PSD Project Board # 08

Work Packages Plans for 2026-27: Work Package Tokamak Exploitation (WP TE)

E. Tsitrone and N. Vianello for TE TFL

E. Tsitrone, N. Vianello, A. Hakola, V. Igochine, D. Keeling, B. Labit, V. K. Zotta

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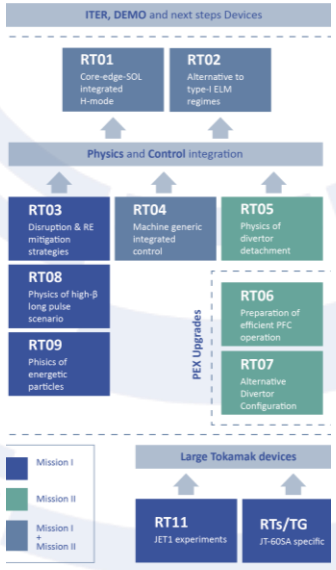
Strongly streamlined programme for WP TE in 26-27

High level objectives for 26-27

- Address urgent R&D issues related to the new ITER baseline / Research Plan (full tungsten wall) : far SOL physics and wall loads; tungsten sources, transport and screening; startup on tungsten limiters; runaways damage of tungsten first wall components and efficiency of boronisation in full tungsten devices ➔ ITER MoU
- Provide a full qualification of the most promising no ELM scenario, focusing on X-point radiator (XPR) and quasi-continuous exhaust (QCE) now considered as a viable option for ITER / DEMO.
- Support modelling efforts for interpretation of available data from TE devices (including JET DD and DT last campaigns) ➔ integrated core/exhaust modelling (EFPW recommendation)
- Prepare the JT-60SA scientific exploitation in the OP2 and OP3 campaigns, pending resources becoming available.

Same structure retained for WP TE in 26-27

- 9 “programmatic” Research Topics (RT01 to RT09)
- 2 Research Topics dedicated to JET (RT10 for data validation, RT11 for analysis of JET campaigns performed before 2022 and related work)
- 8 Research Topics (RT12 to RT18) mapping the existing Topical Groups of the JT-60SA EU-JA Experimental Team.



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- TF leadership being updated for 26-27 (2 TFL, 5 + 1 DTFL)

Role	*Name*	*Beneficiary*
Task Force Leader	Emmanuelle Tsitrone	CEA
Task Force Leader	Nicola Vianello	ENEA
Deputy Task Force Leader	Vito Konrad Zotta	ENEA
Deputy Task Force Leader	Antti Hakola	VTT
Deputy Task Force Leader	David Keeling	UKAEA
Deputy Task Force Leader	Jeronimo Garcia	CEA
Deputy Task Force Leader	Valentin Igochine	MPG
Deputy Task Force Leader	Benoit Labit	EPFL
Project Support Officer	Zeinab Doagouei	MPG

List of Grant Deliverables 2026-2027

ID	*Deliverables Table*	*Date*
TE.D.16	Report on fully integrated simulation of high current partially detached plasma scenario including assessment of PFC erosion in D and DT plasma	Dec 2026
TE.D.17	Report on reduced model validation for plasma reattachment on multiple devices and wide operational space	Dec 2026
TE.D.18	Report on providing input on design and operation of conditioning systems for next step full W devices and focus on standard boronization systems	Dec 2026
TE.D.19	Report on qualification with experiment/modelling of the most promising no-ELM scenario in terms of confinement, exhaust capabilities and plasma wall interaction	Dec 2027
TE.D.20	Report on optimized scheme for "benign termination" of runaway beams documented in view of possible applicability for ITER	Dec 2027

List of Milestones 2026-2027

ID	*Milestones Table*	*Date*
TE.M.09	Proper figure of merit for cross-scenario comparison among no-ELM / ADC defined	Dec 2026
TE.M.10	First wall particle and heat fluxes quantified in XPR in metallic devices	Dec 2026
TE.M.11	ADCs characterized in H-mode conditions in all relevant TE devices	Dec 2026
TE.M.12	Modelling of SPI experiment on JET and ASDEX-Upgrade completed	Dec 2027
TE.M.13	Impact of N-NBI on plasma behaviour documented in JT-60SA and extrapolation to ITER investigated*	Dec 2027

* Pending resources are made available for JT-60SA related work

R&D in support of the EUROfusion-ITER MoU requires experimental time, data analysis and modelling

