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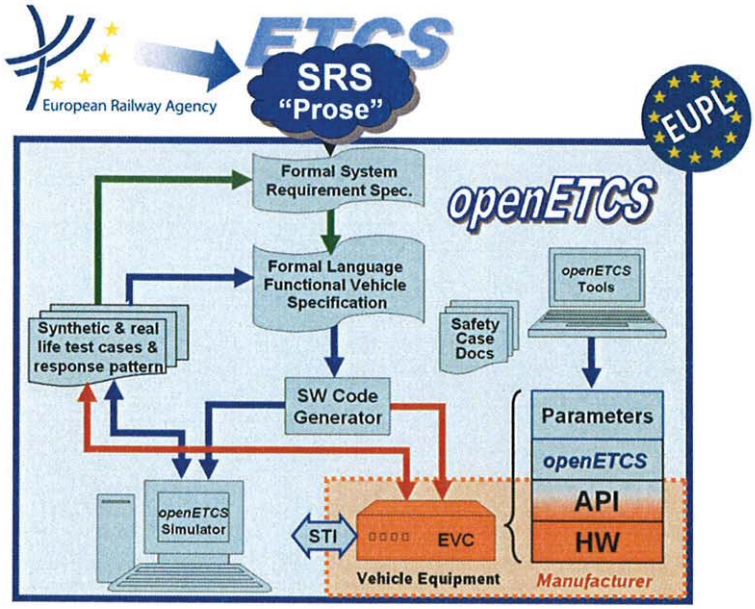
Work-Package 4: "V&V Strategy"

openETCS D4.5.1: openETCS Internal Assessment Plan

Planning and Description of tasks that are performed in the frame of Open ETCS Internal Assessment Activities

Frédérique Vallée and Norbert Schäfer

July 2013
revised August 2015



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Planning and Description of tasks that are performed in the frame of Open ETCS Internal Assessment Activities

Document approbation

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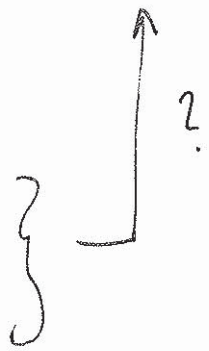

final version

Prepared for openETCS@ITEA2 Project

Abstract: The Internal Assessment Plan describes the Internal Assessment strategy and plan in the frame of V&V activities in the openETCS [8] project. According to the CENELEC EN50128 [4] standard, the assessment is a " Process of analysis to determine whether software, which may include process, documentation, system, subsystem hardware and/or software components, meets the specified requirements and to form a judgment as to whether the software is fit for its intended purpose."
The dates, highlights, deliverables and activities split presented in this plan have been adapted in accordance with the FPP [5] final version.

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Modification History

Version	Section	Modification / Description	Author
0.1	all	1st version	Cyril Cornu
0.2	§1.3	Consistence with Project Quality Documentation	Merlin Pokam
0.9	all	update according to final FPP	Frédérique Vallée, Norbert Schäfer
0.9.1	all	revision and adding agile workflow description	Marc Behrens

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1 Introduction

The role of the Independent Safety Assesor (Assessor) is to perform an assessment of the software developed during the project openETCS. According to the standard EN 50128 and the software safety integrity level (SIL4) of the project, it is very important to remind that the Assessor is working according to the independence criteria defined inside the standard EN ISO/IEC 17020 [1] and shall be given authority to perform the software assessment. Then, the Assessor shall not be part of project stakeholders, and is totally independent from the project teams. Furthermore, the Assessor shall have the knowledge of both ERTMS and ETCS, of the dependability and of the standard EN 50128, even if only the On Board Unit EVC Software and the environment simulation used for development and to qualify the EVC takes part in the project scope. The report of the assessor is deliverable as defined inside chapter 4.3.
For these reasons, the need of an assessment has been identified at the beginning of the project. This activity would simulate a real external assessment process, that would be enhanced by people being part of the openETCS project. This addresses the two main aspects of this task: the technical knowledge on the ETCS OBU and the technical independency regarding the whole software development and project activities.

