogen

223
1966



Agenda



| Starting time (CEST) | Topic | Responsible person |
|----------------------|----------------------------------|--------------------|
| 10:00 | Overview (WP1) | Jordan |
| 10:45 | Progress, status, outlook on WP2 | Bernard |
| 11:30 | Progress, status, outlook on WP3 | Venetsanos |
| 12:15 | Lunch break | |
| 13:15 | Progress, status, outlook on WP4 | Coldrick |
| 14:30 | Progress, status, outlook on WP5 | Kuznetsov |
| 15:15 | Progress, status, outlook on WP6 | Cirrone |
| 16:00 | Wrap-up | Jordan |
| 16:15 | End | |

Agenda



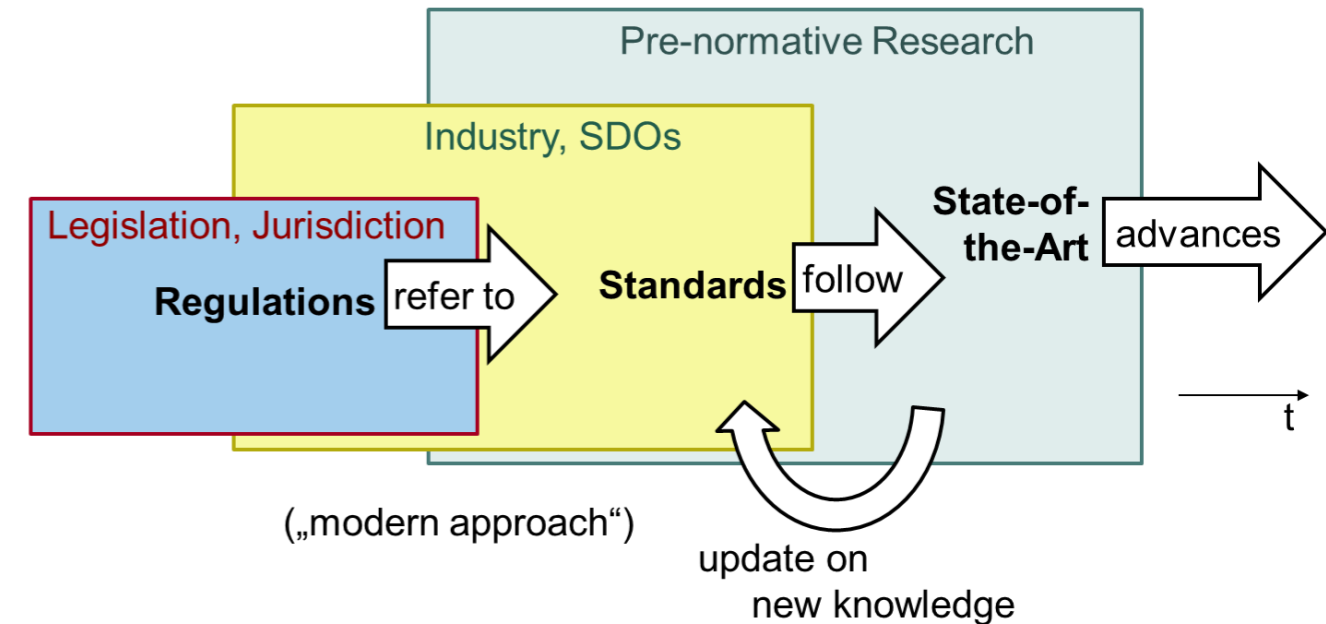
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WP1 Update

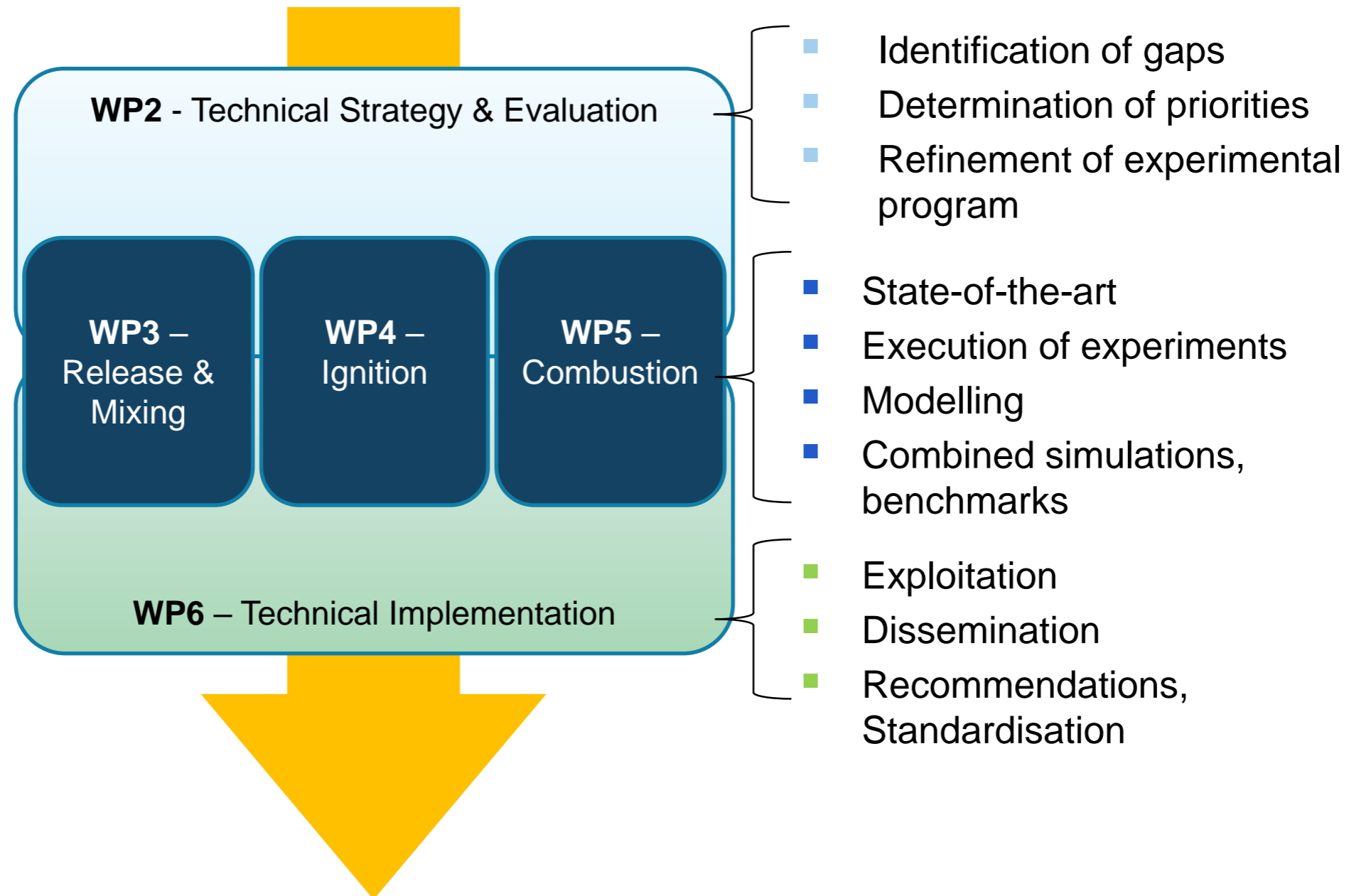
- RTD coordination aspects
 - Expected results
 - Scientific approach
 - Relation between WPs
 - Main challenges
- Administrative coordination aspects
 - Project organization
 - Updated status on deliverables
 - Reporting

