**Mapping Between ISO/IEC TR 29110-5-6-2:2014 Basic Profile**

**and ISO/IEC/IEEE 15288:2008**

**Project Management Process**

| **Ref.** | **ISO/IEC 29110** | **ISO/IEC/IEEE 15288** |
| --- | --- | --- |
| **PM.1** | **PM.1 Project Planning, (PM.O1, PM.O5, PM.O6, PM.O7)** |  |
| PM.1.1 | PM.1.1 Review the Statement of Work  | Define the project§6.3.1 |
| PM.1.2 | PM.1.2 Define with the Acquirer the Delivery Instructions of each one of the Deliverables specified in the Statement of Work. | Define the project§6.3.1 |
| PM.1.3 | PM.1.3 Define the System Breakdown Structure (SBS) that represents the relationship between the system and its system elements.Note: the system boundaries must be definedNote: this task is iterative as the SBS is based on the System Design Document (SDD). The SDD is at the beginning preliminary and all system elements hierarchy is not necessary defined completely. The SBS is updated while the SDD is progressively completed. | Define the project§6.3.1 |
| PM1.4 | PM.1.4 Select lifecycle and define milestones according to the Statement of Work | Establish the Process§6.2.1 |
| PM.1.5 | PM.1.5 Identify the specific *Tasks* to be performed in order to produce the *Deliverables* and their *System Elements* identified in the *Statement of Work.* Include *Tasks* in the SR process along with verification, validation and reviews with Acquirer/other stakeholders and Work Team *Tasks* to ensure the quality of work products. Identify the *Tasks* to perform the *Delivery Instructions.* Document the *Tasks.*This task is performed in parallel with the definition of the SEMP. | Plan the Project Resources§6.3.1Plan the Project Technical and Quality Management§6.3.1 |
| PM.1.6 | PM.1.6 Establish the *Estimated Duration* to perform each task. | Define the project§6.3.1 |
| PM.1.7 | PM.1.7 Identify and document the *Resources*: human, material, equipment and tools, standards, including the required training of the Work Team to perform the project. Include in the schedule the dates when *Resources* and training will be needed. | Plan the Project Resources§6.3.1 |
| PM.1.8 | PM.1.8 Establish the Composition of Work Team assigning roles and responsibilities according to the Resources. | Plan the Project Resources§6.3.1 |
| PM.1.9 | PM.1.9 Assign estimated start and completion dates to each one of the Tasks in order to create the Schedule of the Project Tasks taking into account the assigned Resources, sequence and dependency of the Tasks. Define milestones of the project (e.g. end of phases, payments, deliveries, …) | Plan the Project Resources§6.3.1 |
| PM.1.10 | PM.1.10 Calculate and document the project Estimated Effort and Cost. | Define the project§6.3.1 |
| PM.1.11 | PM.1.11 Identify and document a Risk Management Approach and the risks which may affect the project. | Plan Risk Management§6.3.4 |
| PM.1.12 | PM.1.12 Identify and document a Disposal Management Approach. | Plan Disposal§6.4.11 |
| PM.1.13 | PM.1.13 Document the *Configuration Management Strategy* in the *Project Plan.*Identify the Configuration itemsDefine the applicable configuration statusDefine the tasks and actors to manage the changes and the configuration. | Plan Configuration Management§6.3.5 |
| PM.1.14 | PM.1.14 Include System Description, Scope, Objectives, Deliverables, and reference to the SOW in the Project Plan. | Plan the Project Technical and Quality Management§6.3.1 |
| PM.1.15 | PM.1.15 Generate the Project Plan integrating the elements previously identified and documented. | Plan the Project Technical and Quality Management§6.3.1 |
| PM.1.16 | PM.1.16 Verify and obtain approval of the Project Plan.Verify that all Project Plan elements are viable and consistent. The results found are documented in a Verification Report and corrections are made until the document is approved by PJM. | Plan the Project Technical and Quality Management§6.3.1 |
| PM.1.17 | PM.1.17 Review and accept the Project Plan.Acquirer and other Stakeholders review and accept the Project Plan, making sure that the Project Plan elements match with the Statement of Work. | Plan the Project Technical and Quality Management§6.3.1 |
| PM.1.18 | PM.1.18 Establish the Project Repository using the Configuration Management Strategy. | Activate the Project§6.3.1 |
| PM.1.19 | PM1.19 Assign Tasks to the work team members related to their role, according to the current Project Plan. | Plan the Project Resources§6.3.1 |