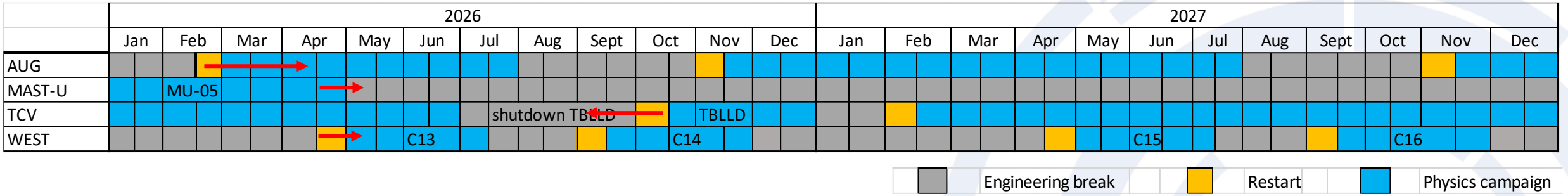
MoU Chapter	MoU Section	TE identifier	Description of the Work	Expected Deliverable Deadline	Relevant Research Topics	Relevant Device
Physics Basis for ITER Scenarios	R&D related to W wall s transport	Development of Plasma Models	Joint development of plasma models	TE-PM-2.1	HFPS improvemenbts	Model available and included in D4 Experiment to be used for validation include high-beta JET database, high-beta scenarios on AUG and JT-60SA, the study of the impact of EP and high-beta on turbulent transport and the study of interplay with q-profile and MHD stability. Modelling should include high-fidelity (GENE, ORB5) and possible derived reduced model as well as JOREK. Propose continuation of the TGLFSat2 validation towards GENE-Tango to be applied to JET high-beta
	Fuel retention and removal f W PFCs					
	ICH supported plasma start-					
	Disruptions and disruptio	Use and Validation of models	Use and validation of workflows for experimental data	TE-VPM-3.1.1	Use and validation of equilibrium analysis workflows	D2
				TE-VPM-3.1.2	Use and validation of core density and temperature workflow	Final results in D2/D3
				TE-VPM-3.1.3	Use and validation of core plasma impurity density workflow	Final results in D3/D4
				TE-VPM-3.1.4	Use and validation of Kalman-Filter supported workflows	D4
			Validation of SOLPS-ITER wide grid and ensuing W source/transport	TE-VPM-3.2		D4
			Validation of JINTRAC and DINA-JINTRAC	TE-VPM-3.3.1	Validation of DINA-JINTRAC full plasma scenario simulation	D4
				TE-VPM-3.3.2	Validation of JINTRAC W limiter plasma simulations	D4
				TE-VPM-3.3.3	Validation of JINTRAC in W tokamak scenarios	D4
				TE-VPM-3.3.4	Validation of JINTRAC in Ne seeding high performance JET plasmas	D4
			Validation of European Transport Solver – Persistent Actor Framework			

- W wall source and transport
- Boronisation
- Disruption and RE mitigation, RE impact
- ELM control and no ELM scenario
- ICRH start up
- Control workflow …

Experimental time in AUG/WEST/TCV
+ modelling resources

Machine availability for 2026-2027 : update since last PB

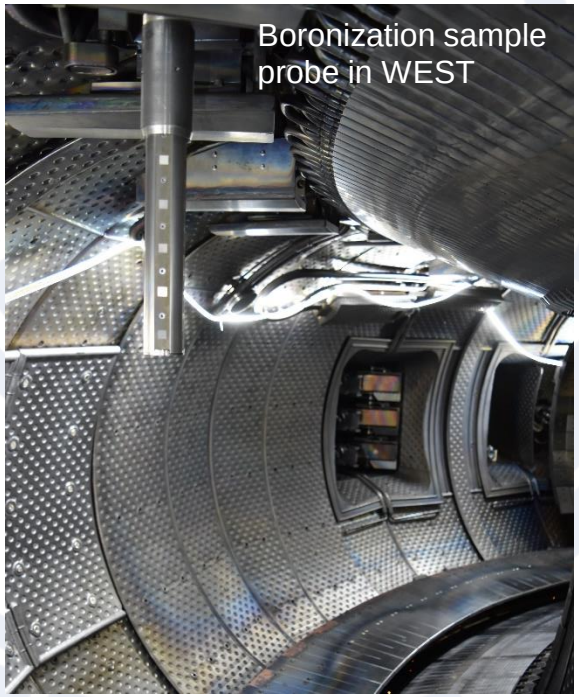
Tentative timeline for TE devices in 26-27