Expected Results = Objectives

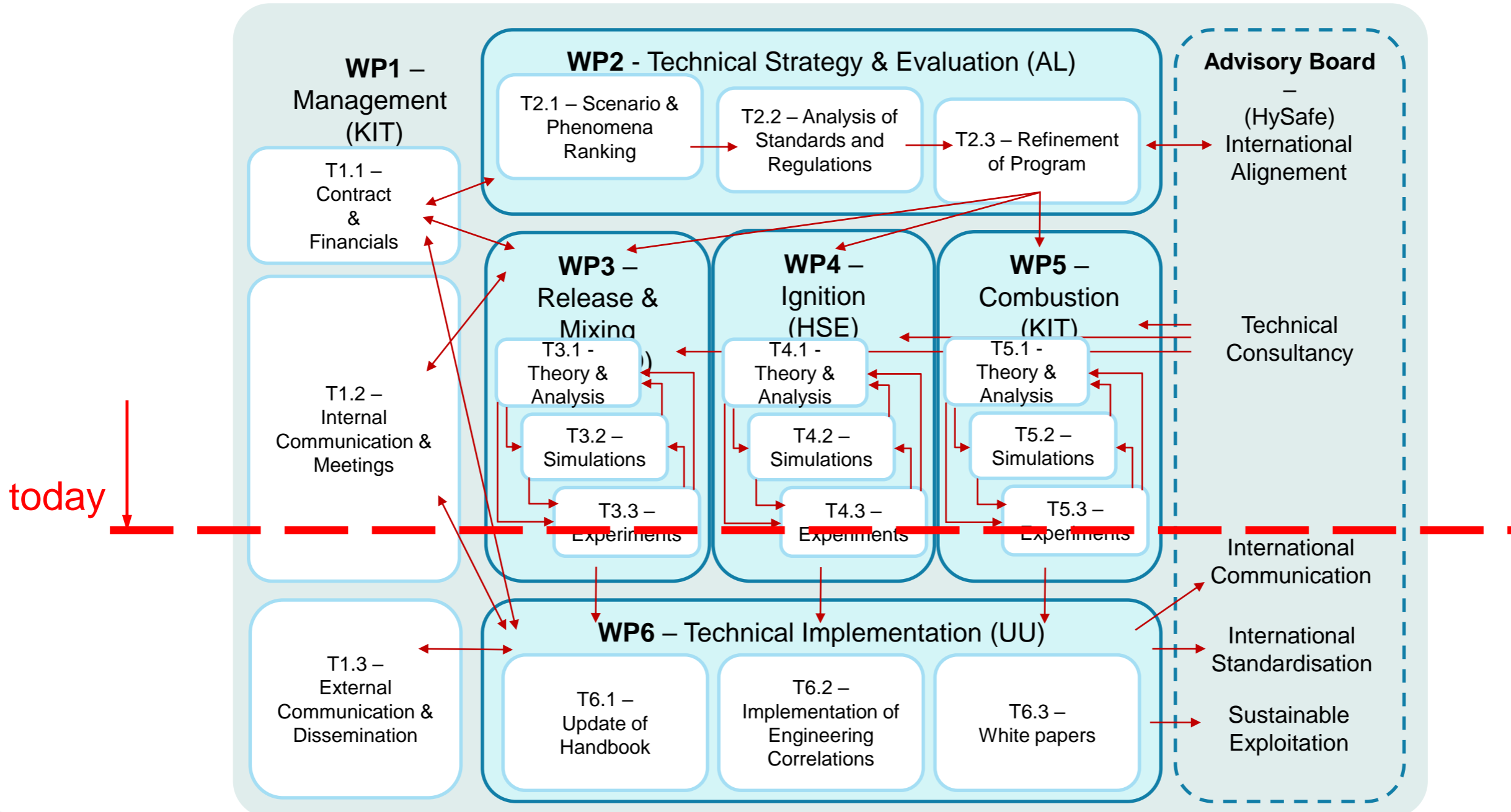
- Develop further the **state-of-the-art** for safe use of LH2
- Report on the initial state-of-the-art and knowledge gaps with priorities related to the envisaged use of LH2
- Execute adjusted **experimental program** addressing release, ignition and combustion phenomena with highest priorities
- **Document and publish** detailed, aggregated and interpreted data in a FAIR way
- Develop suitable **models** and engineering correlations and integrate them in a suitable open risk assessment toolkits
- Provide enhanced **recommendations** for safe design and operations of LH2 technologies
- Support international SDOs in updating existing or developing new international, performance based and risk informed **standards**
- Document and **disseminate** the enhanced state-of-the-art