| **PM.2** | **PM.2 Project Plan Execution (PM.O2, PM.O3, PM.O4, PM.O5, PM.O7)** |  |
| PM.2.1 | PM.2.1 Monitor the Project Plan execution and record actual data in Progress Status Record.  | Assess the Project§6.3.2 |
| PM 2.2 | PM 2.2 Analyze and evaluate the Change Request for cost, schedule and technical impact. The Change Request can be initiated externally by the Acquirer and other Stakeholders, or internally by the Work Team. Update the Project Plan, if the accepted change does not affect agreements with Acquirer and Stakeholders. Change Request, which affects those agreements, needs to be negotiated by both parties (see PM.2.4).  | Control the Project§6.3.2 |
| PM.2.3 | PM.2.3 Conduct revision meetings with the Work Team, identify problems, review risk status, record agreements and track them to closure.\* If an artefact has to be purchased, review and issue the Purchase Order (PO) developed in activity SR.3 to acquire the artefact. | Control the Project§6.3.2Analyze Risks§6.3.4Monitor Risks§6.3.4Prepare for the Acquisition§6.1.1 |
| PM.2.4 | PM.2.4 Conduct revision meetings with the Acquirer, Stakeholders, record agreements and track them to closure. Change Request initiated by Acquirer, and other Stakeholders, or initiated by Work Team, which affects the Acquirer, Stakeholders needs to be negotiated to reach acceptance of both parties.If necessary, update the Project Plan according to new agreement with Acquirer and other stakeholders. | Control the Project§6.3.2 |
| PM.2.5 | PM.2.5 Perform configuration managementAccording to the configuration management strategy, manage in configuration the different artefacts of the project.Generate Product as planned.Identify changes (e.g. architecture, requirements) and/or *Project Plan* to address major deviations, potential risks or problems concerning the accomplishment of the project.Initiate Change Requests on baselined artefacts and analyse impacts (technical cost, quality) before change approval by PJM.Track the changes to closure. | Perform Configuration Management§6.3.5 |
| PM.2.6 | PM.2.6 Manage Project RepositoryUpdate Project Repository at each new System Configuration.Perform backup and recovery testing according to the Configuration Management Strategy. | Control the Project§6.3.2 |
| PM.2.7 | PM.2.7 Perform *Project Repository* recovery using the *Project Repository Backup*, if necessary. | Control the Project§6.3.2 |
| **PM.3** | **PM.3 Project Assessment and Control (PM.O2)** |  |
| PM.3.1 | PM.3.1 Evaluate project progress with respect to the Project Plan, comparing:-actual Tasks against planned Tasks-actual results against established project Objectives-actual resource allocation against planned Resources-actual cost against budget estimates-actual time against planned schedule-actual risk against previously identified | Assess the Project§6.3.2Manage the Risk Profile§6.3.4 |
| PM.3.2 | PM.3.2 Establish and execute actions to treat deviations or problems and identified risks concerning the accomplishment of the plan, as needed, document them in Correction Register and track them to closure. | Control the Project§6.3.2Treat Risks§6.3.4 |
| PM.3.3 | PM.3.3 Elaborate or update the Justification Document of the ProjectRecord the reasons of needs.Record issues, hypothesis, and decisions of the projectKeep trace of meetings and decisions.Regroup or reference the Verification and Validation Reports in the Justification DocumentEstablish traceability between the rationale and the related Systems Engineering artifacts | Analyze the Decision Information§6.3.3 |
| **PM.4** | **PM.4 Project Closure (PM.O2, PM.O8)** |  |
| PM.4.1. | PM.4.1. Formalize the completion of the project according to the *Delivery Instructions* established in the *Project Plan,* providing acceptance support and getting the *Product Acceptance Record* signed. | Close the Project§6.3.2 |
| PM.4.2 | PM.4.2 Update Project Repository. | Close the Project§6.3.2 |
| PM.4.3 | PM.4.3 Execute the Disposal Management Approach | Finalize the Disposal§6.4.11 |

**System Definition and Realization Initiation Process**

| **Ref.** | **ISO/IEC 29110** | **ISO/IEC/IEEE 15288** |
| --- | --- | --- |
| **SR.1** | **SR.1 System Definition and Realization Initiation (SR.O1)** |  |