- AUG and WEST running in usual ~ 9 / 3 months campaigns mode respectively
- TCV running in ~ continuous mode, Tightly Baffled Long Leg Divertor (TBLLD) operation phase extended
- MAST-U only available for 4 months early 2026
- PEX enhancements now fully available (upper divertor in AUG, ITER grade divertor in WEST) + further upgrades (ECRH in WEST and TCV) + TE ENH diags

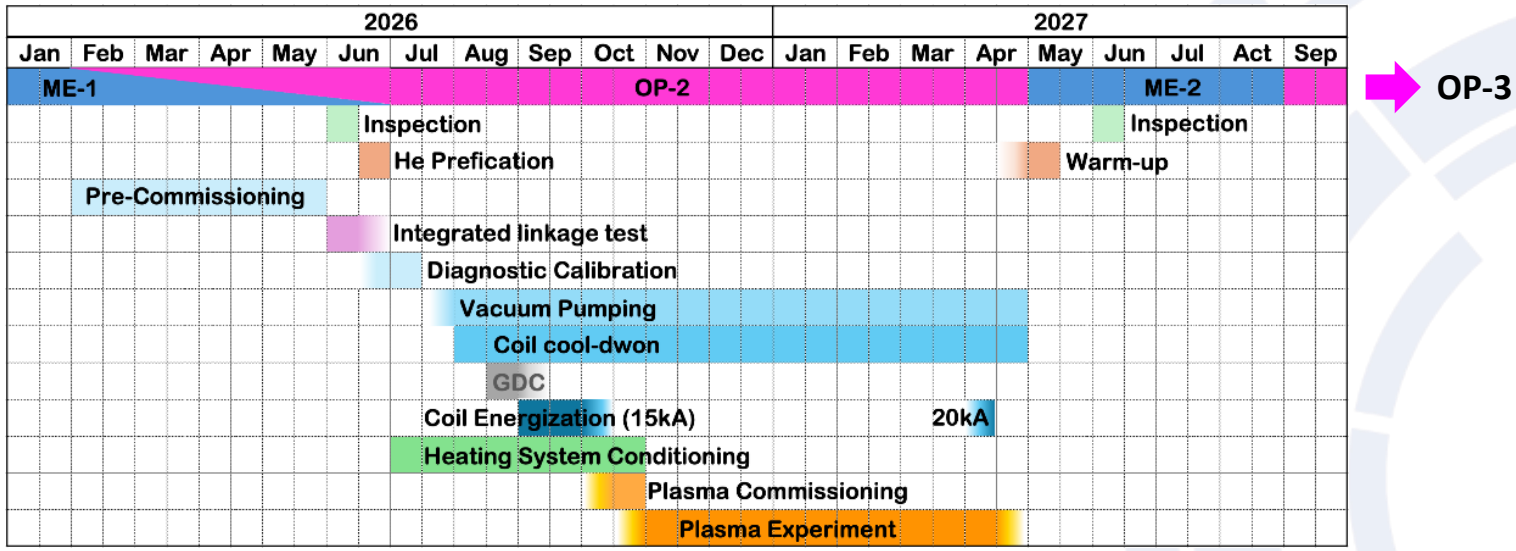
% of op time	2025	2026	2027
AUG	50	40	27,5
TCV	40	35	27,5
WEST	40	40	27,5


