EUROfusion

WPAC Status Report

Physics Project Board | April 1st, 2025

D. Kalupin
(with F. Jenko, V. Naulin, and R. Kamendje)
Thanks to contributions by the E-TASC SB

This work has been carried out within the framework of the EUROfusion Consortium, funded by the European Union via the Euratom Research and Training Programme (Grant Agreement No 101052200 — EUROfusion). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.

Organisation of activities

WP AC: Advanced Computing

Infrastructure

HPC: High Performance Computer
- HW: Hardware
  - ENEA (2023)
  - ENEA (2024 - 2029)

LTDSF: Long-Term Data Storage Facility
- HW: Hardware
  - IPPLM

Support

ACH: Advanced Computing Hubs
- 01: High Performance Computing
  - CIEMAT
  - EPFL
  - MPG
- 02: Integrated Modelling and Control
  - IPPLM
- 03: Data management
  - VTT

DATA: Data maintenance and management activities
- JDC: JET Data Center
  - UKAEA
- DMP: Data Management Plan
  - CEA
  - EPFL
  - IPPLM
  - MPG
  - VR

Software development

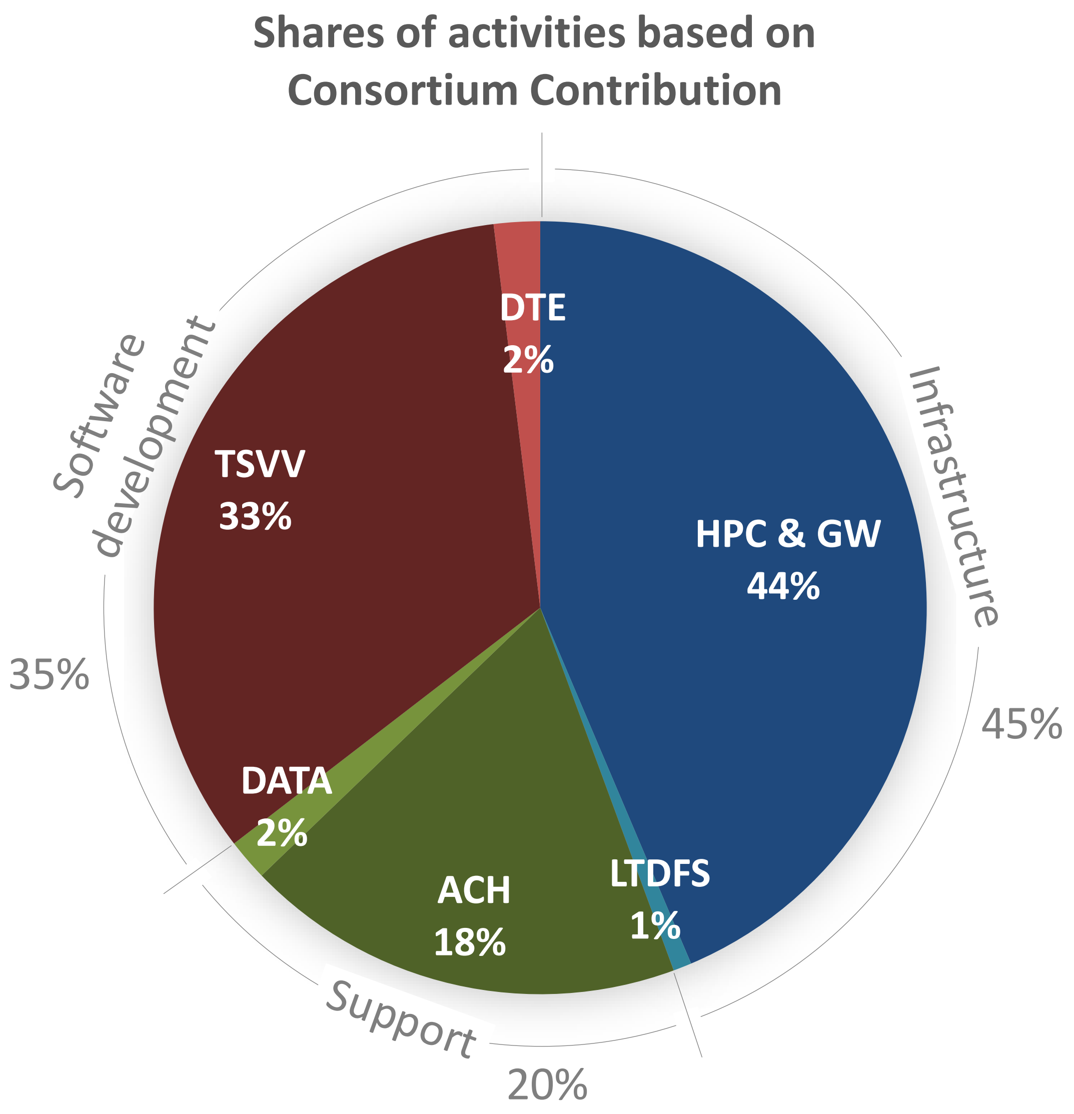
TSVV: Theory, Simulation, Validation and Verification
- 01: Physics of the L-H Transition and Pedestals
  - MPG
- 02: Physics Properties of Strongly Shaped Configurations
  - EPFL
- 03: Plasma Particle/Heat Exhaust: Fluid/Gyrofluid Edge Codes
  - CEA
- 04: Plasma Particle/Heat Exhaust: Gyrokinetic/Kinetic Edge Codes
  - MPG
- 05: Neutral Gas Dynamics in the Edge
  - FZJ
- 06: Impurity Sources, Transport, and Screening
  - CEA
- 07: Plasma-Wall Interaction in DEMO
  - FZJ
- 08: Integrated Modelling of MHD Events
  - MPG
- 09: Dynamics of Runaway Electrons in Tokamak Disruptions and Start-Up
  - CEA
- 10: Physics of Burning Plasmas
  - MPG
- 11: Validated Frameworks for the Reliable Prediction of Plasma Performance and Operational Limits in Tokamaks
  - MPG
- 12: Stellarator Optimization
  - MPG
- 13: Stellarator Turbulence Simulation
  - CIEMAT
- 14: Multi-Fidelity Systems Code for DEMO
  - UKAEA
- 15: Pulse Design Tool
  - CEA