1.1 Project context

The aim of the assessment is to simulate a assessor activity regarding a usual Railway signaling system development by a railway company. The openETCS project main objectives are:

- Transforming of higher-level, informal (i.e. expressed in natural language) ETCS requirements in formal requirements that will be used for validation and verification activities of embedded control systems.
- Adapting of modeling languages such that train control systems can be designed in suitable formalisms and verified against ETCS requirements in early design phases.
- Integrating and developing formal and semi-formal validation and verification techniques in order to prove the correctness of train control systems against formalized ETCS requirements.
- Generating symbiotic effects of large companies, R&D institutes, and SMEs in order to bring together all relevant experts in the field taking advantage from their diverse knowledge within a value adding chain (so called "eco-system" or "Co-Competition").

These four objectives are all related to specific steps of On Board Unit Software development of the European Vital Computer (EVC). Moreover, they all encompass underneath performance, reliability, availability, maintainability and safety objectives, that are usually translated into a Safety Integrity Level (SIL), and the conditions regarding quality, process and overall development activities are gathered in the CENELEC standards EN50128 [4], EN50126 [2] and EN50129 [3]. Therefore, apply the common development strategy for such a railway system makes sense, and allows the project to base the whole EVC Software development on existing CENELEC standards for such Railway signaling systems. Thus, it will allow us to meet these both conditions on design process and Safety Level.

1.2 Internal Assessment Plan objectives

This document provides the overall assessment plan and objectives that will be followed in the frame of assessment activities. The activities are shared according to the main software development categories and deal with:

- Project and Software Quality assurance
- Verification & Validation
- Safety

For each activity, this assessment plan identifies the relevant deliverables, and the criteria that will be considered for the assessment. The Internal Assessment Plan assumes that:

- All versions of the present Assessment Plan and modification tracking are provided in the document history.
- Author of this document are Frédérique Vallée (All4tec) and Norbert Schäfer (AEbt) as ~~Internal~~ Independent Assessors for the openETCS project.
- Main reviewers of this document are:
  - Marc Behrens (DLR), as V&V leader for openETCS project;
  - Jan Welte (TU Braunschweig), as Safety leader for openETCS project.
- Customer for the deliverable of the assessment is the body making use of the project results as well as the author of the artifact under review who has the opportunity to enhance their artifacts incorporating the assessment findings.
- Mission context (product description, context regarding the existing assessment of tools or artifacts in the project) is given.
- The Product and Process assessment scopes are known.
- The standards to be applied for Assessment are the CENELEC EN50126 [2] , EN50128 [4] and EN50129 [3] Standards.

The assessment will done acordy EN 17020.

According to the CENELEC standards, the Independent ~~External~~ Assessor is not allowed to be of the same organization in relation to the other roles contributing to the project results. This point is major because it defines precisely the difference between the Internal Assessment Task and the real assessment according to the CENELEC EN50128. In our case, the people taking part in the Internal Assessment are form different organizations. Members of the assessment team were not directly involved in the EVC development, which creates the model and the executable software. The assessment team is not paid by the organization that manages the project, but has an independant source of funding. In addition the assessor shall have acceptance/licence from a recognised safety authority.

what is this?

for example
AEbt is an independet company, accridicted as EN 17020. In this case, I don't andstand this text!?

2 Project Quality Assessment

This chapter details what are the main features to be checked regarding the quality assurance regarding the whole openETCS activities, from the very beginning of the project to the end of it. The Safety Criteria are defined in the document D2.2 appendix B3, and these criteria will be checked during the Internal Assessment reviews. The main points to be assessed are:

- The Quality Assurance Plan (QAP) completeness
- The Project Deliverables compliance with QAP
- The Management and Responsibilities management

2.1 Applicable Standards

The compliance to the applicable standards is a major point for the quality management system assessment. The major standards to be considered within openETCS are:

- CENELEC EN 50126 [2],
- CENELEC EN 50128 [4] and
- CENELEC EN 50129 [3].

So far, the three standards have been identified as defining the normative frame for the EVC Software development. Due to the scope of the development as described inside the FPP [5] only the CENELEC EN 50128 is applicable for the assessment.

2.2 Quality Assurance Plan - QAP

The purpose of the QA Plan is to define the processes, methods and tools that will be used to develop the openETCS project meeting ITEA requirements, following Open Source principles and practices and applying the SCRUM Methodology. Besides, two of the project outcomes, the openETCS software, the openETCS Tool Chain, will have to comply with CENELEC requirements.

