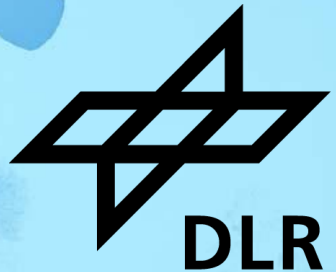
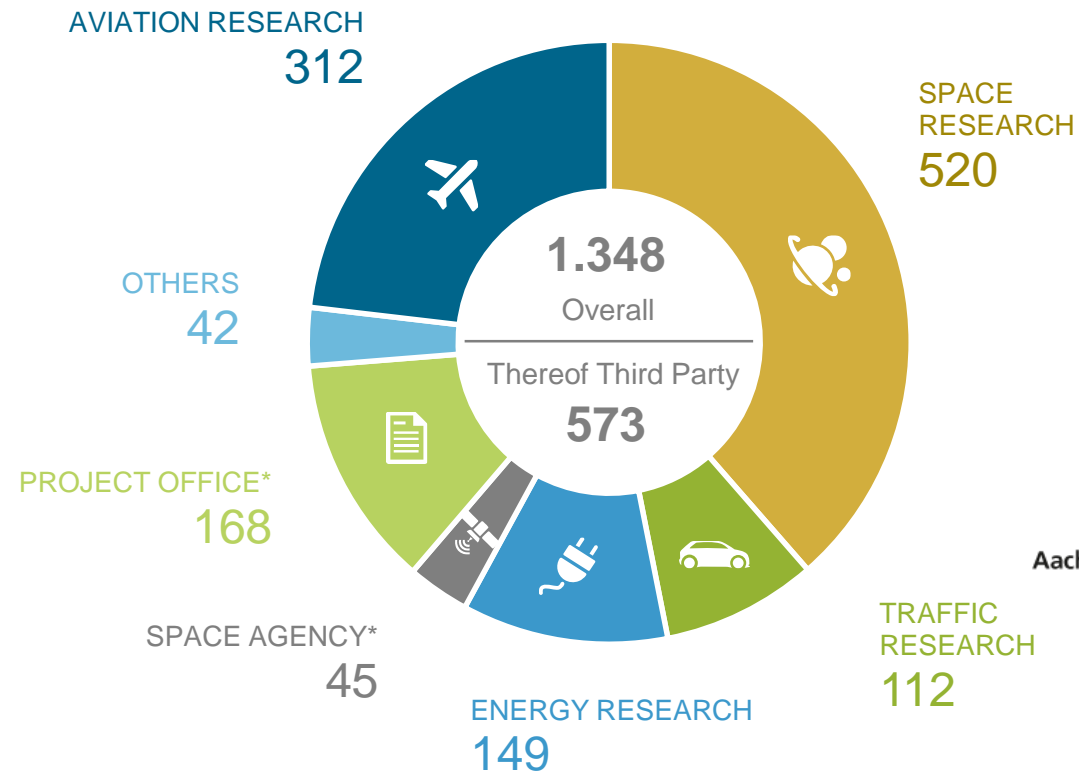


DLR AND THE GERMAN H2 STANDARDIZATION ROADMAP

Contributions and activities of DLR Lampoldshausen within the
German Standardization Roadmap on Hydrogen Technologies



DLR in general



Fiscal year: 2021.

* DLR Project Office and Space Agency without managed third party funds

- 54 Institutes and Entities at 30 Sites
- 4 International offices
- 8 Research stations
- More than 10.000 Employees

DLR Lampoldshausen and Hydrogen



- DLR RA is an established user of (liquid) hydrogen
- DLR is a renowned research institution concerning hydrogen



Standardization Roadmap Background



- 2020: European Hydrogen Strategy
- 2021: Report of ECH2A emphasizing importance of uniform standards and technical rules
- 2023: National Hydrogen Strategy for Germany
- 2023: Start of German Standardization Roadmap Hydrogen Technologies, lead by DIN, DKE, DVGW, NWB, VDA, VDI and VDMA, funded by the Federal Ministry for Economic Affairs and Climate Action

Analysis of the status quo and needs

- Elaboration of a comprehensive overview of the standardization, committee and project landscape

Recommended actions

- Identification of needs within standardization and pre normative need for research
- Derivation, recommendation and prioritization of specific standardization projects

Implementation

- Initiation and implementation of funded national, European or international standardization projects