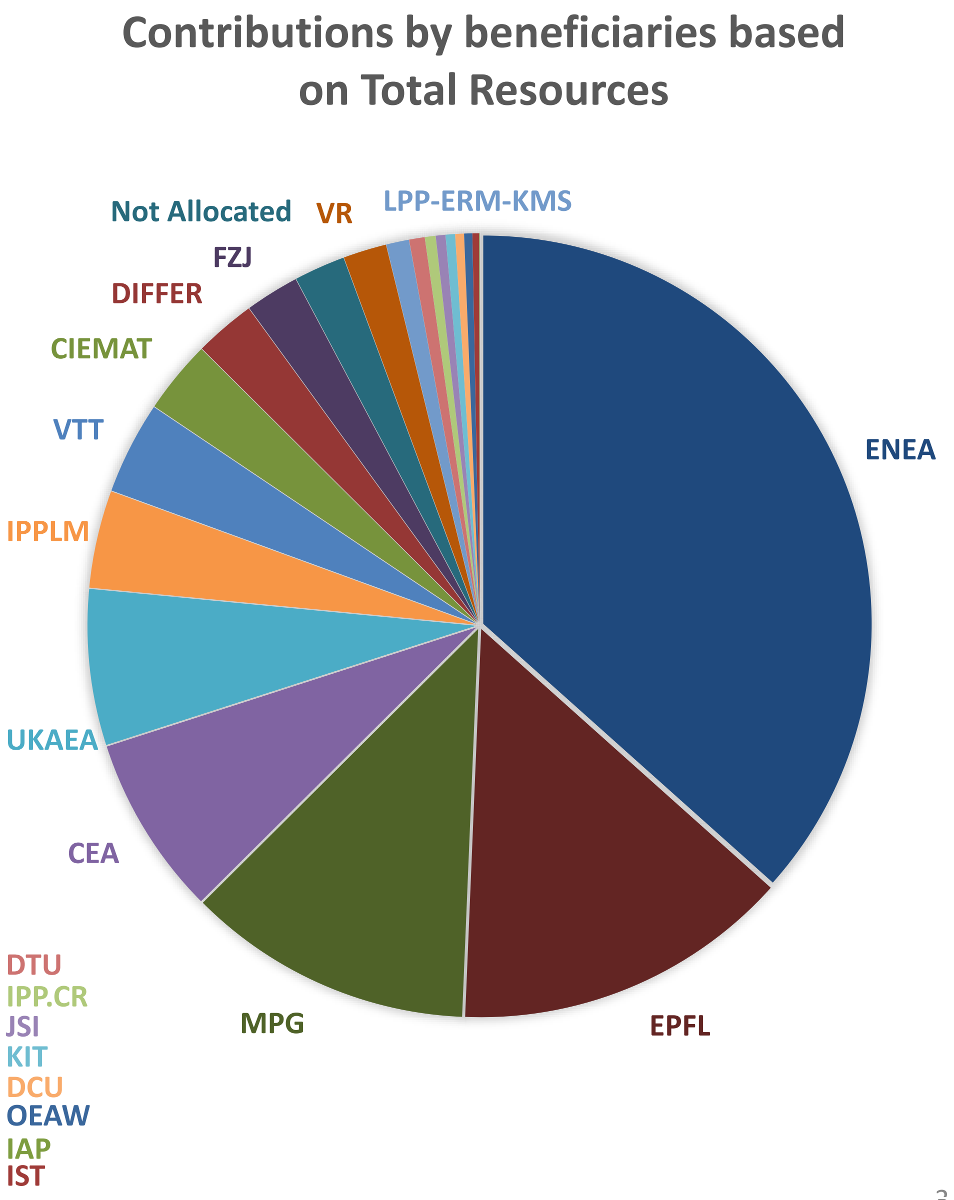
DTE: Digital Twin Environment
- DT: PoC projects
  - CEA
  - CIEMAT
  - ENEA-01
  - ENEA-02
  - EPFL
  - DIFFER
  - UKAEA

Specifics of the WP:

Majority of activities
are pre-approved by the GA
Monitoring of activities
is by the E-TASC SB and the PMU

WPAC resources distribution 2025





TSVV monitoring (by E-TASC SB)

Call for Project proposals: Spring 2020

Detailed workplan with timeline, milestones, SMART deliverables, and risk assessment (2021-2025)

EUROfusion

TSVV Task 1: Physics of the L-H Transition and Pedestals

Expected resources: Up to about 10 ppy per year (incl. about 30% for ACH personnel)

Background

Regarding the plasma core, present-day gyrokinetic (GK) simulations of turbulent transport may be characterized as relatively mature, allowing for quantitative comparisons with measurements on a regular basis. Meanwhile, an important new frontier of GK is to advance towards a comprehensive, self-consistent description of the pedestal/edge region, including the physics of the L-H transition. The time is ripe to address these outstanding challenges, building on years of preliminary work and exploiting the capabilities of emerging exascale supercomputers.

Initial applications of GK codes to the near-edge region of tokamak plasmas over the last decade or so have highlighted the importance of a range of physical effects, calling for global simulations in realistic magnetic geometries – involving electromagnetic effects, high-quality collision operators, and the ability to retain both sub-ion-scale fluctuations and relevant macroscopic (MHD-like) instabilities. Moreover, GK codes have demonstrated the capability to reproduce experimentally measured fluxes in near-edge L-mode plasmas and have been used to explore to some degree the residual turbulent transport in H-, QH-, and I-mode pedestals. In addition, full-f GK codes applicable to the edge and SOL are being developed (see TSVV Task 4), providing new ways to attack the L-H transition problem. Another key aspect of the present TSVV task is the development of validated and fast reduced transport models – on the basis of the GK simulations – to be used in integrated modelling codes.

Aims of the project

- Capability to carry out self-consistent, robust, and validated GK simulations of L-H transitions and to accurately predict the pedestal profiles; extension to QH-/I-mode discharges.
- Validated and fast reduced transport models which can be used for multi-channel core-edge predictive modelling.
- Applications of GK simulations and reduced models to (natural or controlled) small/no ELM regimes, studying their transferability to ITER and DEMO.

Key deliverables

1. Validated local and global (electromagnetic, collisional) GK simulations of ion-scale, electron-scale, and multi-scale turbulent transport in the H-, QH-, I-, and L-mode edge.
2. Extension of these simulations to self-consistently include relevant macroscopic (MHD-like) instabilities and the development of a radial electric field.
3. Consistent application of at least one edge GK code (developed in TSVV Task 4) – which is able to bridge the core, pedestal, and SOL regions and includes neutral physics – to the L-H transition problem.
4. An interpretative and predictive capability of L-H transitions (based on a sound validation strategy and ideally also including extensions to QH-/I-mode discharges) accurately capturing the observed edge plasma dynamics in various machines.
5. Reduced transport models for the pedestal on the basis of GK simulations, involving electron-scale, ion-scale, and macroscopic (MHD-like) instabilities; these can then be included in MHD and transport studies, exploiting synergies with TSVV Tasks 8 and 11.

→

Mid-term review of Theory Simulation Verification & Validation (TSVV) projects 2021-2025 by the E-TASC Scientific Board

Purpose of the review **2023**

The goal of this review is to assess the TSVV projects' performance, the achievements in computational science and plasma physics, the efficiency of the project management, and the project's broader impacts on the EUROfusion programme and the wider scientific community.