The following aspects of quality will be precisely checked by the assessor, whether they belong to the QAP document or to other documents.

- openETCS development process. This process describes the whole documentation and methods of the software development process to be issued in the framework of openETCS project, and the connections between the project inputs, the project outcomes, and the work packages and tasks identified in the project. The consistency between the input and the outcomes documented and informations identified in the development process and the related document content will be checked. A table concerning the development methods according to CENELEC Appendix Table A.3 [4] shall be described inside the plan.
- openETCS tool development process, depending of the tool usage and level of qualification required (T1, T2 and T3). This process has to be described as precisely as the Quality Assurance related to the EVC Software development activity. The verifications and assessments activities that will be performed on this software development process are described in paragraph 5 of the plan.

- Configuration Management Plan. The Configuration Management Plan has to consider each outcome of the project from its very first release version to end of the document whole life-cycle. The documentation change management related to the toolchains definitions or related to the EVC software development have to be considered for both aspects of openETCS project development. This configuration management plan shall consider documentation changes but also toolchain, model and code issued in the frame of openETCS project.
- Review Process. The review process has to be applied from the very beginning of the project to its end.

2.3 Project Deliverables compliance with QAP

The Safety Criteria are defined in the document D2.2, and these criteria will be checked during the Internal Assessment review. The main points to be assessed for the project deliverables are:

- the documentation compliance for Software Safety Integrity Level 4. This includes for instance: architecture of the system, a functional and interface description of the system, the application conditions, the configuration, the hazards to be controlled, the safety integrity requirements and the timing constraints.
- the Requirements for tools class T1, T2 and T3. Tools have been identified so far for each category (text editor, requirements support, configuration support tool for T1, static code analyzers, model checkers, model based testing tools, simulators for T2, and compilers or code generation tools for T3), and all proof of compliance with the CENELEC standard and justification for use will be checked within assessment activities. This point is developed in paragraph 5 of the plan.

2.4 Project Development Process

The Project Development Process is a major point of the Quality Management System. It describes the overall project process, from the very first inputs used in the project, the whole activities that are going to be performed and the corresponding outcomes to be issued, until the final deliverables of the project. The inputs/outputs of each task, within a work package or a specific task, as well as the interfaces between all these tasks and activities, have to be described in this process description. The documents have to be identified in this process, and the connection between the activities to be performed and the related documents shall be provided.

Documents or information related to some points of this process are of major importance for the assessor. Here is a list of technical items that should be examined by the assessor:

- The Architecture definition;
- The Software components, with their functional interfaces (internal and external);
- The functions and sub-functions of the software;
- The Safety Requirements traceability;
- The consistency of applied technics and methods to the Quality Assurance Plan.

2.5 The Role and Responsibilities management

The Quality Assurance in openETCS has to demonstrate that all the persons involved in the project have the sufficient skills and competencies to fulfill their responsibilities. All these competencies have to be gathered and tracked whether in the QAP or in a separate quality related document that has to be identified in the QAP. According to the CENELEC EN50128, the 9 software development key roles to be identified are:

- the Requirements Manager,
- the Designer,
- the Implementer,
- the Tester,
- the Verifier,
- the Integrator,
- the Validator,
- the Project Manager and
- the Configuration Manager.

The information needed in Quality Assurance documentation is:

- Agile methods reflect the actual working flow inside each phase of the development process. Agile methods complying with the development lifecycle should deliver the artifacts ensuring the quality and the proof of compliance to the CENELEC for each of the phases. The roles involved in the agile project should be identified in a clear way describing how the roles inside the project comply with the roles identified in the CENELEC standard.
- The Actual Competencies Matrix of each committer in the project, linked to the work packages and the tasks they are involved in.
- The Needed Competencies Matrix for each task, document and project outcomes. Each people contribution as to be as detailed as possible (at least the contribution to a precise task or outcome).
- From the gap identified between actual competencies matrix and required competencies matrix, a Training plan has to be set up for all the commiters of the openETCS project. This plan will have to track all the identified needs, and then the solutions chosen in order to harmonize the competencies needed and the committer's skills (training session, re-organization, role split, task force re-enforcement, etc...).