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Standardization Roadmap Working Structure








WC PRODUCTION	WC INFRASTRUCTURE	WC APPLICATION	WC QUALITY INFRASTRUCTURE	WC FURTHER TRAINING, SAFETY, CERTIFICATION
SWC PRODUCTION PLANTS	SWC TRANSMISSION AND DISTRIBUTION GRIDS	SWC POWER SUPPLY AND REVERSIBLE FUEL CELL	SWC MEASUREMENT TECHNIQUE	SWC SAFETY
WG Electrolysis	WG Piping	WG Fuel cells	WG Gas analysis	WG Safety design principles
WG Other production methods	WG Transmission pipelines	WG Power plants, turbines, CHP plants	WG Hydrogen measurement technology and billing methods	WG Cyber security
WG Total system integration	WG Plant engineering			WG Explosion protection
	WG Distribution networks	SWC INDUSTRY	SWC MATERIALS	WG Safety and integrity management
SWC HYDROGEN QUALITY		WG (petro)chem. Industry	WG Metallic materials	WG Product certification
WG Hydrogen composition	SWC STORAGE	AG PtX	WG Composites and plastics	WG Further training
WG Verification and sustainability aspects	WG Stationary and mobile pressure vessels	WG Thermoprocessing equipment		
	WG CCU/CCS *	WG Steel Industry	SWC COMPONENTS	
	WG Underground gas storage	SWC HEAT	WG Components for infrastructure	
	WG Liquefaction	WG Domestic applications	WG Components for application and technologies	
		WG Controls		
		WG Commercial applications		
		SWC MOBILITY		
		WG Filling systems		
		WG Road vehicles		
		WG Railway vehicles		
		WG Shipping		
		WG Aviation		
		WG Special vehicles		

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Standardization Roadmap and DLR Lampoldshausen



				
WC PRODUCTION	WC INFRASTRUCTURE	WC APPLICATION	WC QUALITY INFRASTRUCTURE	WC FURTHER TRAINING, SAFETY, CERTIFICATION
SWC PRODUCTION PLANTS <ul style="list-style-type: none"> WG Electrolysis WG Other production methods WG Total system integration 	SWC TRANSMISSION AND DISTRIBUTION GRIDS <ul style="list-style-type: none"> WG Piping WG Transmission pipelines WG Plant engineering WG Distribution networks 	SWC POWER SUPPLY AND REVERSIBLE FUEL CELL <ul style="list-style-type: none"> WG Fuel cells WG Power plants, turbines, CHP plants 	SWC MEASUREMENT TECHNIQUE <ul style="list-style-type: none"> WG Gas analysis WG Hydrogen measurement technology and billing methods 	SWC SAFETY <ul style="list-style-type: none"> WG Safety design principles WG Cyber security WG Explosion protection WG Safety and integrity management WG Product certification WG Further training
SWC HYDROGEN QUALITY <ul style="list-style-type: none"> WG Hydrogen composition WG Verification and sustainability aspects 	SWC STORAGE <ul style="list-style-type: none"> WG Stationary and mobile pressure vessels WG CCU/CCS * WG Underground gas storage WG Liquefaction 	SWC INDUSTRY <ul style="list-style-type: none"> WG (petro)chem. Industry AG PtX WG Thermoprocessing equipment WG Steel Industry 	SWC MATERIALS <ul style="list-style-type: none"> WG Metallic materials WG Composites and plastics 	
		SWC HEAT <ul style="list-style-type: none"> WG Domestic applications WG Controls WG Commercial applications 	SWC COMPONENTS <ul style="list-style-type: none"> WG Components for infrastructure WG Components for application and technologies 	
		SWC MOBILITY <ul style="list-style-type: none"> WG Filling systems WG Road vehicles WG Railway vehicles WG Shipping WG Aviation WG Special vehicles 		