The project achievements are considered, along with possible deviations from the original proposal. Specific challenges and opportunities are identified, and changes to project priorities, activities and objectives are proposed.

Furthermore, on a higher level, additional synergetic interactions between projects in EUROfusion and adjustments to the overall project portfolio are proposed.

Methodology

The review was carried out as a three-step process:

- Presentation of each TSVV project's achievements to date to a broad audience of EUROfusion scientists, focusing on the main scientific and technical highlights, briefly mentioning specific impacts (achieved or anticipated) on the WPs, and plans. All materials are available at https://indico.euro-fusion.org/event/2429/

→ **E-TASC General Meeting 2024** →

Final Review & EUROfusion Science Meeting

Annual reporting/monitoring (including Thrusts)

→ 2021 → 2022 → 2023 → 2024 → 2025

Minimal deviations from the original Work Plan

Scope

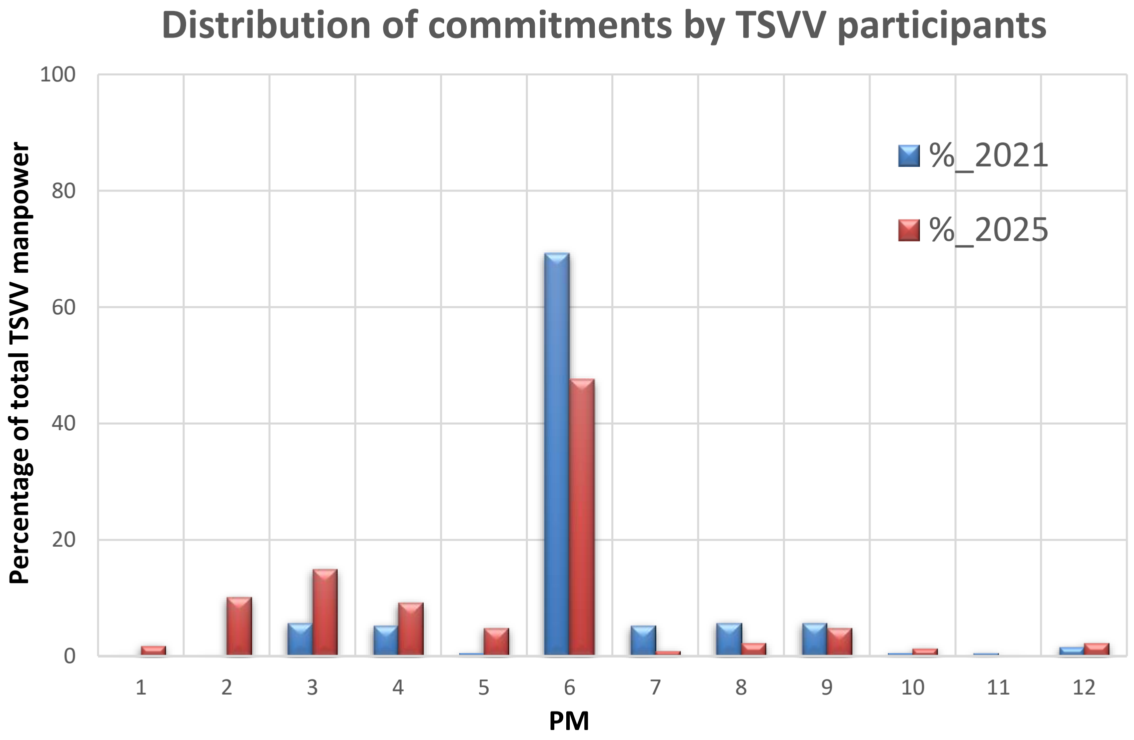
- The main identified challenge was the ITER re-baselining and the replacement of Be by W at the first wall → lead to small scope corrections by TSVV-06 and -07
- Otherwise, small extensions of scope to include additional tasks

Most recent updates are available @:

- **E-TASC General Meeting** (https://indico.euro-fusion.org/event/3034/)
- **Annual reports 2024** (https://idm.euro-fusion.org/default.aspx?uid=2P5FVJ)

Personnel

- Normal fluctuation due to exchange of employers/tasks
- Project-oriented structure is preserved with the substantial fraction of >6PM commitments



Overall implementation is similar to TSVVs: **Call (2020) → Annual monitoring (2021-2025) + Review (2024)**

Specific:

- **The Call aimed to establish 5 ACHs with competences in 3x HPC, 1x IM, 1x DB**
- **Tasks for each ACH are defined through the Call for projects (annual) and approved by the E-TASC SB**

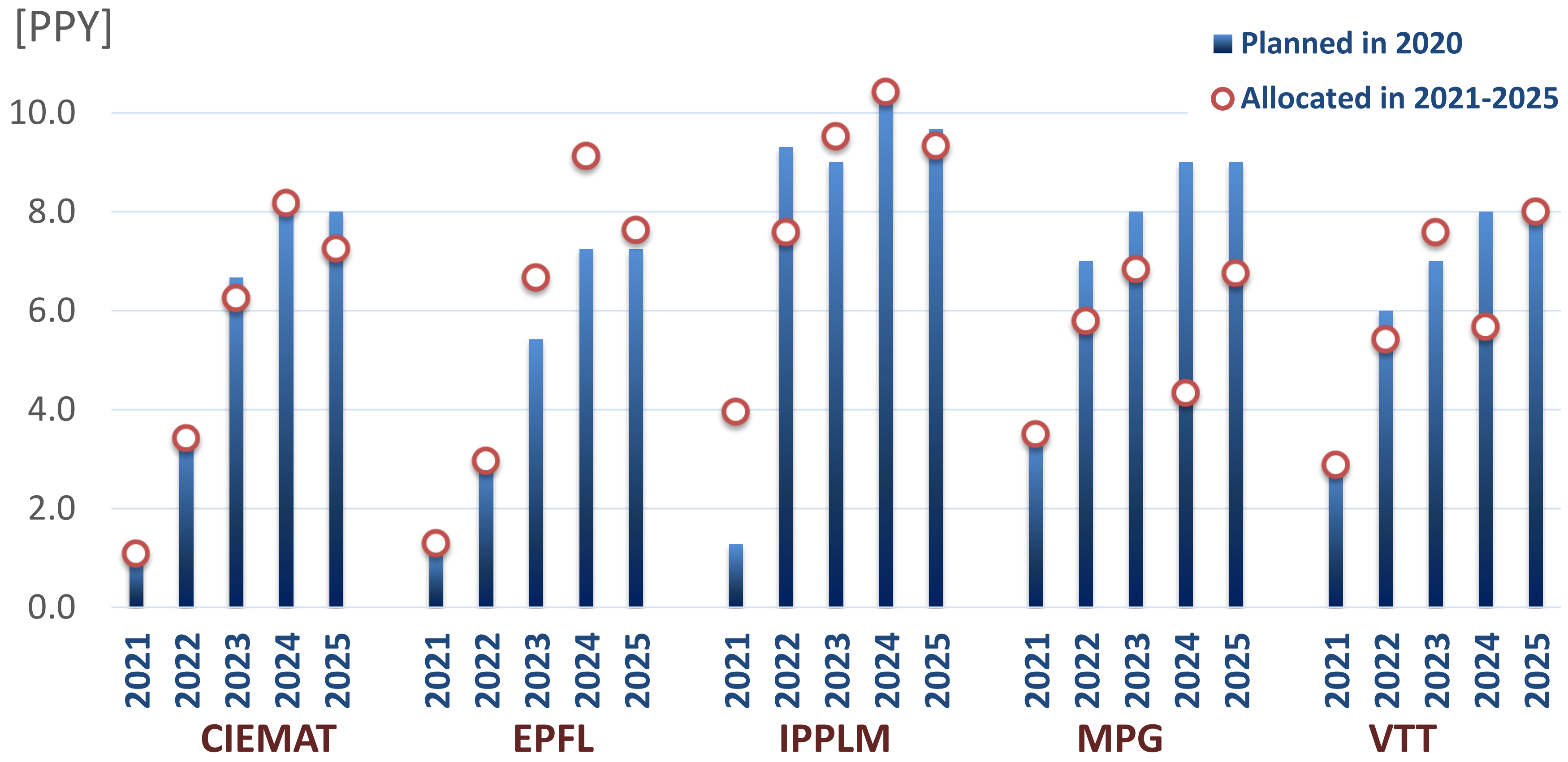
Reference for the request:

In this section, please provide the contact information for your request.

Request
Short Title for the request
Code Name
TSVV or Work Package behind the request
Criticality: Refers to the impact of the request on the timeline of your code (High/Medium/Low)
Code Coordinator (Developer)
Name
Institution
Contact (official) e-mail
Contact telephone (optional)
Code Development Team (optional)
Team member (name / email)
Team member (name / email)
Team member (name / email)

	A	B	C	D	E	F	G	H	I	J
1	Year	ACH	Customer Project/WP	Code	Project Coordinator	PM's request	PM's assigned	ACH team members	Tasks description	Comments
449	2025	CIEMAT	ACH	management	Mervi Mantsinen	3.0	3.0	M. Mantsinen	Management of ACH activities	rate agreed by the E-
450	2025	CIEMAT	ALL	CINCOMP	Denis Kalupin	3.0	3.0	X. Saez	Continued support for the CINCOMP project is expected. Therefore in 2025 we request:	
451	2025	CIEMAT	TE	SOLPS	David Coster	12.0	12.0	G. Saxena	After 2023 and 2024 work improving the OpenMP implementation in the SOLPS-ITER B2.5 plasma	Prolongation from 2024
452	2025	CIEMAT	TRED	ALYA	Ezequiel	8.0	10.0	A. Soba (2PM) +X. Saez (6PM)+ M.	Alya neutron transport module NEUTRO can benefit from performance improvements of its own,	contribution to IFMIF
453	2025	CIEMAT	TSVV-02	XTOR-K	Hinrich Lütjens	6.0	9.0	E. C. Flores	GPU Porting of XTOR-K	Prolongation from 2024
454	2025	CIEMAT	TSVV-04	BIT1	David	6.0	6.0	E. C. Flores(3PM)+A. M. Silanes(3PM)	Regular benchmarks on Pitagora to help identify and resolve performance limiting issues	Prolongation from 2024
455	2025	CIEMAT	TSVV-04	GENE-X	Philipp Ulbl	0.0	3.0	M.Garcia's team (1PM) & Fusion group	Implementied and tested the ability to access the unstructured computational grid in arbitrary	New tested files
456	2025	CIEMAT	TSVV-07	ERO2.0	Juri Romazanov	3.0	6.0	A. M. Silanes	A full-functioning GPU version of the code (option choice at the compile step) with code	Prolongation from
457	2025	CIEMAT	TSVV-07	SPICE	Michael Komm	10.0	10.0	A Soba	Optimisation of SPICE2 memory footprint and optimisation of collisional operators	Prolongation from
458	2025	CIEMAT	TSVV-08	JOREK	Matthias Hoelzl	12.0	12.0	F. Cipolleta	Find a way to limit the degrees of freedom on the side the walls when using the free boundary	Prolongation from
459	2025	CIEMAT	TSVV-12	GVEC	Florian	4.0	4.0	X. Saez (3PM)+ M. Garcia-Gasulla	The 3D MHD equilibrium code GVEC has recently be extended to use a new plasma boundary	Original request for MPG
460	2025	CIEMAT	TSVV-13	STELLA	Jose Manuel	6.0	9.0	M. Garcia-Gasulla (9PM)	stella's implicit treatment of parallel streaming is made possible by a Green's function approach	Post-deadline request
461	2025	EPFL	ACH	management	Paolo Ricci	3.0	3.0	Paolo Ricci	management of ACH activities	
462	2025	EPFL	ALL	CINCOMP	Denis Kalupin	3.0	0.0			Depends on availability
463	2025	EPFL	PMU-COMM	EFRDT	TBD	12.0	12.0	Samy Mannane	Development of Digital Twin of EUROfusion fusion reactors	
464	2025	EPFL	PrIO	DEFUSE	Alessandro Pau	3.0	3.0	Cristian Sommariva	Parallelization, optimization and modularity/portability enhancement of the DEFUSE code	
465	2025	EPFL	TE	MEQ	Antoine Merle	6.0	6.0	Alessandro Mari	Acceleration of equilibrium reconstruction in MEQ	
466	2025	EPFL	TSVV-01	GYSELA	Virginie	12.0	12.0	Emily Bourne + Mathieu Peybernes	Support for GPU porting of GYSELA	
467	2025	EPFL	TSVV-01	ORB5	Tobias Görler	3.0	1.5	Florian Cabot	Visualisation tools of particle data for gyrokinetic and hybrid fluid-kinetic codes	LINE SPLIT
468	2025	EPFL	TSVV-02	GENE, ORB5, GBS,	Justin Ball	12.0		Alessandro Balestri	Experimental data for code validation of TSVV-02 codes	