| SR.1.1 | SR.1.1 Revise the current Project Plan with the Work Team members in order to achieve a common understanding and get their engagement with the project.  | Activate the Project§6.3.1 |
| SR.1.2 | SR.1.2 SYS shall define in cooperation with the PJM the technical activities and generate the SEMP. | Plan the Project Technical and Quality Management§6.3.1 |
| SR.1.2 | SR.1.3 Define the data model of the projectDefine the entities to manage in the project (e.g. requirements, system element, IVV plan, IVV procedure, IVV results), their properties (e.g. maturity, version, target release) and their relation (e.g. satisfies, allocated to, verify, validate) | Establish the Process§6.2.1 |
| SR.1.3 | SR.1.4 Set or update the implementation environment. | Establish the Infrastructure§6.2.2 |
| **SR.2** | **SR.2 System Definition and Realization (SR.O2, SR.O6, SR.O7)** |  |
| SR.2.1 | SR.2.1 Elicit acquirer and other stakeholders requirements and analyse system context | Elicit Stakeholder Requirements§6.4.1 |
| Identify and consult information sources of requirements (Acquirer, users, stakeholders, previous systems, documents, etc.): Statement of Work, Concept documents, previous System description, etc.Analyse the context of use of the system with acquirer and other stakeholders:• Identify the stakeholders• Define the concepts of use of the system• Define scenarios, business processes | Elicit Stakeholder Requirements§6.4.1 |
| Analyse the context of use of the system with acquirer and other stakeholders:• Identify the stakeholders• Define the concepts of use of the system• Define scenarios, business processes | Elicit Stakeholder Requirements§6.4.1 |
| Generate or update the \* Concept of Operations that describes the way the system works from the operator’s perspective. | Elicit Stakeholder Requirements§6.4.1 |
| Identify and analyze requirements to - Determinate the scope and system boundary,- If applicable, identify the strengths and weaknesses of the previous system | Elicit Stakeholder Requirements§6.4.1 |
| - Ensure that the Stakeholder requirements are complete and consistent- Elicit missing Stakeholder requirementsResolve conflicting, duplicate and out-of-scope Stakeholder requirements | Elicit Stakeholder Requirements§6.4.1 |
| Generate or update the Stakeholders’ Requirements Specification. | Define Stakeholder Requirements§6.4.1 |
| SR.2.2 | SR.2.2 Verify the *Stakeholders Requirements Specifications* with PJMObtain Work Team agreement on the *Stakeholder Requirements Specifications* | Perform Verification§6.4.6 |
| SR.2.3 | SR.2.3 Validate the Stakeholders Requirements Specification with the Acquirer and other stakeholdersObtain Acquirer and Stakeholder agreement on the Stakeholder Requirements Specifications | Perform Validation§6.4.8 |
| SR.2.4 | SR.2.4 Elaborate System Requirements and the Interfaces | Define System Requirements§6.4.2 |
| Define the system boundary. | Define System Requirements§6.4.2 |
| Define interface requirements between the System and its environment.Note: Interface requirements are included in System Requirements Specification. Separate specification document can be established. | Define System Requirements§6.4.2 |
| Define System requirements, System design constraints and interface requirements with external entities/actors using the SMART criteria: Specific, Measurable, Accepted, Realistic and Traced. | Define System Requirements§6.4.2 |
| Define the external functions ensured by the system (black box). | Define System Requirements§6.4.2 |
| Define reuse constraints. | Define System Requirements§6.4.2 |
| Define the applicable requirements and constraints to the system | Define System Requirements§6.4.2 |
| Generate or update the System Requirements Specifications | Define System Requirements§6.4.2Analyze and Maintain System Requirements§6.4.2 |
| SR.2.5 | SR.2.5 Elaborate System Elements Requirements Specifications and the System interfacesNote: System Element requirements are generally elaborated in parallel with the System Logical and Physical Architectural Design Activity (see Activities SR.3.1 and SR.3.3) | Document and Maintain the Architecture§6.4.3 |
| Note: System elements requirements become needs and expectation in input of the system elements implementation. | Document and Maintain the Architecture§6.4.3 |