2.6 Quality Log and Traceability

In the framework of assessment activities, all discrepancies related to Quality Assurance whatever the level considered, shall be gathered in the Quality Log being part of the deliverable 4.3. This log will be used by the Assessor as a list of possible or required improvements, to be used as a roadmap in order to get rid of all quality assurance concerns or discrepancies identified during the whole project life cycle. The Quality Log table shall encompass the following information:

- Number of the log row,
- Document/ Outcome concerned and precise discrepancy localization,
- Document/ Outcome version,
- Date,
- Discrepancy description by assessor, and comments (assessor, author or else),
- Action planned to fix (commonly defined by at least the document author and the assessor),
- Action Deadline and
- Status of the log (fixed, under investigation...)

2.7 Deliverable

One deliverable will be issued in the frame of this part of assessment activity: The Project Quality Assurance Assessment Report. This deliverable will present the results of the overall quality assessment for the project.

3 V&V Assessment

This chapter details what are the main features to be checked regarding the Verification and Validation (V&V) activities regarding the whole openETCS software development activities, from the very beginning of the project to the end of it. The Quality Criteria regarding V&V activities are defined in the document D2.2 appendix B4, and these criteria will be checked during the Internal Assessment review. The main points to be assessed are:

- V&V Plan,
- Verification & Validation activities for Primary Toolchain,
- Verification & Validation activities for Model,
- Verification & Validation activities for Code and
- Safety.

3.1 V&V Plan

The purpose of the V&V Plan is to define, describe and plan the verification and validation activities in the project openETCS. As the goals of the project include the selection, adaption and construction of methods and tools for a FLOSS development in addition to performing actual development steps, the V&V plan will deal separately with these two aspects. The Verification Plan for the model should describe the selection of verification strategies and techniques to be applied in openETCS for Testing the openETCS Semi-Formal Model (higher level architecture defined with SCADE System- SysML) and Formal Model (low level architecture and source code defined with SCADE Suite). The set of techniques, the definition of the process for test creation, test coverage and completeness, and roles in the testing team will be assessed in the same way as for the Quality Assurance Aspects. The Verification Plan for the tool is based on the CENELEC compliance for the qualified tools T1, T2 and T3. The Assessment will focus on quality assurance and traceability of the verification.

The Validation Plan aims to give a frame to Validation activities to be performed within the openETCS project. It aims at determining whether the developed tool fits the user needs, in particular with respect to safety and quality relatively to the environment it will be run in. The Validation plan shall describe the validation strategy for both primary and secondary toolchains and for the EVC Software [1] to be developed as well. The documentation shall be provided on techniques and tools used and on environment description. The assessment will focus on the coverage of artifacts to be covered within the openETCS project validation plan, and the consistency between the Validation outcomes description in the plan and the effective Validation activities performed in the Frame of openETCS project.

3.2 Verification and Testing Activities

The first aspect is related to the Verification activities. The Assessment for Verification will mainly concern the following points:

- Evidence
- Test Specifications. The Test Specifications will have to fulfill the CENELEC requirements regarding the tests objectives, the precise content of the test in terms of environment handling, data and expected results. Their consistency with the test policy will be checked and assessed.
- Test Reports. The test reports will have to report as precisely as possible the information related to the test performance. The test results are compared with the expected results defined during the test specification, failures have to be recorded, described and then investigated. The test environment such as Tester names and test conditions have to be clearly described as well.

The final reports on one iteration of the Verification and Testing activities have to be integrated in the Quality Assurance Verification report, in order to prove the consistency of the Verification activities with the CENELEC Standards. After the milestone of the iteration the results are picked up in the agile process.

3.3 Validation Activities

The second aspect is related to the Validation Activities. The Assessment for Validation will mainly concern the following points:

- The creation of a Validation Plan in order to define a frame for Validation activities (as described in previous paragraph);
- The creation of a Validation Report. This report should describe the toolchain, the model or the code tested by functional approach, provide the results of validation activities and provide the analysis and the identified discrepancies between expected and actual results. All discrepancies detected and/or treated shall be gathered in the Software Validation Report.