469	2025	EPFL	TSVV-03	FELTOR	M. Wiesenberger	3.0	2.0	Nicola Varini	Show scalability of FELTOR for ITER sized simulations.	
470	2025	EPFL	TSVV-03	GBS	Louis Stenger	12.0	12.0	Ferhat Sindy	Implementation of uncertainty quantification estimate in GBS.	
471	2025	EPFL	TSVV-03	GBS	Louis Stenger	6.0	4.0	Nicola Varini	Implementation of an implicit time stepping algorithm in GBS	
472	2025	EPFL	TSVV-03	GBS	Louis Stenger	2.0	2.0	Emmanuel Lanti	Implementation of low-rank approximation in GBS neutral solver	
473	2025	EPFL	TSVV-03	GRILLIX	Andreas	2.0	2.0	Nicola Varini	3D solver for GRILLIX	
474	2025	EPFL	TSVV-03	SOLEDGE3X	Hugo Bufferand	6.0	5.0	Emily Bourne	Optimize GPU version of SOLEDGE3X for production	
475	2025	EPFL	TSVV-03	SOLEDGE3X	Hugo Bufferand	4.0	3.0	Pyiush	Optimization of linear solvers in SOLEDGE3X	
476	2025	EPFL	TSVV-03	SOLEDGE3X	Hugo Bufferand	6.0	5.0	Mathieu Peybernes	Optimization of MPI communications in SOLEDGE3X	
477	2025	EPFL	TSVV-04	GENE-X	Philipp Ulbl	6.0	3.0	Piyush Panchal	Support for parallel I/O optimization of the GENE-X code	GENE-X
478	2025	EPFL	TSVV-04	GYACOMO	Jacob Emil	4.0	2.0	Nicola Varini	Optimisation of the drift-kinetic and gyrokinetic coupling in the GYACOMO code	
479	2025	EPFL	TSVV-09	JOREK	Matthias Hoelzl	2.0	2.0	Cristian Sommariva	Benchmark and optimisation of collision operators	
480	2025	EPFL	TSVV-10	ORB5	Thomas	12.0	5.0	Emmanuel Lanti	Modularization of ORB5	
481	2025	EPFL	TSVV-12	ASCOT5	Simppa	5.0	3.0	Gilles Fourestey	GPU porting of ASCOT5	
482	2025	EPFL	TSVV-12	SPEC	Christopher Berg	6.0	4.0	Emmanuel Lanti	Python bindings for the Stepped Pressure Equilbirum Code with refactoring and unit tests	
483	2025	IPPLM	ACH	ETS	Par Strand	12.0	12.0	Par Strand	ETS maintenance Continued Support and maintenance for ACH workflows (ETS, HCD, ...)	
484	2025	IPPLM	ACH	IMAS	Marcin Plociennik	21.0	21.0	Bartek Palak	IMAS Ecosystem Infrastructure support	
485	2025	IPPLM	ACH	management	Marcin Plociennik	3.0	3.0	Marcin Plociennik	management of ACH activities	
486	2025	IPPLM	PrIO	DATABASES	Frassinetti	1.0	3.0	Agata Filipczak	PEDESTAL DB	This activity may require
487	2025	IPPLM	PrIO	DEFUSE	Alessandro Pau	2.0	4.0	Dimitriy Yadykin	- Migration to new EUROfusion Gateway and long term maintenance (backup solution and	This activity may
488	2025	IPPLM	PrIO	DRESS	Jacob Eriksson	2.0	2.0	Dimitriy Yadykin	Integration of the DRESS synthetic neutron diagnostics into IMAS.	
489	2025	IPPLM	PrIO	DYON	Hyun-Tae Kim	2.0	2.0	Dimitriy Yadykin	DYON is a plasma initiation modelling code, that can predict the plasma breakdown phase,	
490	2025	IPPLM	PrIO	MSST	Daniele Marocco	2.0	2.0	Dimitriy Yadykin	Integration of the MSST synthetic neutron diagnostics into IMAS.	
491	2025	IPPLM	TSVV-01	GENE	Tobias Goerler	3.0	3.0	Dimitriy Yadykin	Refine python-based IMAS interfaces for GENE and assess tighter coupling via GENE, i.e.	
492	2025	IPPLM	TSVV-01	GYSELA	Virginie	3.0	4.0	Ludovic Fleury		Running on HPC with
493	2025	IPPLM	TSVV-02	GENE-ORB5-GBS-	Justin Ball	3.0	3.0	Dimitriy Yadykin	We seek to ensure the IMAS compatibility of the major codes used by TSVV-02 (GENE, ORB5,	
494	2025	IPPLM	TSVV-03	FELTOR	Patrick Tamain	0.8	0.8	Krzysztof Gałązka	Extend deployment of IMAS outputs in TSVV3 codes to a minimum set allowing the use of	LINE SPLIT
495	2025	IPPLM	TSVV-03	GBS	Patrick Tamain	0.8	0.8	Krzysztof Gałązka	Extend deployment of IMAS outputs in TSVV3 codes to a minimum set allowing the use of	LINE SPLIT
496	2025	IPPLM	TSVV-03	GRILLIX	Patrick Tamain	0.8	0.8	Krzysztof Gałązka	Extend deployment of IMAS outputs in TSVV3 codes to a minimum set allowing the use of	LINE SPLIT