| Allocate System requirements to System elements in conformity with the functional and physical architecture and decompose requirements so that System element requirements are distinctively and clearly defined. Elaborate System element requirements derived from the System architectural design but that cannot be traced to a specific parent System requirement  | Document and Maintain the Architecture§6.4.3 |
| Refine as necessary external interface requirements and identify internal interface requirements between System Elements. | Document and Maintain the Architecture§6.4.3 |
| Generate or update a System Element Requirements Specification for each System Element defined in the System Design Document.Note: interface requirements are included in System Elements Requirements Specifications. Separate specification document can be established.Note: System elements requirements become needs and expectation in input of the system elements implementation. | Document and Maintain the Architecture§6.4.3 |
| SR.2.6 | SR.2.6 Verify and obtain work team (WT) agreement on the System and System Elements Requirements Specifications  | Perform Verification§6.4.6 |
| Ensure with WT that requirements are SMART. In particular• are precise, concise, non-ambiguous• are consistent (in the same specification, with input specifications)• are properly traced• can be implemented (DES)• can be verified and validated (IVV)• fall within cost and schedule constraints of the project | Perform Verification§6.4.6 |
| The results found are documented in a *Verification Report* and corrections are made until the document is approved by PJM. If documents are under configuration, identify and characterize the impact of the change and initiate if necessary (i.e. change approved) a *Change Request.* | Perform Verification§6.4.6 |
| SR.2.7 | SR.2.7 Validate that System *Requirements Specifications* satisfies *Stakeholders Requirements Specifications*.The results found are documented in a *Validation Report* and corrections are made until the document is approved by the SYS. | Perform Validation§6.4.8 |
| SR.2.8 | SR.2.8 Define or update traceability between RequirementsAccording to the data model defined in SR.1.2, at each level of decomposition of the system, define or update traceability between- System requirements, interface requirements and their parent stakeholder’s requirements- System elements requirements, interface requirements and their parent system requirements. | Define System Requirements§6.4.2Analyze and Evaluate the Architecture§6.4.3Document and Maintain the Architecture§6.4.3 |
| SR.2.9 | SR.2.9 Establish or update the *IVV plan* and *IVV Procedures* for the System verification and validation.Establish traceability between IVV Plan and the specified Requirements, between IVV Procedures and IVV PlanNote: Verification is the confirmation, through the provision of objective evidence, that specified requirements have been fulfilled. Methods of verification are: inspection, review, simulation, test.Note: Validation is the confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilledNote: The IVV plan can be a single document or a separate document | Plan Verification§6.4.6Plan Validation§6.4.8 |
| **SR3.** | **SR3. System Architectural Design (SR.O3, SR.O6, SR.O7)** |  |
| SR.3.1 | SR.3.1 Document or update the *Functional System Design.* | Define the Architecture§6.4.3 |
| Elaborate the functional architecture with the internal functions of the system and their relations (interfaces), by analysing:• The System Requirements• The external functions of the system (black box) | Define the Architecture§6.4.3 |
| Define the internal functions and interfaces. | Define the Architecture§6.4.3 |
| Identify the artifacts to reuse. Decide whether to make, buy or reuse. | Define the Architecture§6.4.3 |
| \* Elaborate the Purchase Order (PO) for the artefact to be purchased. | Advertise the Acquisition and Select the Supplier§6.1.1 |
| Define in parallel the System elements requirements and interface requirements. | Define the Architecture§6.4.3 |
| SR.3.2 | SR.3.2 Make trade-offs of the *System* Functional *Architecture* | Analyze and Evaluate the Architecture§6.4.3 |
| Make trade-offs among the different possible functional architectures relative to the requirements. Update the *Justification Document* and establish traceability with the requirements as defined in PM. | Analyze and Evaluate the Architecture§6.4.3 |