Scientific Approach



Relation between WPs

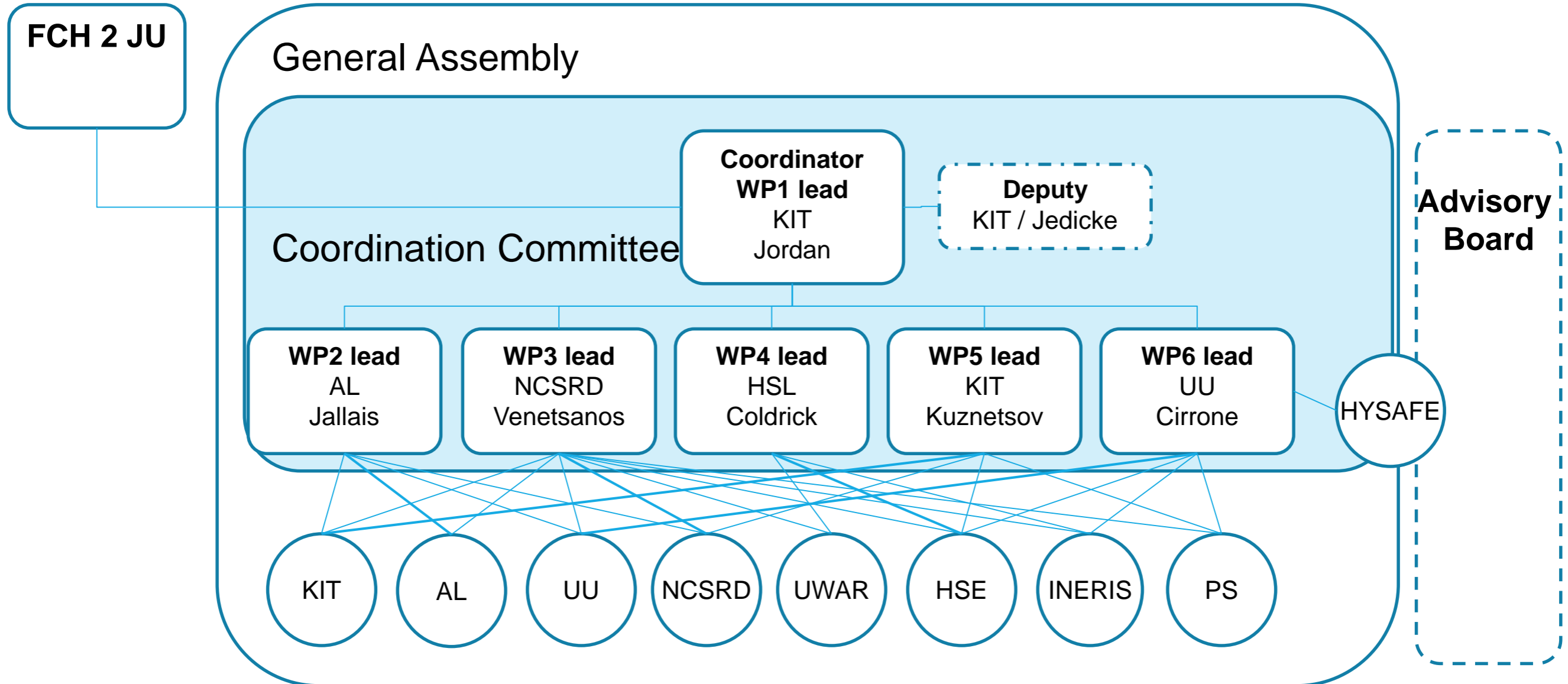


Main Challenges

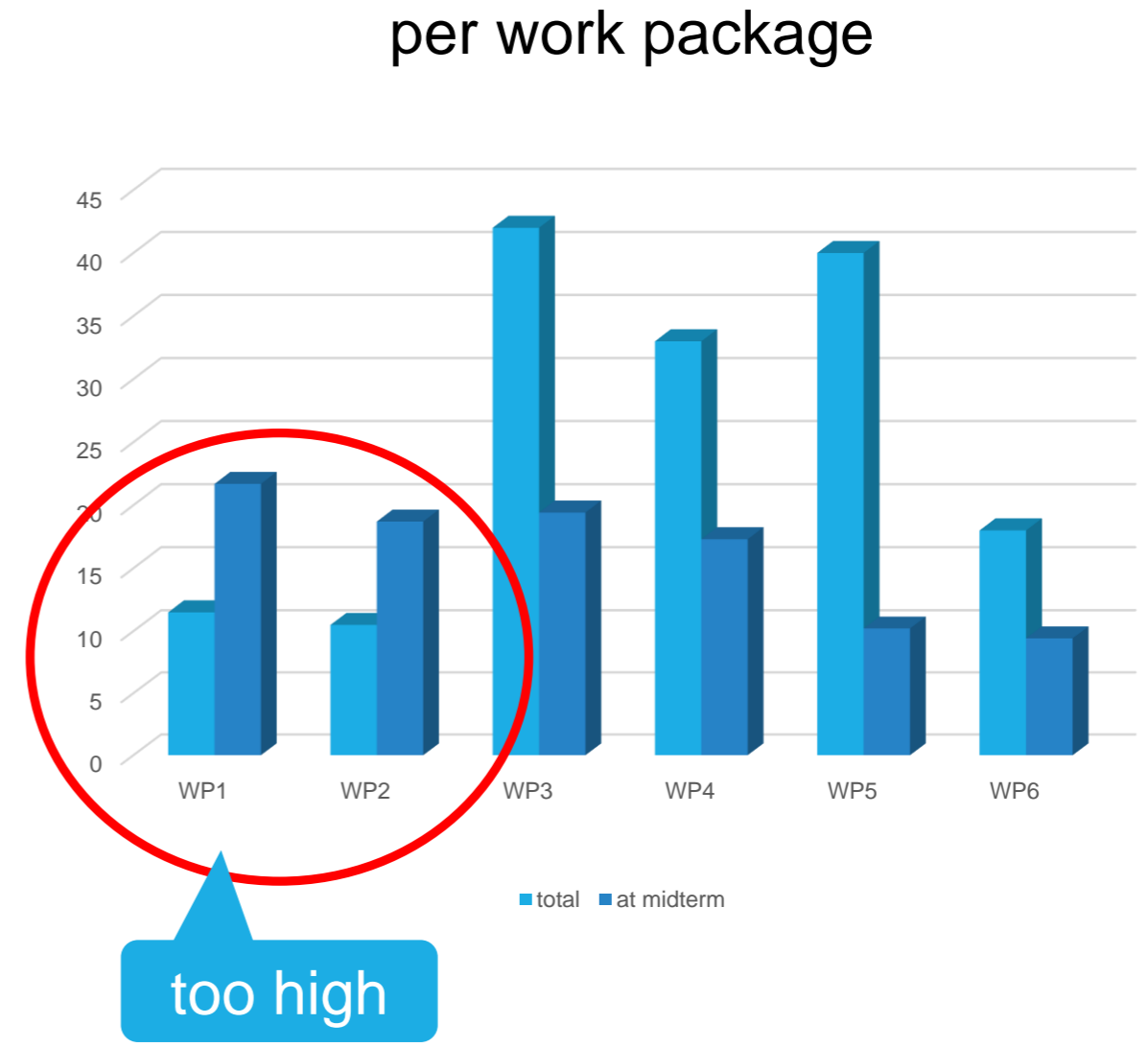
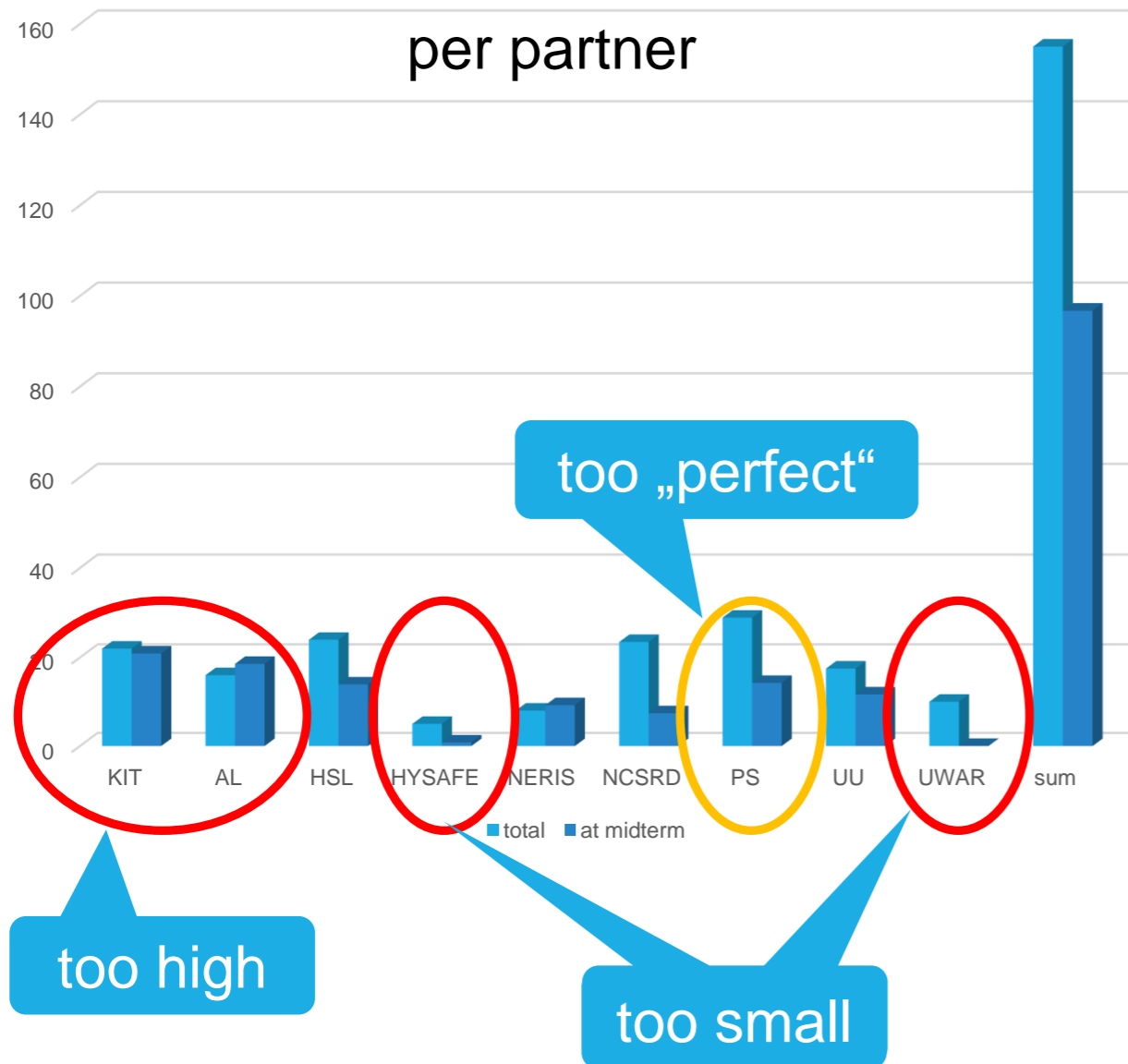


- Address **the right knowledge gaps** with the limited funding
- **Integrate** analytical, experimental and simulation work
- Get **experimental work** properly and timely done, despite difficulties in supply and costs associated with materials, components and measurement techniques in the **cryogenic field**
- Find the right formats and channels to **inform** all stakeholders
- Initiate and possibly drive the right **standardization** work
- Providing a **sustainable impact** as time limited project (in particular, when comparing to typical timelines for product development and standardization)

Project Organisation - Governance



Review / Justification of AL, KIT, HySafe, UWAR



WP1 – RTD coordination – Administrative coordination Reporting



SyGMa - System for Grant Management - Google Chrome

ec.europa.eu/research/participants/grants-app/reporting/REP-779613-1/PeriodicReportForm/all

njorthom (EXTERNAL) ?