ACH status



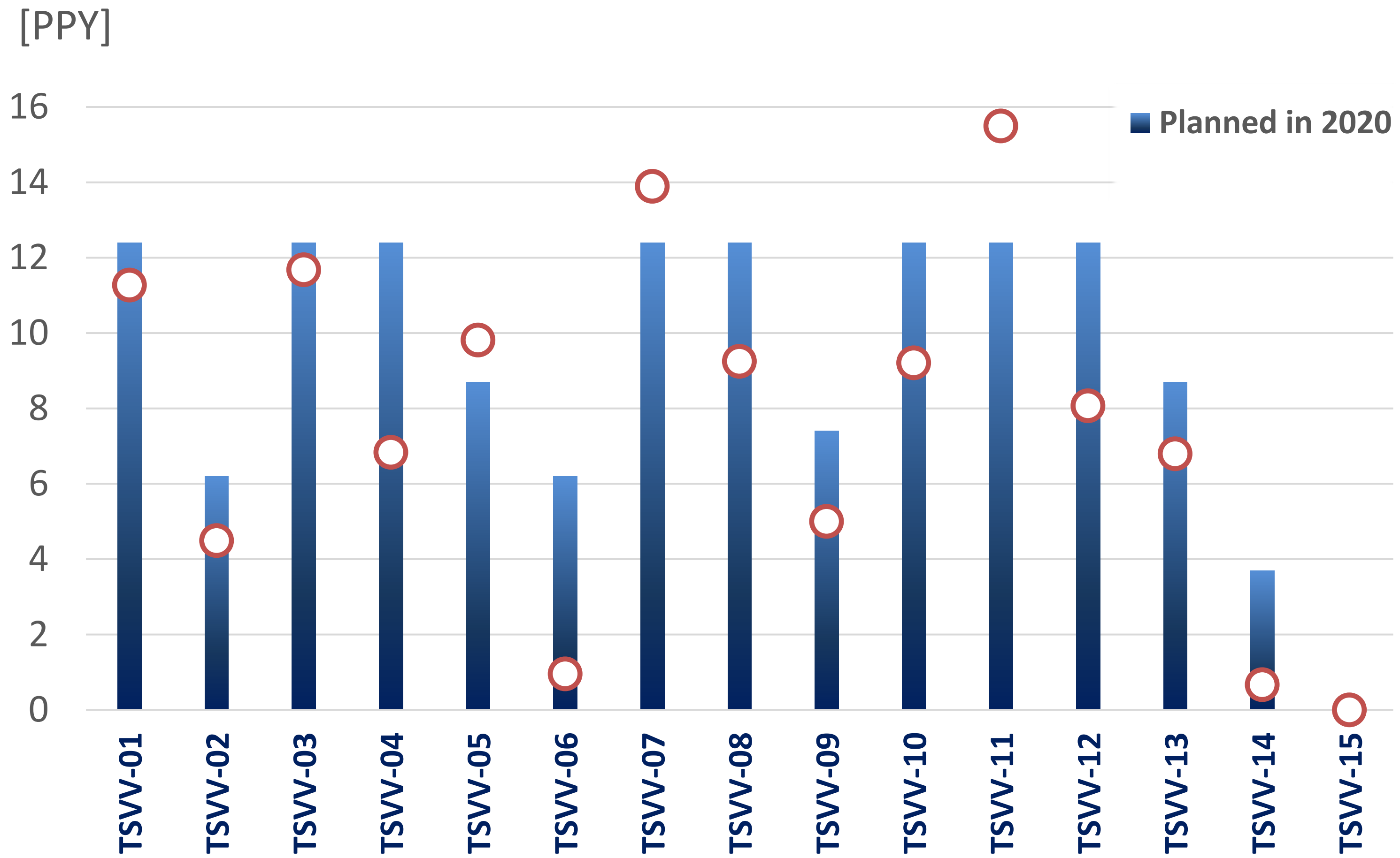
Competences

- Very few cases when ACH support couldn't be provided due to lack of competence
- Overbooking of IM-oriented hub is higher compared to others

Personnel

- Difficult to maintain due to industry demand on IT
- New team members need several months learning
- Inter-operation between hubs helps, but can't cover all the gaps

Use of ACH resources by TSVVs



TSVVs

- All TSVVs are provided with the adequate level of support

Other WPs

- Received overall support **> 25 PPYs**

HPC&GW

- Support level increases annually **5 PPYs**

EUROfusion Standard Software

First published in the Call for projects (2020) ➔ Discussed and revised after the General Meeting (2024)

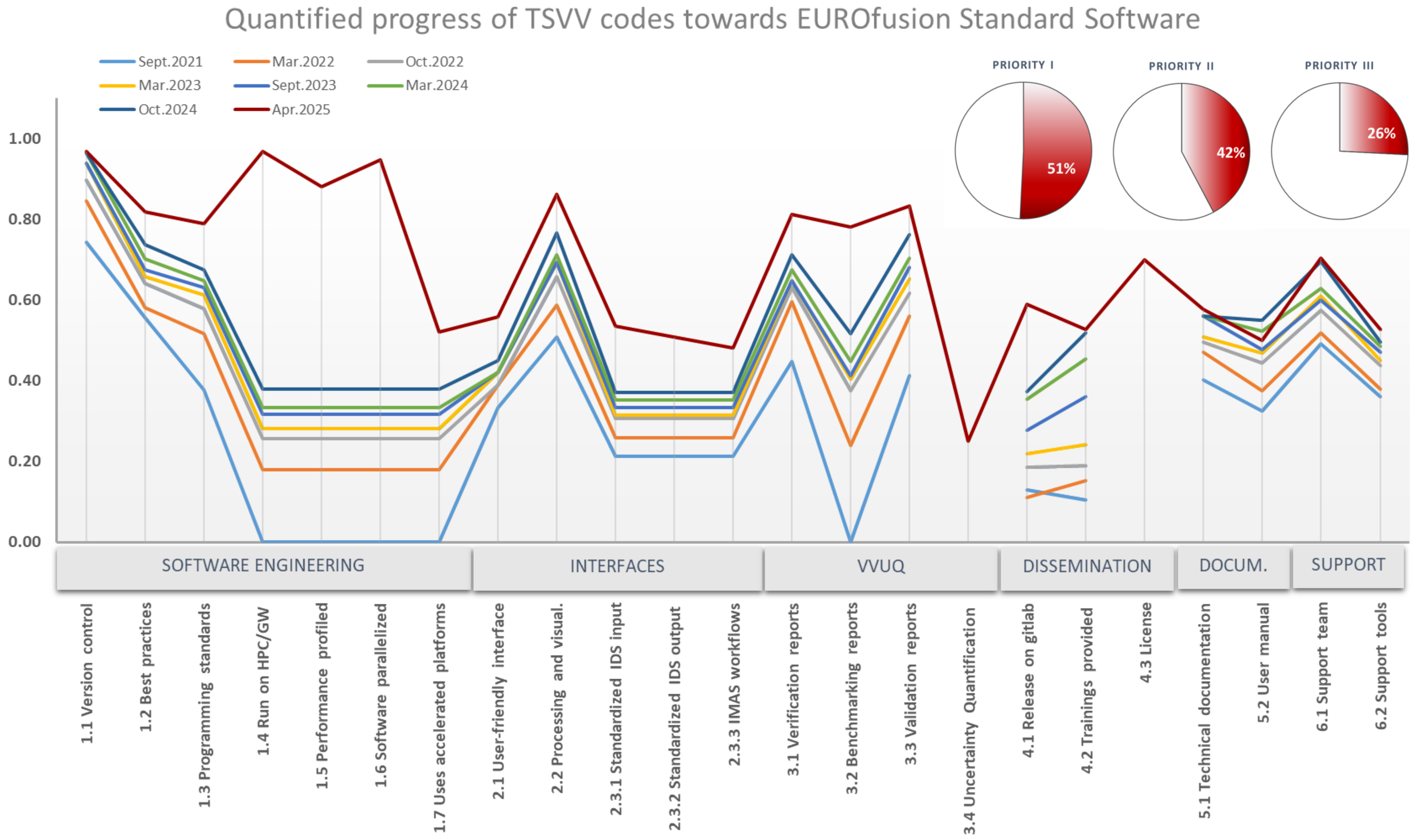
The quality assurance framework for ***EUROfusion Standard Software*** is built on the following principles:

- **Free availability** (within EUROfusion) of an up-to-date release version of the source code used for production runs.
- **Best practices for software development**, including version control, regression/unit testing, and shared development rules.
- **Technical documentation**, including detailed user manuals and reference publications with descriptions of the underlying models.
- **User support**, providing assistance for users, co-developers, and support staff through designated contact points, mailing lists, issue trackers, and other tools.
- **Plans for software verification and validation**, involving third-party reviews and incorporating uncertainty quantification.
- **User-friendly interfaces and visualization/post-processing tools**, including intuitive designs and interfaces to the IMAS Data Dictionary (where applicable) to allow understanding and navigating through the application in an efficient way.
- **Specific plans for dissemination and user training** across EUROfusion.

