Set of criteria to be used for monitoring of TSVV code development towards EUROfusion-Standard-Software.

Within E-TASC, we distinguish between two types of software. On the one hand, we have "research software" which is typically developed within TSVV Tasks or in the broader community. It tends to aim at addressing specific scientific questions and has a very limited user base (often more or less identical with the development team). The majority of our software in fusion research today falls in this category, and while it will continue to play an important role in the future, it is clear that several significant challenges ahead – like supporting or even guiding ITER operation and DEMO design – call for a more professional approach. Consequently, E-TASC will provide the platform and support to develop so-called EUROfusion standard software, taking the development, dissemination, and exploitation of fusion software to a new level.

EUROfusion standard software will be developed with a very rigorous, consistent quality assurance process that is common across the E-TASC initiative; it is designed to benefit a wide range of users across EUROfusion, well beyond the team of code developers, and will adhere to the following guidelines:

- Free availability (within EUROfusion) of an up-to-date release version of the source code used for production runs
- Good software engineering practices (version control, regression/unit testing, shared development rules etc.)
- High-quality code documentation via user manuals and reference publications (including, in particular, a detailed description of the underlying model)
- Excellent support of users, co-developers, and support staff within EUROfusion (via contact person, mailing list, issue tracker, and the like)
- Specific plans for code verification and validation (involving a third party), in particular within EUROfusion, including aspects of uncertainty quantification
- User-friendly, intuitive interfaces and visualisation/post-processing tools, including interfaces to the IMAS Data Dictionary (where applicable)
- Specific plans for code dissemination and user training within EUROfusion

The development of EUROfusion standard software – either based on existing research software or from scratch – is to be primarily driven by the ACHs, but in close partnership with the TSVV Tasks. Actually, in many cases, research software will be further developed by the ACHs (in liaison with or as vital part of TSVV Tasks) to become part of the EUROfusion standard software suite. The latter will carry significant Intellectual Property.

Following criteria will be used to monitor the progress of TSVV codes towards EUROfusion Standard Software. The progress on individual criteria is to be quantified using the "traffic light" system as: not started / in progress / completed.

SOFTWARE ENGINEERING
1. Version control implemented
2. Software engineering standards (incl. CI and regression/units tests) established
3. Coding standards (facilitating code maintainability and portability) established; this includes the use of modern programming languages and compilers
4. Performance optimization on HPC systems

CODE INTERFACES
1. User-friendly interface (e.g., GUI) for easy code handling
2. Post-processing and visualisation tools as a part of the code releases
3. Interface to the IMAS Data Dictionary

VVUQ
1. Specific plans for code verification, inter-code benchmarking, and code validation
2. Code verification studies accomplished, reports/papers available for download
3. Inter-code benchmarking accomplished, reports/papers available for download
4. Code validation studies accomplished, reports/papers available for download

CODE DISSEMINATION
1. Up-to-date release version of the source code available on the Gateway for download
2. Trainings provided to code users within EUROfusion

CODE DOCUMENTATION
1. High-quality technical documentation (including a detailed description of the underlying model) available for download
2. User manual available for download

USER SUPPORT
1. Responsive support team (involving code developers) in place
2. Tools for managing support requests (mailing list, issue tracker etc.)