3.4 V&V log and traceability for Model

The V&V activities can be split in testing activities and verification activities. The testing activities aim at verifying the Model behavior and performances against the corresponding

[1] By EVC Software we mean the productive output to EVC, i.e. SCADE code generated by the SCADE Model + manual written code.

software specification, in order to achieve the objectives for the EVC Kernel Software Model. For each test, a Test Specification has to be issued and will have to fulfill the CENELEC requirements regarding the tests objectives, the precise content of the test in terms of environment handling, data and expected results. Their consistency with the test policy will be checked and assessed. At the end of the test, a test report is then created. The consistency between the Test specification and the Test Results is then gathered and analyzed in the V&V documents. The Assessment will not focus on the Verification activity itself (which is dealt with in the frame of Verification and Validation activities), but on the following assessment activities:

- The consistency between the tests to be performed, and the coverage of the functional requirements by these tests;
- The traceability between the tests and the requirements;
- The robustness of the methods employed and their compliance to the CENELEC Standards;
- The fulfillment of V&V results according to the expected results defined in the V&V plans.

3.5 V&V log and traceability for Code

V&V activities on code will have to take place, mainly in order to complete the coverage of the Model Verification and Validation activities. Indeed, requirements that are not covered at the sub-system level will have to be highlighted in the Code Verification activity, whatever their content. The assessment activity will focus on the coverage of:

- The method and process used to fill this log, and the accordance to the CENELEC EN50128;
- The tools supporting the process for V&V at Code level;
- The fulfillment of the V&V log, regarding all the information needed in order to track the issues raised during the V&V activities;
- The traceability aspect between the V&V documentation issued in the frame of V&V activities, and the V&V log.

3.6 Deliverable

One deliverable will be issued in the frame of this part of assessment activity: The V&V Assessment Report. This deliverable will present the results of the overall Verification and Validation assessment for the project.

4 Safety Activities Assessment

The Safety Activity is particularly relevant to be assessed, as a necessary condition to develop and supply a SIL4 EVC Software. The Safety Strategy defined within the WP4 activities for openETCS project assumes that the overall Safety activities in the openETCS project will be performed and will cover the full software development life-cycle. The overall Safety Activities shall be described in the openETCS Safety Plan.

4.1 Safety Evaluation Criteria

The Safety Evaluation Criteria that will be considered for the Internal Assessment are described in the Safety Criteria deliverable D2.2. These criteria will be checked during the V&V phases, but will also be reviewed in the Frame of Internal Assessment. The main criteria to be assessed are:

- The method and process for Safety Activities, from Safety Plan to the whole Safety Case, and their consistency with the CENELEC;
- The tools supporting the process and the method;
- The traceability between the software development process and the Safety related documents;
- The coverage of Safety requirements by V&V activities at different levels (System, sub-System, model, code) on Safety functions and components.

4.2 Safety Documentation Assessment

The main Safety related documents to be assessed are:

- The Preliminary Risk Assessment (this document initiates the Safety log).
- The System and Sub-System Safety Study. These points have to be clearly defined and connected according to the software design steps defined in the openETCS process. The following points are especially relevant for:
  - The transformation method from the Sub-System model (meta-model in MDD) to the Software model (COTS, branching, refinement and code generation algorithms and options);
  - The Software components refined from the sub-system model (components description and version, components traceability, SIL level, traceability for safety requirements traceability);
  - The compiling toolchain analysis (COTS, branching of the software, the compilation options and scripts for compile or integrate);
  - The Safety Requirements;
  - The software configuration management (version, date, developers, etc...);
  - The critical parameters, within the following :
    * Common parameters for whatever the train or the trackside to be considered,
    * Interlocking parameters,
    * Fault data and fall-back positions.
- The Code Safety Analysis activities:
  - The code metrics analysis,
  - The Function call graph Analysis,
  - The Safety Requirements traceability,
  - The SEEA (Software Errors and their Effects Analysis) for the whole code generated,
  - The CCR (Critical Code Review) for the Safety related functions.

- The Safety V&V activities:
  - The Verification activities on the transformation method from the system model to the sub-system model (bugs on process, side files needed, terminology consistency, proof on formalized properties);
  - The verification activities on the compilation toolchain (compilation bugs, side files generated, memories mapping, comparison of compiling options);
  - Test plan and test reports on the software components.
- The Safety log, filled during the whole project duration. The main information to be assessed is:
  - The coverage for all hazardous situation identified during the project;
  - The list of all Safety tickets or corrective actions performed in the frame of safety activities, and their status regarding the Safety property or issue related.
- The Global Safety requirements coverage. A document should gather all the Safety requirements identified since the very beginning of the project. All the concerns encountered during the very beginning of the Safety activities should be gathered too, and then linked to the solutions identified and applied, in order to get rid of the concern.