Endorsed by the E-TASC SB on 12.03.2025

https://idm.euro-fusion.org/?uid=2Q72WQ&version=v2.2

Progress towards EUROfusion Standard Software



Data Management Plan (DMP)

Goal is to provide FAIR based data for EUROfusion (related to Grant deliverable). Charge for 2025 is to

- **Provide a searchable catalogue/**database of metadata (waveforms) from the participating sites. (Scenario A)
- **Demonstrate direct data access** of a subset of experimental data for user applications to run on. (Prototyping Scenario B).
- **Investigate** (and pending available resources) develop the technology to integrate

  modelling/simulation data as a "facility" of its own

Activity is divided into Core services (PSNC) providing infrastructure and Sites (AUG, COMPASS/-U, JET, MAST/-U, TCV and WEST) providing data mappings and remote data access.

With the long-term data storage facility (LTDSF) and the ability to mint PID's we have the tools to support the longer-term vision towards a one stop facility for researching, accessing, processing, analysing, and sharing experimental and modelling data.

Data Management Plan (DMP)

Infrastructure is in place!

- A UDA (UKAEA) based client/server installation is available and tested on all sites.
- Data ingestion and curation procedures and protocols have been tested for Scenario A data (metadata services) for all devices
- UDA has been updated and is being tested with new security enhancements to allow for Authentication and Authorisation (needed for Scenario B data releases)
- Performance issues with large data volumes has been resolved
- Future work is related to adaptation to user needs and further performance improvements.

Metadata - Waveforms, etc (Scenario A) is ready for production services

- Ready for production services: Will be launched on the new gateway (faster access to HW is being explored).
- EUROfusion users will initial have access to: AUG: (11,500 discharges), WEST (~1,200) , TCV: (“full catalogue”), JET (TBD: on request mapping tool), MAST-/U &Compass/-U (pending release agreement)
  - Some embargos and data restrictions may apply

Direct data access has been demonstrated for a number of use cases (scenario B):

- Remote access tools are available using UDA/IMAS
- A set of user needs representing different TSVVs needs have been defined and tested.
- Relevant data mappings are being developed and have been demonstrated for select devices.

Initial testing of integration with modelling/simulation data has started.

- Strategy is to use SimDB and integrate with UDA/IMAS access
- Allow users to log/share simulation results through the catalogue
- The availability of the long term data storage facility (LTDSF) is of key importance to this

Digital Twin

Data Infrastructure: all kind high-quality data, (plasma, materials, machine components and actuators); standardised data formats and interfaces; FAIR data management; uncertainty quantification)

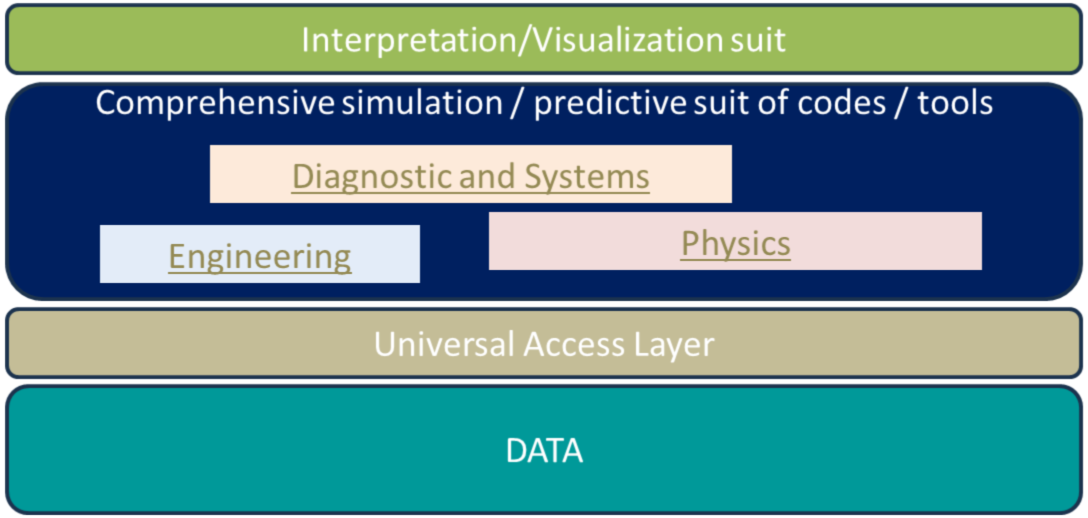
Predictive and Simulation Codes: Physics-Based models; AI/ML models; HPC Compatibility; frameworks to couple multiple simulation domains

Real-Time Feedback Systems: control algorithms; integration with real tokamak

Visualization Tools: friendly UIs, 3D visualisation, tools for evaluation of DTE predictions vs experiment

Benchmarking and Validation: accuracy and reliability of DTE

Computing and storage resources



Computational and storage resources

Aim of DT activities:
Various essential elements for DTE development are **already embedded within the DSD work programme**.

PoC projects serve as key enablers, focusing on **integration with engineering software** to bridge the gap between physics and engineering models.

Digital Twin – Proof of Concept (PoC) projects

The aim is to address identified **gaps and opportunities** through targeted **Proof of Concept (PoC)** projects. **These projects shall link data from science and engineering** to build integrated solutions that meet current needs and advance future capabilities.

