

# openETCS Competence Matrix Record Template

The scale for the skill or knowledge level ranges from 0 (no competence) to 3 (advanced level of competence) and includes the years of experience in this competence. E.g. "(3,10)" representing an advanced level of competence with 10 years of experience in this field.

Personnel		Company					
Areas of expertise			Participant_1	Participant_2		Participant_n	
<b>Application of CENELEC Standards</b>							
EN 50126							
EN 50129							
EN 50128							
...							
<b>Application of TSI-CCS Standards</b>							
TSI-CCS							
Subset-026							
Subset-027							
Other Subsets of the TSI-CCS							
<b>Application of railway regulations</b>							
French national regulations							
German national regulations							
Netherlands national regulations							
Other European national regulations							
<b>Experience in Application Domain ERTMS/ETCS</b>							
Train Development							
Track Development							

Personnel	Company					
Areas of expertise		Participant_1	Participant_2		Participant_n	
Control and Signalling System Development						
Operations <b>Experience in Application Domain safety attributes of ERTMS/ETCS</b> <b>Hazard and risk analysis of safety-related railway systems</b> FTA						
FMEA						
FMECA						
HAZOP						
... <b>Requirements engineering</b> System requirement techniques						
Software requirement techniques						
Formal methods						
Structured methodology						
Requirements Modelling						
Tool: Doors						
Tool: ProR						
<b>Development of safety-related systems</b> System architecture techniques						
System design approach: V - Model Development						
System design approach: Agile Development						
System safety design principles						
Model based system design: SysML						

Personnel		Company				
Areas of expertise			Participant_1	Participant_2		Participant_n
Model based system design: Event-B						
Model based system design: Petri nets						
Model based system design: SCADE						
Model based system design: GSN (Goal Structure Notation)						
<b>Development of software for safety-related systems</b>						
Software Configuration Management						
Software architecture techniques						
Open Source Software Development principles						
Software design techniques: V-Model Software Development						
Software design techniques: Agile Software Development						
Software design techniques: Compiler						
Software design techniques: Data Converter						
Model based interface specification: XML						
Model based interface specification: XML						
Model based software design: UML						
Model based software design: SysML						
Model based software design: VDM						
Model based software design: z-, B-Method						
Model based software design: System C						
Model based software design: Java (Eclipse)						
Model based software design: SCADE						

Personnel		Company					
Areas of expertise			Participant_1	Participant_2		Participant_n	
Model based metamodel design: ECORE (EMF)							
Model based database design: ERD							
Model based software design: other formal methods							
Language ADA and coding standards							
Language C, C+ and coding standards							
Distributed revision control: GIT							
Tool: Papyrus							
<b>Testing, verification and validation of safety-related systems</b>							
ERTMS/ETCS Test Specifications							
Safety related system test execution techniques (verification & validation)							
Safety related system test evaluation techniques (verification & validation)							
Subset-076 testing							
Logic checking of requirements							
Method: Conformance analysis							
Method: Coverage analysis							
Safety related system test evaluation techniques (verification & validation)							
Software in the Loop test techniques							
Model based system test techniques							
Formal verification techniques							
Formal validation techniques							

Personnel		Company					
Areas of expertise			Participant_1	Participant_2		Participant_n	
<b>Testing, verification and validation of software for safety-critical systems</b>							
Functional Software verification and validation techniques							
Software performance verification and validation techniques							
Safety related software verification and validation techniques							
Model based software test techniques							
Interface testing							
Implementation testing							
<b>Assessment of safety-related railway systems and software</b>							
ERTMS/ETCS system context assessment							
Safety related system assessment techniques							
Safety related software assessment techniques							
Process assessment							
Tool assessment							
Acceptance/licence from recognised safety authority							