All these documents constitute the Global Safety Case, and are a relevant set of documentation to be evaluated by the assessor. The Global Safety Case is analyzed, with the verification that all risks identified in the Hazard log have been covered, and that external constraints (exported constraints) are precisely defined.

4.3 Deliverable

One deliverable will be issued in the frame of this part of assessment activity: The Safety Assessment Report. This deliverable will present the results of the overall Safety assessment for the project.

Document to be evaluated	Not examined	Quick Read	Read by Sampling	Attentive Read
Quality Assurance Plan				X
Quality Procedures (e.g review process)			X	
Quality logs documentation		X		
Software Risk Analysis			X	
Functional specification				X
Software Architecture and Safety properties (SSRS with Safety Properties)				X
Software Formal Model (System and Sub-System level)			X	
Source code	X			
Software Tests specification (Integration, installation and validation)			X	
Overall tests results			X	
Parameters Validation report			X	
Safety Case				X

Table 1. depth of assessment and control activity according to the CERTIFER standards

5 Assessment Method and Processes

5.1 Detail level for documentation evaluation

This table 1 gives an overview of the depth of assessment and control activity according to the CERTIFER standards (French Assessor)

5.2 Detailed tool assessment

According to the CENELEC there are 3 different classes of tools, leading to specific assessment for each tool class. According to the D2.2 document, the tool Assessment for the project toolchain will focus on different aspects according to the role and the category of each tool proposed for the project. The tool category definition is described in §2.3 of this document.

The Safety Criteria for tools are defined in the document D2.2 appendix A, and these criteria will be checked during the Internal Assessment reviews.

5.3 Intermediate Evaluation Assessment

The Internal Assessment activities is supposed to improve the openETCS project compliance with a standard need of Assessment for such a SIL4 Software. Therefore, different activities related to the assessment have to be performed during the on-going process of Software development. These actions can be performed in different ways:

- Intermediate Reports. These reports will be triggered at specific time/issue of the project, as described in §6.1. They will be based on a pre-defined set of documentation defined in accordance with documentation authors and coordinators, and gathered in a specific GitHub repository. Then, Assessor's remarks will be gathered as issues related to these specific audits. These issues will then be gathered in the Internal Assessment Backlog, document to be integrated as an appendix of final Assessment Report Evaluation.
- Audits. These Audits will be triggered if specific points are detected as critical during an intermediate Evaluation Assessment. These Audits will be described and documented in specific GitHub Repository. Audits description (object, reason, context, actions, validation by assessment) will be supported by the GitHub issue facility, and gathered in the Internal Assessment backlog.
- Meeting minutes. These meetings can be triggered by a specific need highlighted during an intermediate evaluation or an audit. The associated minutes would then be hosted in a specific GitHub Repository, and then gathered the Internal Assessment Backlog.

5.4 Assessment Report Evaluation

The Assessment Report is the global document gathering all the evaluations or audits that have been performed during the Internal Assessment of the project. This report will bring the proof that the software developed within openETCS project is compliant with the Safety objectives. The results presented in this report are:

- justifications on cross-acceptance verification activities;
- intermediate assessments synthesis;
- Quality and V&V audits conclusion (including the tracking of improvement axis and corrective actions);
- The list of software components evaluated (+configuration management results);
- Conclusions on Product Evaluation.

5.5 Agile Assessment

The agile approach is expected to be described inside the documents from the planning phase (this document is also part of the planning phase) and will be part of the development and the assessment.

The assessment itself is also performed in an agile way making use of the project ecosystem. Thus the different documents to be assessed as well as the findings will be tracked on the github story board [7].

The following **conventions** apply to the story board:

- Each **card** is represented by one github issue (issue).
- Each issue is assigned to a **user story** by a lable.

- The **columns** (Backlog, Ready, InProgress, Done) of each issue are represented by labels and the open/close state of the issue. A more detailed description is found below.
- The **deliverables** itself will be a snapshot of the repository at the milestone 6.
- The **duration of a sprint** is defined to be two weeks.
- During **planning poker** the story points are assigned to an issue.
- The **user stories** are documented inside the product backlog [9].
- The **agile workflow** is supported by features of the waffle.io workflow [6].