The following proposals scored exceptionally high and fall within the budget

Short Reference No	Principal Investigator	Title
CEA-02	Marie-Helene Aumeunier	Integrated Multi-Physics Analysis and Coupled Tools for fusion
CIEMAT-02	Carlos Moreno	Digital Twin Proof of Concept for the Breeding Blanket System
ENEA-01	Domenico Marzullo	Digital Twin platform for integrated design of tokamak components – pilot project on EU-DEMO divertor
ENEA-02	Alessandro Spagnuolo	Integrated Digital Twin Framework for Disruption Analysis, Tokamak Structural and Activation Product Transport
EPFL-01	Cristian Sommariva	Prototyping and assessment of a highly flexible infinitely scalable digital twin of fusion power plants using existing and commercial technologies
DIFFER-02	Thomas Morgan	Divertor digital twin for materials lifetime optimisation
UKAEA	Andrew Davis	MOOSE platform

High Performance Computer and the Gateway cluster (1)

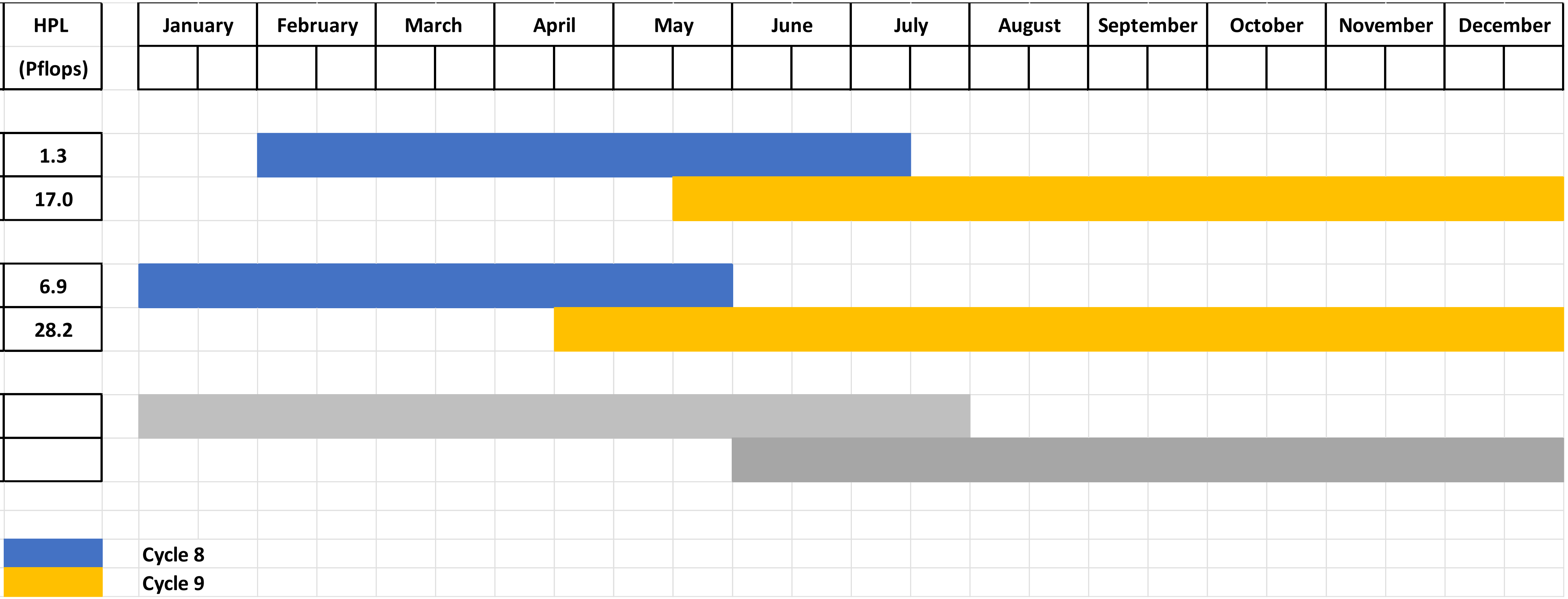
- **Marconi-Fusion phased-out following flooding incident on 19 October 2024**
- **260 Leonardo CPU nodes provided as compensation as of January 30, 2025**
- **Gateway back in operation in the end of December 2024**

	CPU	GPU	Gateway	CPU	GPU	TOTAL
	# nodes	# nodes	# compute nodes	HPL (Pflops)	HPL (Pflops)	HPL (Pflops)
	Marconi	Leonardo	Gateway	Marconi	Leonardo	TOTAL
From August 3, 2023 until July 31 2024	2848	72	88	5.96	5.00	10.96
From August 1, 2024 until Oct. 19, 2024	1424	100	88	2.98	6.94	9.92
From Oct. 20, 2024 to January 29, 2005	0	100	0 (Oct. 20) 88 (Dec. 31)	0.00	6.94	6.94
	Leonardo-CPU	Leonardo-GPU	Gateway	Leonardo-CPU	Leonardo-GPU	TOTAL
From January 30, 2025	260	100	88	1.33	6.94	8.27

High Performance Computer and the Gateway cluster (2)

- **Delay in the availability of new Pitagora platform with respect to initially announced date (January 2025)**
- **Current understanding indicates start of production in mid-April for GPU and mid-May for CPU (validation by ACHs two weeks before, respectively)**
- **Expected availability of new Gateway with all specific tools and data migrated: end of May**

	Nodes	HPL (Pflops)
Leonardo-CPU	260	1.3
Pitagora-CPU	1008	17.0
Leonardo-GPU	100	6.9
Pitagora-GPU	168	28.2
Old Gateway		
New Gateway		



Long Term Data Storage Facility (LTDSF)

Fusion data volumes are growing exponentially, driven by increase diagnostic data, complex simulations and AI-driven analysis. To secure these and other data EUROfusion issued the **Call for offers for hosting LTDST** (deadline 31.01.2025).

- ***3 offers*** *were submitted in response*
- *Following the detailed assessment by the Technical Evaluation Panel –* ***LTDSF implementation is awarded to IPPLM (PSNC in Poznan)***
- *Procurement and start of operation (provisional –* ***summer 2025****)*
- *Ensuring the maintenance of data for* ***10 yrs*** *(with the possibility of expansion to accommodate growing demands)*

Technical Specification:

Long-Term Archival Storage (slow, disk storage): ***10PB***
*Immediate Data Access (SSD high-speed storage):****1PB***
Data Transfer Link: Fast connection to CINECA HPC (Pitagora) in Bologna.
Bandwidth (sustained): ***40 GBit/s***
External Network (bandwidth): ***20 GBit/s*** *with a back-up at similar speed*

Materials & Links

- **Summary from 1st E-TASC General Meeting (11-15 Nov. 2024, Garching):**
  https://idm.euro-fusion.org/?uid=2S53YT&action=get_document
- **Materials from the 1st E-TASC General Meeting:**
  https://indico.euro-fusion.org/event/3034/
- **EUROfusion Standard Software:**
  https://idm.euro-fusion.org/?uid=2Q72WQ&version=v2.2
- **Review of Advanced Computing Hubs (ACHs) – 2024:**
  https://idm.euro-fusion.org/Portal/Pages/ContentView.aspx?uid=2RHUC2
- **Mid-Term Review of TSVV projects (2023):**
  https://idm.euro-fusion.org/Portal/Pages/ContentView.aspx?uid=2P9MS8
- **WPAC reporting:**
  https://idm.euro-fusion.org/default.aspx?uid=2PMTS8
- **WPAC Presentation at the last Physics Project Board:**
  https://indico.euro-fusion.org/event/3244/contributions/13043/attachments/6235/10996/DSD-WPAC-Oct2024.pdf