Grant Management Project Periodic Report

779613 (PRESLHY) FCH2-RIA
THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION
HORIZON 2020
Period No: 1 Duration (months): 18
Reporting Period : [01 Jan 2018 - 30 Jun 2019]

Tech. Report (Part B) Financial Statements

Partners Financial Report

[Use of Resources summary](#)
[Export Use of Resources to PDF](#)
[Financial Statements Summary](#)
[Financial Statements Summary](#)

| Number ▲ | Role | Short Name | Legal Name | Country | PIC | Status |
|----------|------|------------|---|---------|-----------|---|
| 1 | CO | KIT | KARLSRUHER INSTITUT FUER TECHNOLOGIE | DE | 990797674 | Draft |
| 2 | BEN | AL | L AIR LIQUIDE SA | FR | 999964853 | Frozen/Ready For Submission to COO/Ready For Sign |
| 3 | BEN | HSE | HEALTH AND SAFETY EXECUTIVE | UK | 999461811 | Available for revision |
| 4 | BEN | HySafe | INTERNATIONAL ASSOCIATION FOR HYDROGEN SAFETY | BE | 950564014 | Available for revision |
| 5 | BEN | INERIS | INSTITUT NATIONAL DE L ENVIRONNEMENT ET DES RIS | FR | 999958063 | Draft |
| 6 | BEN | NCSR | NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOI | EL | 999978239 | Draft |
| 7 | BEN | PS | PRO-SCIENCE - GESELLSCHAFT FUR WISSENSCHAFTLICH | DE | 972429075 | Available for revision |
| 8 | BEN | ULster | UNIVERSITY OF ULSTER | UK | 999885313 | Available for revision |
| 9 | BEN | UWAR | THE UNIVERSITY OF WARWICK | UK | 999976784 | Available for revision |

Reporting

Revision reason

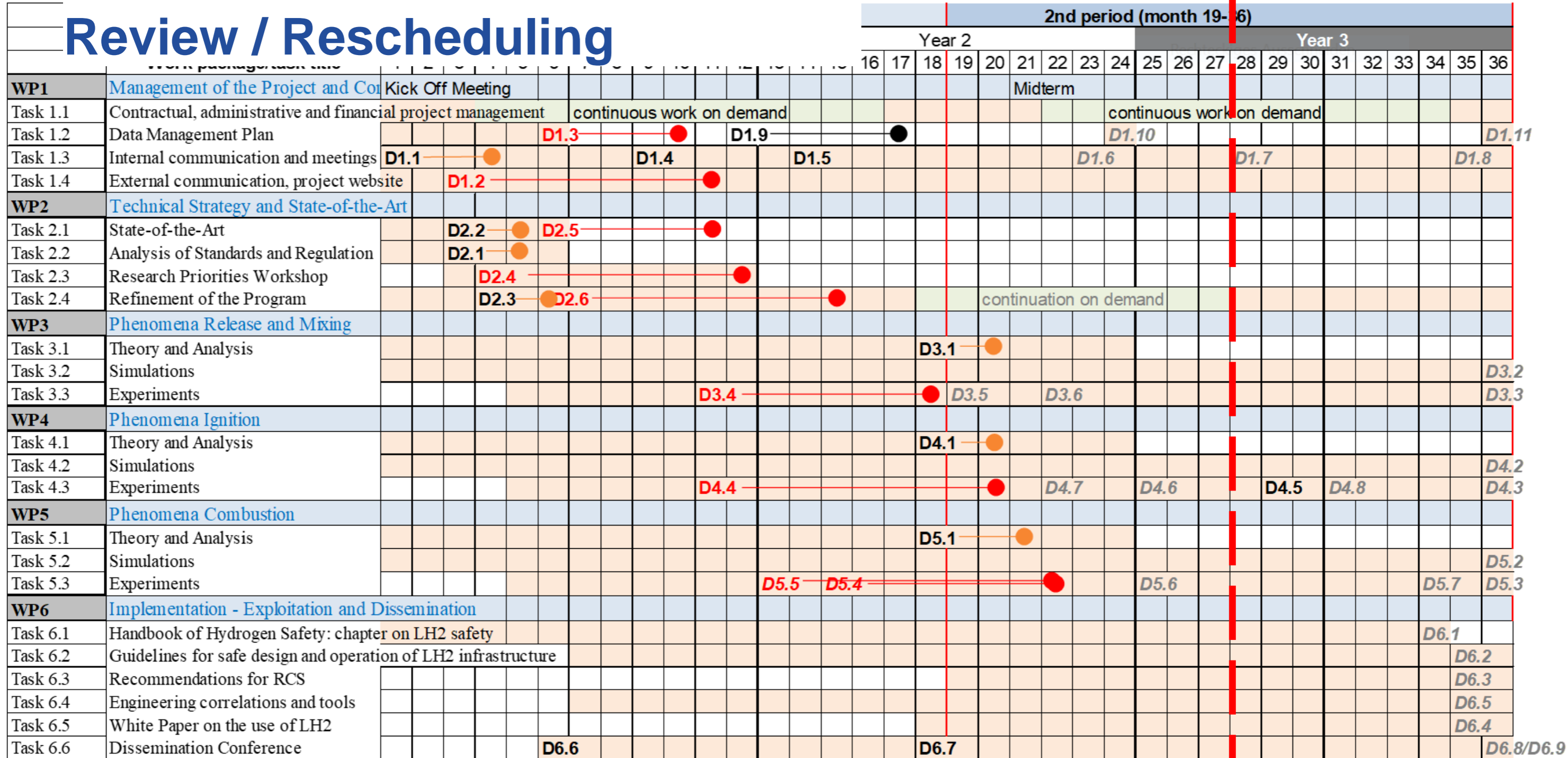


EC requested revision: Rejected for further details on the personnel costs overspending for WP1 and WP2 personnel costs/ unplanned contributions required esp. from the WP leaders & partner HSL, esp. WP1 14 mm versus 8 planned for KIT for the whole project and ALAT already overspending the MM planned in general for all WPs for the life of the project, with the following request : Please review the WP1 and WP2 reported personnel costs to ensure all WP1 management efforts and WP2 technical strategy development as man-months were 1) indeed needed and related to achievement of the project objectives, and also 2) in line with the principles of sound management - ECONOMY, efficiency & effectiveness - in case the answer to any of the above 2 questions is NO, please quantify and remove the extra costs from P1 claim - or advise the MM and amounts to be rejected from our end if needed. If the answer to the above 2 Questions is YES, then please ensure partners' commitment to complete projects tasks within Money & time resources available, & plan for better coordination to avoid further deviations as per Report. In view of the missing 3 partners FS (which were rejected to them instead of submission of the drafts) 1) Please coordinate w/ AL, INERIS & NCSR if needed to revisit their submission and then resubmit to us the full package . 2) We take note that the huge negative deviations are due to the lack of submission, and 3) after the review of the submission and the 3 missing FS as drafts, we have the following comments - AL: pls make sure no ODC to be reported by AL related to P1 tasks, 2) INERIS personnel costs reported are actual and in line with the H2020 rules; 3) UWAR personnel costs under-spending is to be further explained as to 'contributing' (UK national or ?) project finding the costs for prof. We look forward to responses and re-submission with 2 weeks from