Ultra fast reflectometer in AUG


Boronization sample probe in WEST

Preparation for JT-60SA OP-2 campaign ongoing

K. Takahashi, ETCM-05, Feb 2026

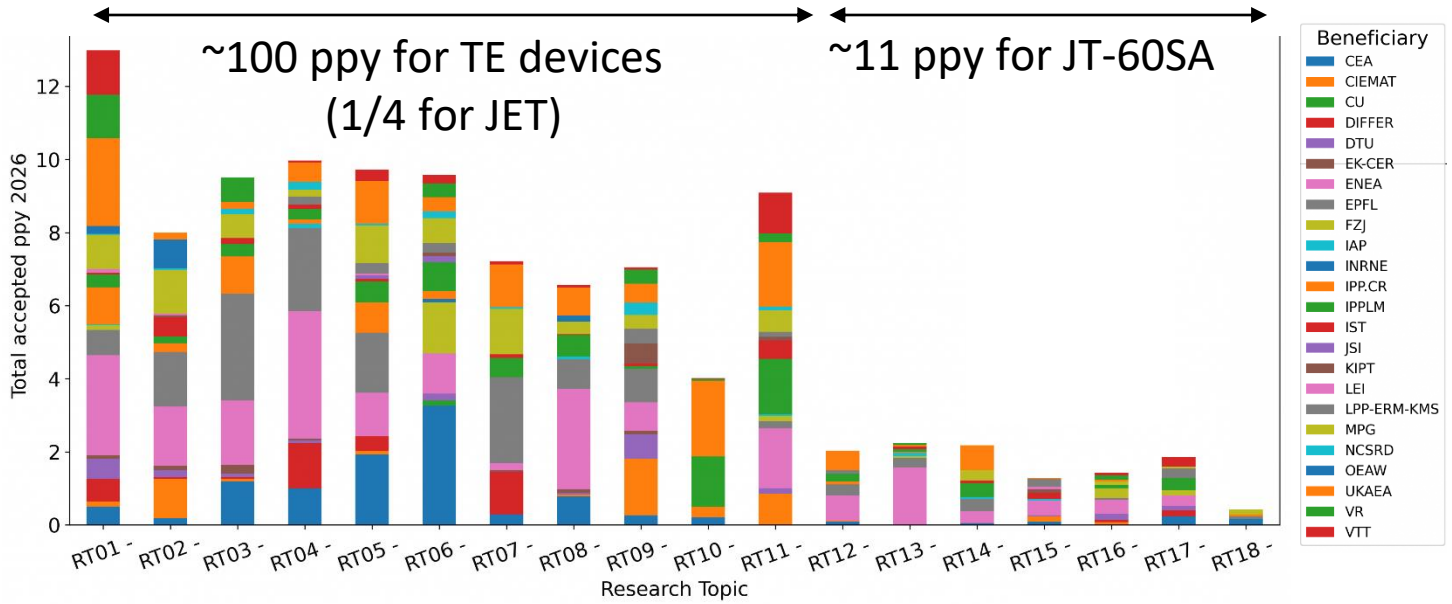


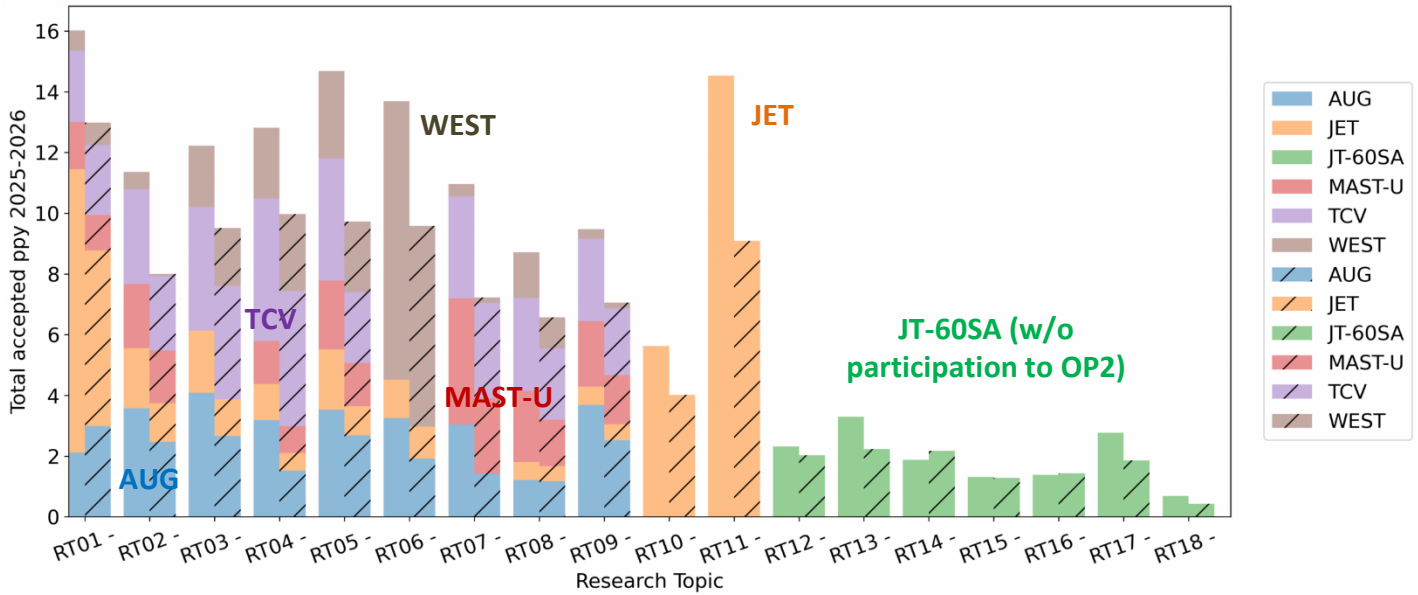
Assessment of experimental proposals by TGL / ETL