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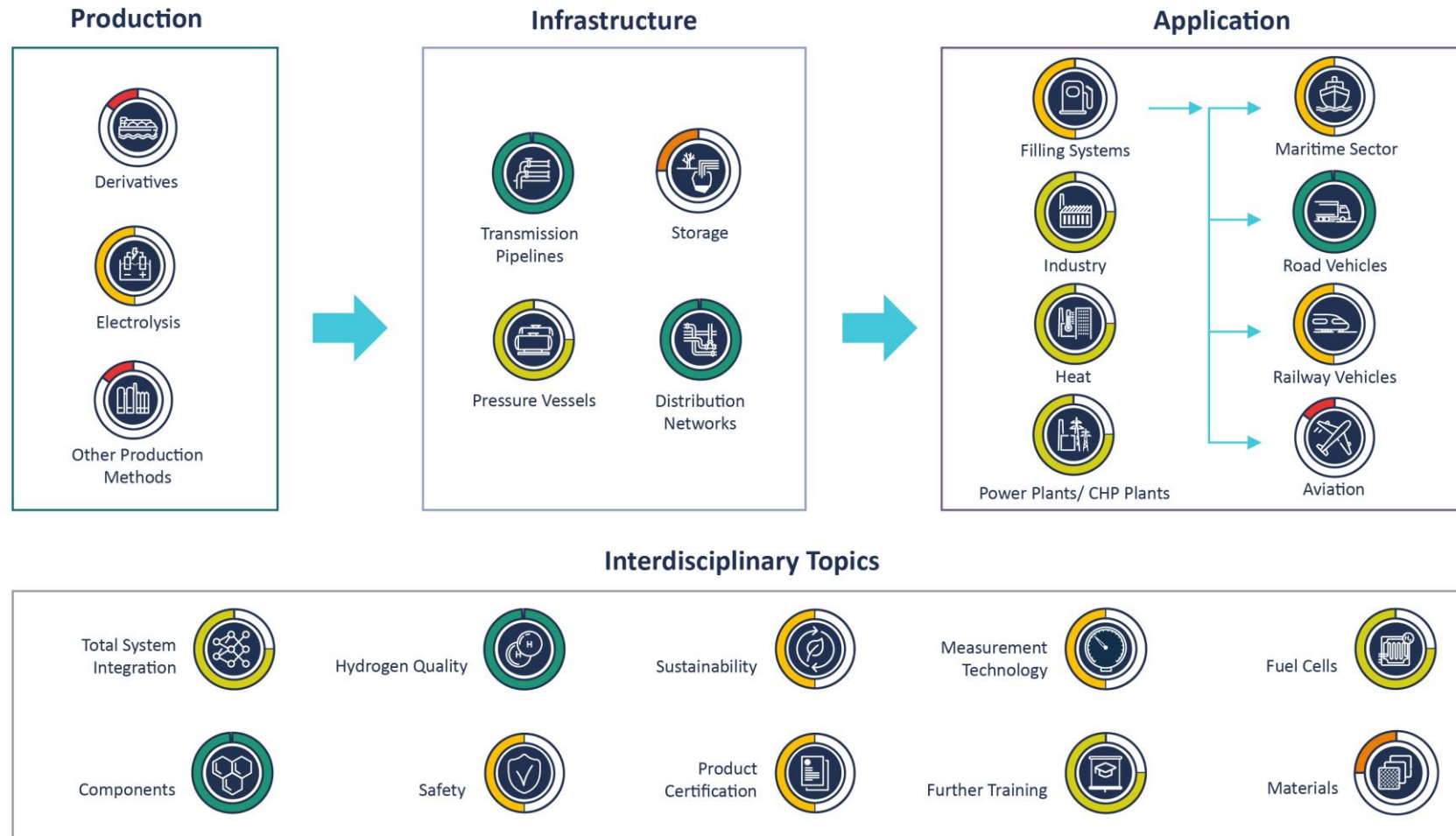
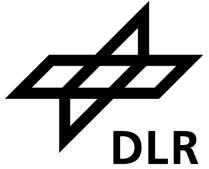
Results of the Standardization Roadmap - Numbers



- More than 950 identified standards and regulations → Public list at <https://www.din.de/en/innovation-and-research/hydrogen/standards-search>
- Approximately 180 identified knowledge or regulation gaps
- 23 initiated standardization projects
- 22 standardization projects in funding review
- 28 suggested research projects

General results of the Standardization Roadmap

Development status of the technical rule-setting for hydrogen technologies



Supported by:



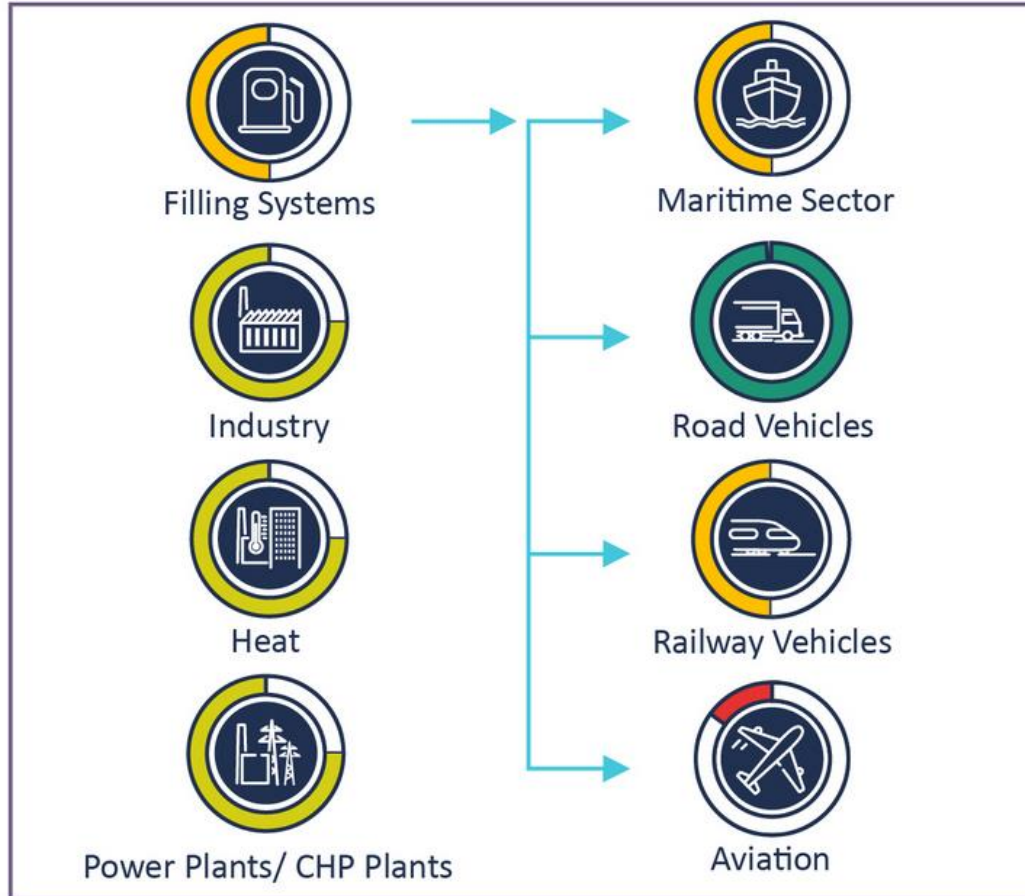
on the basis of a decision
by the German Bundestag

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Bernhard Linseisen, Institute of Space Propulsion, 05.06.2025

Standardization Roadmap and ELVHYS I

Application



Infrastructure



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- Identified research needs with potential relevance or connections to ELVHYS:
 - Testing of composite H₂-transport containers by acoustic methods
 - Boundary conditions for filters and absorbers for hydrogen liquefaction
 - Sealing materials for cryogenic applications
 - Measurement of para-LH₂-concentration
 - Testing and surveillance of storage containers
 - Filling interfaces
 - Identification of hazard zones of maritime hydrogen storage facilities
 - Safety statistics for hydrogen incidents
 - Modelling of cryogenic hydrogen releases

- Standardization projects with connection to ELVHYS topics already started:
 - Hydrogen technologies in Aerospace newly established within DIN
 - DVGW guideline on measurement of the concentration of para-LH2
- Projects initiated by the SRHT in which DLR Lampoldshausen is involved:
 - Statistics on hydrogen incidents → Paper accepted for ICHS2025
 - H2-sensors for aviation → to be addressed in DIN standardization working group NA-131-07-01-AA (Hydrogen technologies in Aerospace)
 - Analysis of LH2-releases → research project in preparation

Finalisation of the Standardization Roadmap



- Publication of final report is planned for end of October during an online publication event
- Reports and database will stay freely available online permanently
- Further works resulting from the Standardization Roadmap Hydrogen Technologies can not be excluded

Topic: **DLR and the German H2 Standardization Roadmap**
Contributions and activities of DLR Lampoldshausen within the German Standardization Roadmap on Hydrogen Technologies

Date: 2025-06-05

Author: Bernhard Linseisen

Institute: Institute of Space Propulsion

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