

**P1** – highest priority, critical tasks, **P2** – essential tasks, **P3** – highly desirable tasks.

	Code name	Tasks required to ACH	ACH name	PPM /year
ACH Cat.1, HPC				6 (total)
TSVV-5 <b>P1</b>	EIRENE-NGM	Optimisation of MPI load balancing in line with previous HLST project SOLPSOPT and profiling of MPI-OpenMP hybrid operation <ul style="list-style-type: none"> <li>• Improve distribution of work between processes for multiple strata cases</li> <li>• Add option to allow distribution of processes in simple balancing scheme</li> <li>• Identify optimal load balancing and thread count strategy</li> <li>• Identify hotspots in hybrid operation</li> </ul>	ACH-MPG  No real alternative, ACH MPG can provide direct continuation of earlier HLST support	2
TSVV-5 <b>P1</b>	EIRENE-NGM	Assist development towards spatial domain decomposition using MPI to allow the running of very large cases <ul style="list-style-type: none"> <li>• Initialisation of separate subdomains based on input parameters</li> <li>• Create suitable set of MPI communicators for efficient operation</li> <li>• Addition of particle exchange between processes</li> <li>• Development of collection of final results from subdomains or use of parallel IO for direct output</li> </ul>	ACH-MPG  No real alternative, ACH MPG can provide direct continuation of earlier HLST support	4

TSVV	Code name	Tasks required to ACH	ACH name	PPM /year
ACH Cat.2, IM				6 (total)
TSVV-5 <b>P2</b>	EIRENE-NGM	Integration of code I/O in the IMAS: <ul style="list-style-type: none"> <li>- new structure to allocate grid and tallies information of neutral species based on HDF5 EIRENE output.</li> <li>- using AMNS data through IMAS</li> </ul>	ACH-IPPLM  Alternative ACH-VTT	0.5
TSVV-5 <b>P1</b>	EIRENE-NGM	Algorithmic development: implementation and optimization of improved particle tracking procedures, source estimators and newly developed fluid-kinetic-hybrid schemes for variance reduction in standalone and coupled EIRENE-CFD simulations <ul style="list-style-type: none"> <li>• Flexible combination of analog and non-analog particle tracing schemes with collision, track-length and next-event estimators</li> </ul>	ACH-IPPLM  Alternative ACH-MPG	5

		<ul style="list-style-type: none"> <li>• Generalization and optimization of KDMC simulation in EIRENE.</li> <li>• Further development and optimization of the multilevel KDMC simulation method within EIRENE.</li> </ul>		
TSVV-5 <b>P2</b>	EIRENE-NGM	Develop HPC-conform interfaces of the NGM to the other codes (TSVV-3, 4, 6).	ACH-IPPLM  Alternative  ACH-MPG or ACH-VTT	0.5

TSVV	Code name	Tasks required to ACH	ACH name	PPM /year
ACH Cat.3, D				3 (total)
TSVV-5 <b>P1</b>	EIRENE A&M data: AMJuel, HydHel, H2Vibr, surface data, etc.	Data-management protocols needed in connection with HPC. Application of AI/ML techniques to UQ of these data and code performance boost by selection of the necessary level of accuracy/detail. Provide integration of the data into the IMAS.	ACH-VTT  No real alternative	1.5
TSVV-5 <b>P3</b>	EIRENE-NGM	Providing GPU-based performance boost (starting with just investigating feasibility)	ACH-VTT  Alternative  ACH-MPG	0.5
TSVV-5 <b>P1</b>	EIRENE-NGM standalone and E-CFD packages (SOLPS, EMC3-EIRENE, etc.)	Providing uniform and well-structured database of the simulated data (EUDAT-based) accessible to all users/developers. It should mimic the CI and "portfolio" application cases (selected validation/verification and physical tasks). It should answer challenges due to huge data amount (typical for MC codes like EIRENE in particular in the context of large volume grids necessary for ITER and DEMO simulations), versioning of the input data (also massive) etc.	ACH-VTT  No real alternative	1.0