WP1 – RTD coordination – Administrative coordination

Review / Rescheduling

M27



today

| | 1st period (month 1-18) | | | | | | | | | | | | 2nd period (month 19-36) | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------|---|------|---|------|---|---------------------------|---|---|----|------|----|--------------------------|----|------|----|------|----|---------------------------|----|------|----|-------|----|------|----|------|----|------|----|------|----|-------|----|-----------|----|
| PRESLHY schedule | Year 1 | | | | | | Year 2 | | | | | | Year 3 | | | | | | | | | | | | | | | | | | | | | | | |
| Work package/task title | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| Management of the Project and Contractual, administrative and financial project management | Kick Off Meeting | | | | | | continuous work on demand | | | | | | Midterm | | | | | | continuous work on demand | | | | | | | | | | | | | | | | | |
| Data Management Plan | D1.3 | | | | | | | | | | D1.3 | | D1.9 | | | | D1.9 | | | | | | D1.10 | | | | | | | | | | D1.11 | | | |
| Internal communication and meetings | D1.1 | | D1.1 | | | | D1.4 | | | | | | D1.5 | | | | | | | | D1.6 | | | | D1.7 | | | | | | D1.8 | | | | | |
| External communication, project website | | | D1.2 | | | | | | | | D1.2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Technical Strategy and State-of-the-Art | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| State-of-the-Art | | | D2.2 | | D2.2 | | D2.5 | | | | D2.5 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Analysis of Standards and Regulation | | | D2.1 | | D2.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Research Priorities Workshop | | | D2.4 | | | | | | | | D2.4 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Refinement of the Program | | | D2.3 | | D2.3 | | D2.6 | | | | | | | | D2.3 | | | | | | | | | | | | | | | | | | | | | |
| Phenomena Release and Mixing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Theory and Analysis | | | | | | | | | | | | | | | | | | | D3.1 | | D3.1 | | | | | | | | | | | | | | | |
| Simulations | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experiments | | | | | | | | | | | D3.4 | | | | | | D3.4 | | D3.5 | | D3.6 | | | | D3.5 | | | | | | | | | | | |
| Phenomena Ignition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Theory and Analysis | | | | | | | | | | | | | | | | | | | | | D4.1 | | | | | | | | | | | | | | | |
| Simulations | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experiments | | | | | | | | | | | D4.4 | | | | | | D4.4 | | D4.7 | | D4.6 | | D4.7 | | D4.6 | | D4.7 | | D4.5 | | D4.8 | | D4.3 | | | |
| Phenomena Combustion | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Theory and Analysis | | | | | | | | | | | | | | | | | | | D5.1 | | D5.1 | | | | | | | | | | | | | | | |
| Simulations | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experiments | | | | | | | | | | | D5.5 | | D5.4 | | | | | | | | D5.7 | | D5.6 | | D5.4 | | D5.5 | | | | D5.2 | | D5.3 | | | |
| Implementation - Exploitation and Dissemination | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Handbook of Hydrogen Safety: chapter on LH2 safety | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | D6.1 | |
| Guidelines for safe design and operation of LH2 infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | D6.2 | |
| Recommendations for RCS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | D6.3 | |
| Engineering correlations and tools | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | D6.5 | |
| White Paper on the use of LH2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | D6.4 | |
| Dissemination Conference | | | | | | | | | | | D6.6 | | | | | | | | D6.7 | | | | | | | | | | | | | | | | D6.8/D6.9 | |

KIT Discha
high p done
low T after pool

HSE Rainout
exp. done
under review

KIT Pool
exp. startet
Safety review

INERIS Fund
MIE open
draft to be reviewed

KIT Electr.

HSE Cond.
Phase
needed?

HSE
Confined

KIT Layer
new device
required

KIT Jet fire
exp. done
under review

KIT Tube
problem in
exp. Set-up

Reporting



- Presence at the FCH JU 2019 Program Review and Stakeholder Meeting
 - Preparation of a poster (back-up)
 - Distribution of flyers
- Waiting for initiation of 2nd [Annual Data Reporting](#) (D1.10)

WP1 – RTD coordination – Administrative coordination

Deliverables to be delivered I/II



| | | | | | | |
|-----|-------|--|---|-----|--------|----|
| D06 | D1.6 | 4th Project Meeting | 1 | KIT | OTHER | CO |
| D23 | D3.6 | Summary of experiment series E3.5 (Rainout) results | 3 | HSE | REPORT | CO |
| D10 | D1.10 | 2nd Annual Data Reporting | 1 | KIT | REPORT | CO |
| D24 | D4.1 | Theory and Analysis of Ignition with specific conditions related to cryogenic hydrogen | 4 | HSE | REPORT | PU |
| D28 | D4.5 | Summary of experiment series E4.2 (Electrostatic) results | 4 | PS | REPORT | CO |
| D29 | D4.6 | Summary of experiment series E4.3 results | 4 | HSE | REPORT | CO |
| D38 | D5.7 | Summary of experiment series E5.5 results | 5 | HSE | REPORT | CO |

Several requests KIT internally?