The following **roles** are defined within the agile assessment:

- **Product Owner**: Is described to be the leader of the task.
- **Scrum Team**: Is described to be the Assessment Team.
- **Scrum Master**: Is choosen and described for each milestone. The name can be found within the milesone description. The Scrum Master manages the team and moderates the grooming and review meetings.

The assingment of an issue to a column is identified through the issue's state and lable. The different lables describe the different state the issue is in. This state is enhanced by the state 'closed' and 'open' of the issue. In the following enumeration you can find columns of the assessment story board and its conditions in github.

- **Backlog**:
  - *Enter condition*: In this colum all the issues which do not fit to one of the 'Enter conditions' below are collected. Each newly entered issue will first appear in this column.
  - *State description*: The backlog carries a list of issues which are part of the user stories described in the **product backlog** and not part of the sprint backlog. They cannot be self assigned. The state of these cards can be changed by prioritisation of the product owner.
  - *Exit condition*: The prioritisation of the issue by the product owner is performed during a grooming session direcly grooming this issue into digestable tasks which ideally can be performed within one sprint.
- **Ready**:
  - *Enter condition*: If an issue is prioritised from the product backlog to enter the sprint backlog it is assigned the github label called 'ready'.
  - *State description*: Currently noone is working on this issue. In this colum all the issues which can be self-assigned by the assessment team are collected. This column represents the **sprint backlog**.

  - *Exit condition*: The self assignment by one member of the assessment team takes the issue to the next state 'InProgress'. The temporal down-prioritisation of the issue takes this issue back to the state 'Backlog'. The permanent down-priotitisation of this issue takes the issue off the story board by setting the issue to done and adding a comment for the issue to be canceled.

- **InProgress**:
  - *Enter condition*: Is an issue self-assignment by a member of the assessment team it gets forwarded to this column and is assigned a github label called 'in progress'.
  - *State description*: An assessment team member is working on this issue during the current **sprint**.
  - *Exit condition*: The completion of the task takes this issue to the state 'Done'. The temporal down-prioritisation of the issue takes this issue back to the state 'Backlog'. The permanent down-priotitisation of this issue takes the issue off the story board by setting the issue to done and adding a comment for the issue to be deffered.

- **Done**:
  - *Enter condition*: An issue that has been performed is put to the column done. The issue is closed on github and the story points asssigned are earned.
  - *State description*: The issue is closed. The results are picked up during the next **sprint review**.
  - *Exit condition*: In case the issue is re-opened it gets forwarded to the 'Backlog'. Additional actions taken to perform the task described within the issue add up to its story points.

6 Internal assessment activities planning

This part describes how the Internal Assessment will be performed all along the openETCS project. It will identify the main project outcomes and deadlines that will trigger Internal Assessment activities. The project is now following this agreed milestones:

- December 2013 1st assessment
- February 2014 1st assessment synchronization meeting Nürnberg
- Freeze on project development process assessment related inputs for the assessment: 30.09.2015
- Release of Internal Assessment Report part related to project development process assessment related as review: 16.10.2015
- Freeze on toolchain related inputs for the assessment: 17.10.2015
- Release of Internal Assessment Report part related to toolchain as review: 30.10.2015
- Freeze on documents for assessment: 15.11.2015
- Release of Internal Assessment Report as review: 4.12.2015

6.1 Internal Assessment committers

The assessment is realized with people part of the project, but not involved in the main outcomes related to the main topics/objects to be assessed.

- Frédérique Vallée (Head of All4tec)
- Norbert Schäfer (Head of AEbT)

6.2 Internal assessment formalism

The formalism and structure of each part of the Internal Assessment Plan is based on the LaTeX templates provided to the project as global template. The plan and structure of each of assessment report will be based on the same principle:

- Description of the processes, documents and outcomes to be assessed;
- Evaluation criteria for each item to be evaluated;
- Results of the evaluation on rough criteria (passed or not passed);
- List of concerns detected in the frame of evaluation, and recommendations to the project.

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[9] openETCS team. The openetcs product backlog @ONLINE, October 2015. https://github.com/openETCS/product-backlog/issues/.