WP TE call for participation to OP2 (~3 ppy reserved)

- Timeline for JT-60SA under consolidation, OP-2 expected to start end 2026
- Assessment of experimental proposals by JT-60SA Experiment Team ongoing (EU : 40% of experimental time)
- WP TE call for participation to OP-2 for the EU team to be launched as soon as selection of experiments finalized (~ june 2026)

Resources allocated for the 2026 campaign : staffing



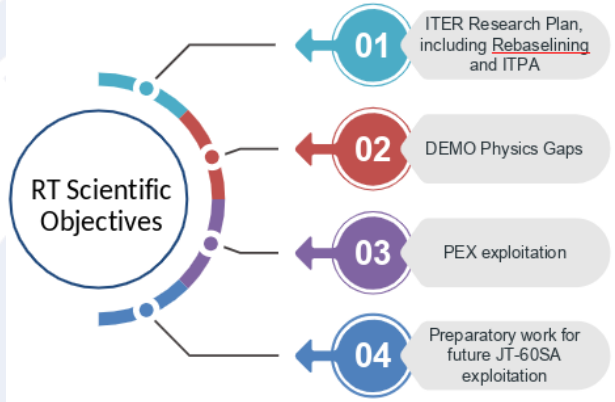


- WP TE ensuring access to fusion devices to > 20 Beneficiaries
- Research Topics used as home for pan EU teams

- Decrease of campaign participation budget by 15% in 2026 compared to 2025
- JET : focus of JET activities before DTE3 (RT11), less support for JET data validation (RT10)
- JT-60SA : ~ 11 ppy dedicated to JT-60SA preparation of OP2/OP3/W phase + ~3 ppy for OP2 campaign participation not allocated yet

Resources allocated for the 2026 campaign : experimental proposals selected

2026-2027	ASDEX-U	MAST-U	TCV	WEST
Shots proposed	1283	719	2242	1930
Overbooking	2	4	1,5	3



Prioritization scheme :

Priority 1 (P1) : should get experimental time (addressing RT objectives, team effort, technical feasibility)

Priority 2 (P2) : would get time only if P1 completed (or back up)

Priority 3 (P3) : out of scope

➔ Running most urgent P1 for ITER in 2026, reduced scope in terms of operational space explored, lower contingency %

Shot allocation for 2026					
RT	ASDEX-U	MAST-U	TCV	WEST	Total
RT01	24	16	70	15	125
RT02	30	32	70	0	132
RT03	30	0	85	45	160
RT04	15	16	70	30	131
RT05	24	24	70	30	148
RT06	34	0	0	150	184
RT07	45	48	120	15	228
RT08	32	24	70	15	141
RT09	16	16	50	0	82
Contingency	50	0	60	84	194
Sum	**300**	**176**	**665**	**384**	**1525**

RT03 : disruption / RE high priority for ITER

RT06 : PWI in full W devices in support of ITER new baseline

RT07 : AUG PEX upgrade (upper divertor), TCV TBLDD, MAST-U ADC before long shutdown

WP TE budget : challenging for 2027

Numbers to be checked by Admin, based on IMS as of 16/03/26

CC cost (keuros)	2025	2026	2027
TE missions	986	867	**445**
TE secondment	0	87,5	0
TE-1 management	481	488	495
TE-2 campaign participation	6242	5375	**3779**
TE-3 machine operation	17185	15513	**10978**
TE-4 Enhancements	3411	1675	1144
Total	**28305**	**24005,5**	**16841**

2026 : now including budget for JT-60SA scientific exploitation 2027 : based on indicative resources in IMS, not including JT-60SA

Budget for 2026 now manageable

- Budget for scientific exploitation of JT-60SA granted by GA for 2026
- % of machine operation allows running most urgent P1 experiments
- Campaign participation prioritized for missions

Budget for 2027 challenging (cf Marco's talk on reserve list)

- No support available for the scientific exploitation of JT-60SA in 2027
- Staffing marginal for other TE devices (not linear with % of operational time)
- Missions budget not enough to cover campaign participation
- % of machine operation does not allow to accomodate P1 proposals

2027 (tentative)	ASDEX-U	TCV	WEST
P1 shots requested	**506**	**1081**	**560**
Current plan	**321**	**1045**	**264**
Scenario II	**409**	**1140**	**336**
Scenario IV	**467**	**1330**	**384**

Current plan : all devices at 27.5%
Scenario II : AUG/WEST at 35%, TCV at 30%
Scenario IV : AUG/WEST at 40%, TCV at 35%