Under review

Waiting for initiation

Done

Done (report to be extracted from D3.4 and uploaded)

Under review

Under review

Deliverables to be delivered II/II



| | | | | | | |
|-----|------|--|---|--------|--------|----|
| D32 | D5.1 | Theory and Analysis of Combustion of Pre-mixed systems with cryogenic hydrogen | 5 | KIT | REPORT | PU |
| D35 | D5.4 | Summary of experiment series E5.1 results | 5 | PS | REPORT | CO |
| D07 | D1.7 | 5th Project Meeting | 1 | KIT | OTHER | CO |
| D22 | D3.5 | Summary of experiment series E3.4 (Pool) results | 3 | PS | REPORT | CO |
| D27 | D4.4 | Summary of experiment series E4.1 (General ignition) results | 4 | INERIS | REPORT | CO |
| D30 | D4.7 | Summary of experiment series E4.4 (Pool) results | 4 | PS | REPORT | CO |
| D36 | D5.5 | Summary of experiment series E5.2 results | 5 | PS | REPORT | CO |
| D37 | D5.6 | Summary of experiment series E5.3 results | 5 | PS | REPORT | CO |

Under review

Report to be finished and reviewed

Postponed, or to be replaced by this meeting

Tests started, finalisation waiting for test site restructuring for safety reasons

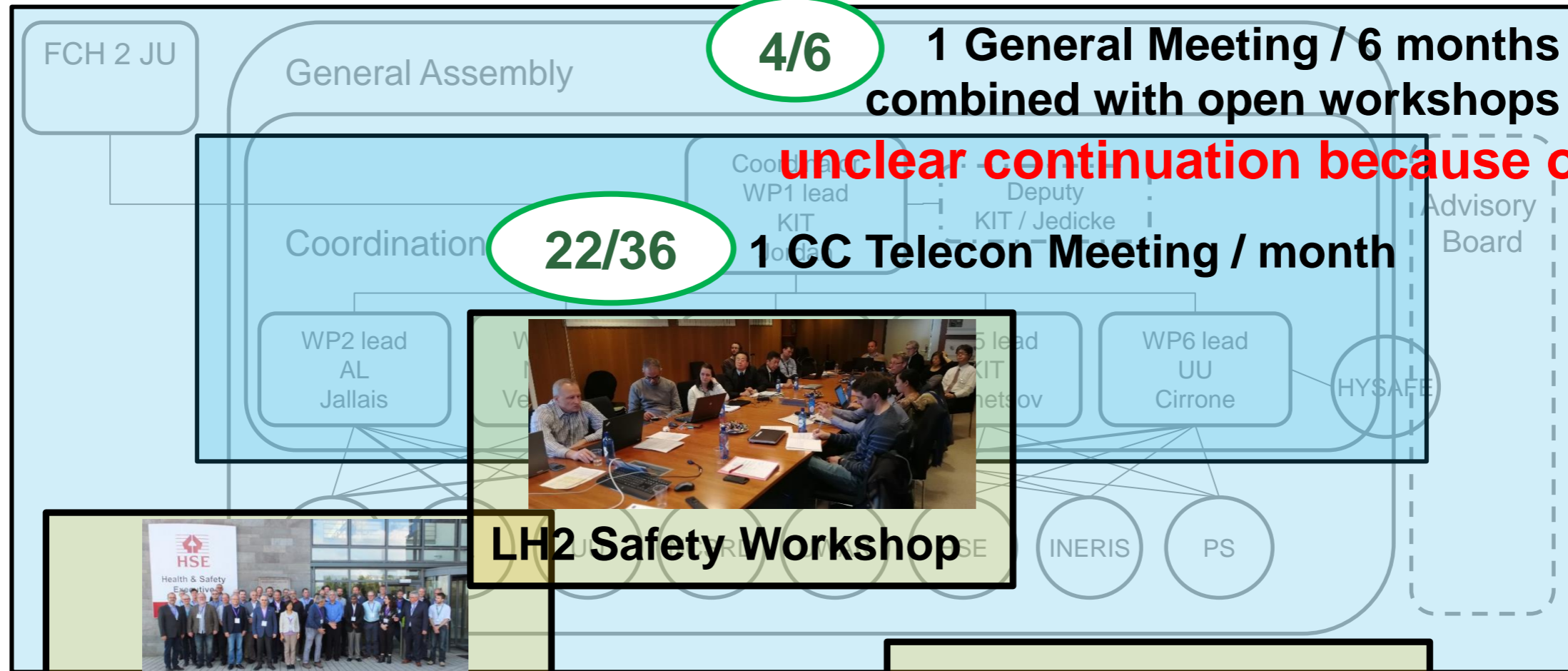
Tests further delayed?

Tests started, finalisation waiting for test site restructuring for safety reasons