| Functional architecture can be done in a model based environment and generated as a document.Note: trade-offs is used here as a product name of a recording decision-making action within a *Justification Document* | Analyze and Evaluate the Architecture§6.4.3 |
| SR.3.3 | SR.3.3 Document or update the Physical System Design. | Define the Architecture§6.4.3 |
| Elaborate the physical architecture by:• analysing the System Requirements (e.g. non functional requirements allocated directly the System Elements)• analysing the Functional Architecture and allocating internal functions to System Elements• Identifying System Elements to reuse. | Define the Architecture§6.4.3 |
| Identify the artifacts to reuse. Decide whether to make, buy or reuse. | Define the Architecture§6.4.3 |
| \* Elaborate the Purchase Order for the artefact to be purchased. | Advertise the Acquisition and Select the Supplier§6.1.1 |
| Analyze the design as needed to demonstrate it can satisfy System Requirements (e.g. maintainability, reliability, security, safety integrity, usability, etc.) | Analyze and Evaluate the Architecture§6.4.3 |
| Elaborate the physical and functional interfaces (external and internal) between System Elements. Define in parallel the interface requirements. | Define the Architecture§6.4.3 |
| SR.3.4 | SY 3.4 Make trade-offs of the System Physical Architecture | Analyze and Evaluate the Architecture§6.4.3 |
| Make trade-offs among the different possible physical architectures relative to the requirements and the functional architecture. Update the *Justification Document* and establish traceability with the requirements. | Analyze and Evaluate the Architecture§6.4.3 |
| Physical architecture can be done in a model based environment and generated as a document | Analyze and Evaluate the Architecture§6.4.3 |
| Generate or update the Traceability Record.Note: trade-offs is used here as a product name of a recording decision-making action within a *Justification Document* | Analyze and Evaluate the Architecture§6.4.3 |
| SR.3.5 | SR.3.5 Verify and obtain approval of the System Design. | Perform Verification§6.4.6 |
| Verify correctness of System Design Document, its feasibility and consistency with their System Requirements Specification.Use the Requirements Traceability Matrix to verify the adequate satisfaction of System Requirements. The results found are documented in a Verification Report and corrections are made until the document is approved by DES.  | Perform Verification§6.4.6 |
| If System Design is under configuration management, identify and characterize the impact of the change and initiate if necessary (i.e. change approved) a Change Request. | Perform Configuration Management§6.3.5 |
| SR.3.6 | SR.3.6 Establish or update the Integration plan and Define or update the *IVV Plan and IVV Procedures* based in the System Design and the *System Elements Requirements Specifications*Establish traceability between IVV Plan and the specified Requirements, between IVV Procedures and IVV Plan. | Plan Integration§6.4.5Plan Verification§6.4.6Plan the Transition§6.4.7Plan Validation§6.4.8 |
| SR.3.7 | SR.3.7 Document the \*System User Manual or update the current one, if appropriate.Note: The System User Manual can be initiated in a preliminary version from the System Requirements Specification, Concept of Operation are available.\*(Optional) | Prepare for Operation§6.4.9 |
| SR.3.8 | SR.3.8 Verify and obtain approval of the \* *System User Manual,* if appropriateVerify consistency of the System *User Manual* with the System.Demonstrate the use of the System with its *User Manual.*The results found are documented in the *Verification Report* and corrections are made until the document is approved by ACQ and STK.\*(Optional) | Perform Verification§6.4.6Perform Validation§6.4.8 |
| **SR.4** | **SR.4 System Construction (SR.O4, SR.06, SR.07)** |  |
| SR.4.1 | SR.4.1 Construct or update Software System Elements.Software Construction is performed according to the ISO/IEC 29110-5-1-2. | Perform Implementation§6.4.4 |
| SR.4.2 | SR.4.2 Construct or update Hardware System Elements.Buy, build or re-use the Hardware System Elements identified in the *System Design Document* and in accordance with the *Project Plan* with regards to fabrication stages (i.e. prototyping, first article, pre-series, series production) In case of Hardware System Elements with software, integrate the Software System Elements into the Hardware System Elements | Perform Implementation§6.4.4 |