Tests further delayed, because of technical problems

Tests further delayed, because of the need for new facility

Project Organisation - Meetings



unclear continuation because of COVID2

22/36

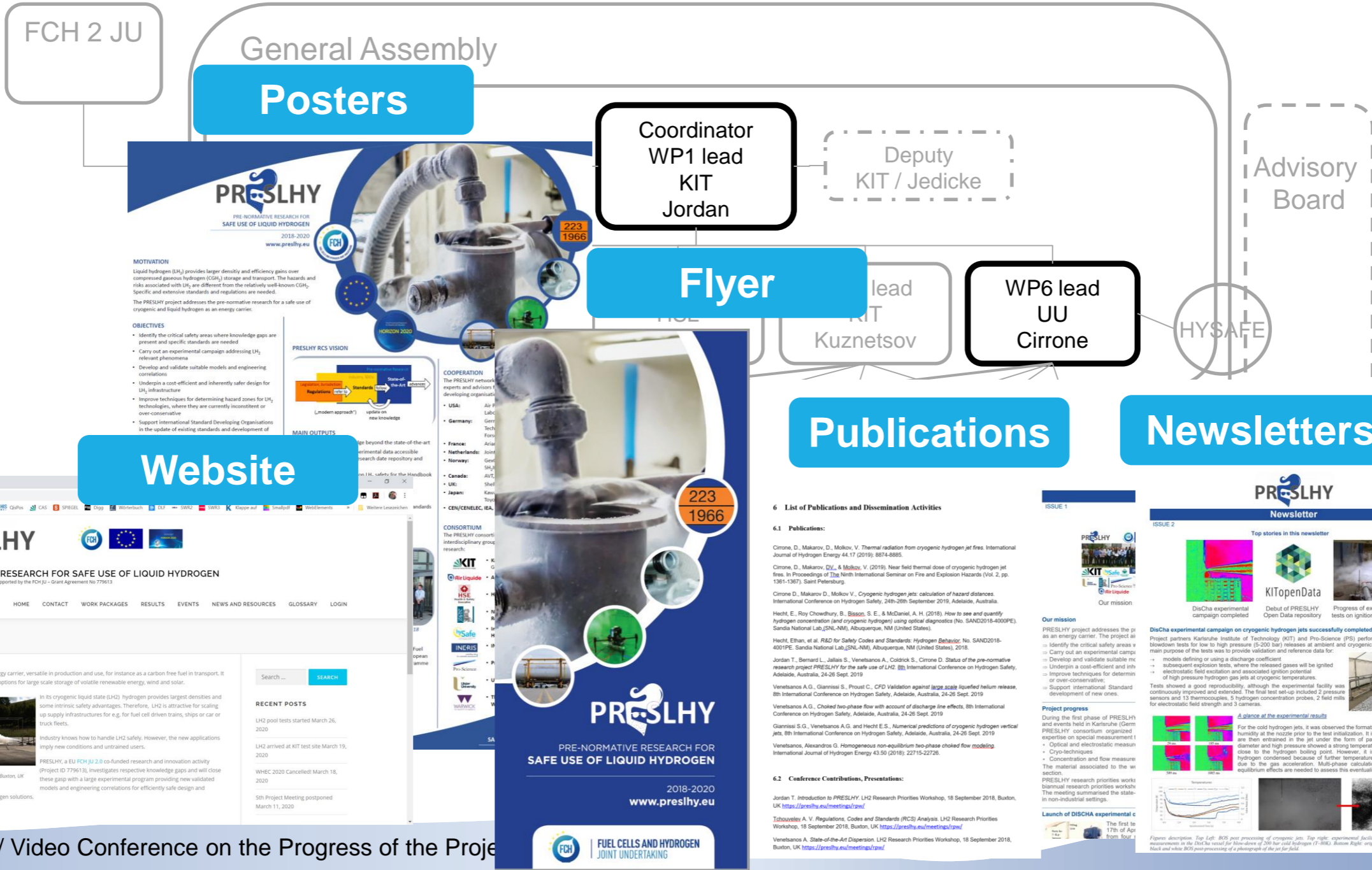
1 CC Telecon Meeting / month



2nd LH2 Safety Workshop 10/2020
with SH2IFT @ RPW2020

Dissemination Workshop 12/2020(?)

Project Organisation - Communication

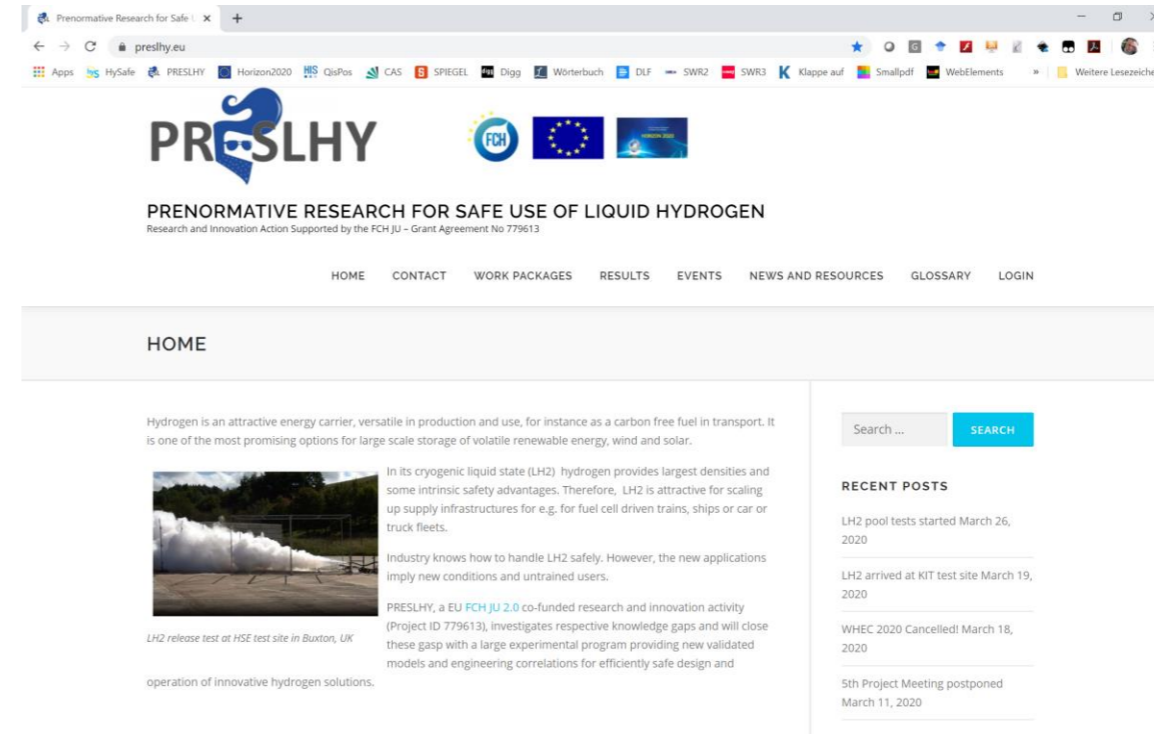


Reporting - Progress, Status and Achievements



Task 1.4 External Communication (+ Networking)

- Website updated
- Partnership with SH2IFT project maintained
 - invitation of coordinator to the CC meetings
 - initiative for 2nd workshop



Reporting - Progress, Status and Achievements



Task 1.4 External Communication (+ Networking)

- Update of Preliminary Working Item (ISO/PWI 24077) titled “Safe Use of Liquid Hydrogen in Non-industrial Settings” on 12/2019 in Grenoble



- Presentation at CEN/CENELEC SFEM WG Hydrogen in 01/2020 in Brussels, Belgium



Reporting - Progress, Status and Achievements



Task 1.4 External Communication (+ Networking)



■ Next steps:

- Development of a NWIP for a self-contained TR “Basic consideration for LH2 safety in non-industrial settings”
- Defining a pathway for integration of the new TR in an ISO TR 15916 update