| SR.4.3 | SR.4.3 Verify that the *System Elements* satisfy their *System Elements Specifications*Perform in-coming acceptance verification of System Elements in accordance with:• the *Project Plan*• the *System Design Document*• the *System Elements Requirements Specifications*• the applicable *Verification Procedures*.Note: for Hardware System Elements that include software, this task includes the verification of the integration of the software into the hardware System Elements. | Perform Verification§6.4.6 |
| SR.4.4 | SR.4.4 Correct the defects found until successful verification (reaching exit criteria) is achieved. | Perform Configuration Management§6.3.5Perform Verification§6.4.6 |
| **SR.5** | **SR.5 System Integration, Verification and Validation (SR.O5, SR.O6, SR.O7)** |  |
| SR.5.1 | SR.5.1 Verify IVV plan and IVV Procedures.Verify consistency among System Requirements Specification, System Design and IVV plan and Verification Procedures. The results found are documented in a Verification Report. | Perform Verification§6.4.6 |
| SR.5.2 | SR.5.2 Integrate the System using System Elements (HW, HW+SW)Verify the interfaces according to IVV plan and Integration Procedures for integration testing.The results found are documented in the Integration Report. | Perform Integration§6.4.5 |
| SR.5.3 | SR.5.3 Verify the System against its RequirementsThe results found are documented in an Verification Report.Prepare the acceptance of the system. | Perform Verification§6.4.6 |
| SR.5.4 | SR.5.4 Validate the System against it’s Stakeholders RequirementsAccept the System by ACQ  | Perform Validation§6.4.8 |
| SR.5.5 | SR.5.5 Correct the defects found and retest to detect faults introduced by the modifications.  | Analyze and Maintain Stakeholder Requirements§6.4.1Analyze and Maintain System Requirements§6.4.2Document and Maintain the Architecture§6.4.3Perform Implementation§6.4.4 |
| SR.5.6 | SR.5.6 Document the \*System Operation Guide or update the current guide, if appropriate.\*(Optional) | Perform the Transition§6.4.7 |
| SR.5.7 | SR.5.7 Verify and obtain approval of the \*System Operation Guide, if appropriate Verify consistency of the System Operation Guide with the System. The results found are documented in a Verification Report. \*(Optional) | Perform Verification§6.4.6Perform the Transition§6.4.7Perform Validation§6.4.8 |
| **SR.6** | **SR.6 System Deployment (SR.O6, SR.O7)** |  |
| SR.6.1 | SR.6.1 Review Product  | Execute the Agreement§6.1.2 |
| SR.6.2 | SR.6.2 Document the System Maintenance Document or update the current one(s). | Execute the Agreement§6.1.2 |
| SR.6.3 | SR.6.3 Identify training needs and develop System User and Maintenance Training Curriculum and Material in accordance with the Project Plan.Note: The System Training Specification is an input to develop the System and Maintenance training enabling systems. | Execute the Agreement§6.1.2Perform the Transition§6.4.7 |
| SR.6.4 | SR.6.4 Verify and obtain approval of the System *Maintenance Document and System Training Specifications.*Verify consistency of System *Maintenance Document* with *System Requirements Specifications*.Verify consistency of System *Training Specification with System Requirements Specifications*.Validate the *System Training Specifications* and *System Maintenance Document* with the acquirer and the other stakeholdersThe results found are documented in a *Verification Report* and corrections are made until the document is approved by PJM and maintenance as a stakeholder (STK). | Execute the Agreement§6.1.2Perform the Transition§6.4.7Perform Maintenance§6.4.10 |
| SR.6.5 | SR.6.5 Perform delivery Support delivery of training to Acquirer and other Stakeholders including:- Training-the-trainer- Support to pilot training classesIn case of Hardware/Software upgrades, support transition from previous to new system, according to Project Plan including;- Legacy data conversion/transfer- System transition provisions such as interim/bridge System or System Elements- Replaced/obsolete hardware/software/data “sun setting”, archiving or disposal | Deliver and Support the Product or Service§6.1.2 |
| SR.6.6 | SR.6.6 Transition to Manufacturing and In-service/After-sales Support | Perform the Transition§6.4.7 |