



EULYNX Initiative



Europe's Rail Joint Undertaking

Generic interface and subsystem requirements for SMI

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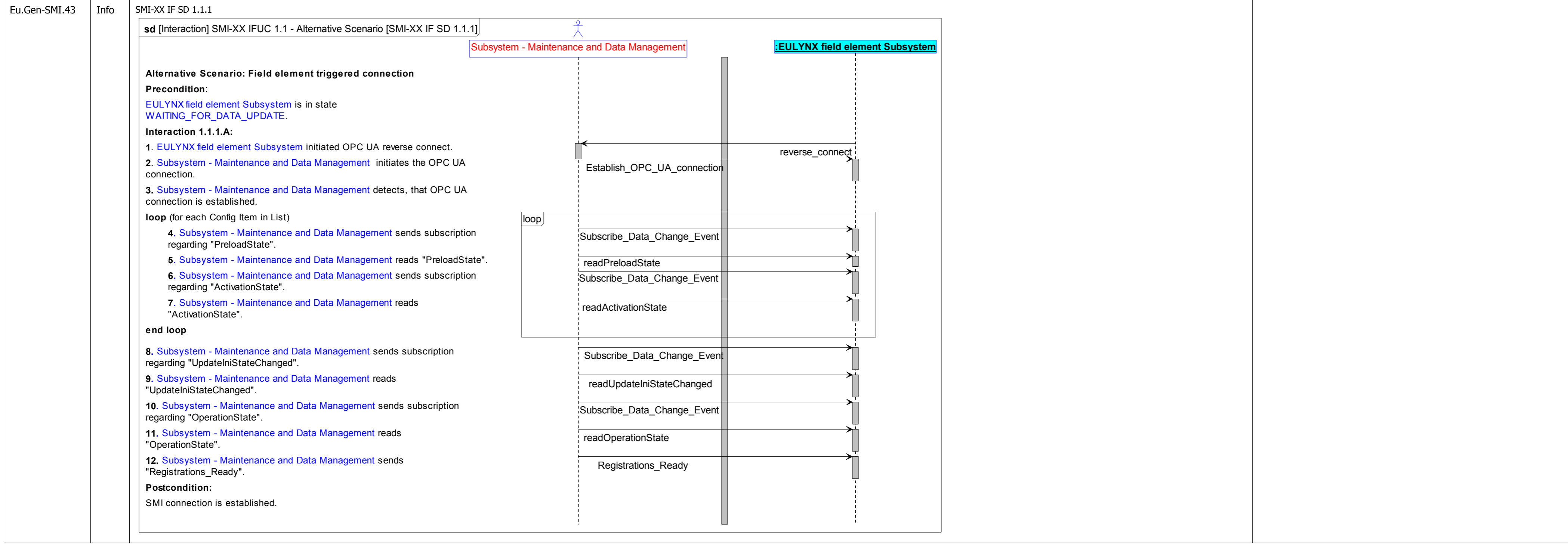
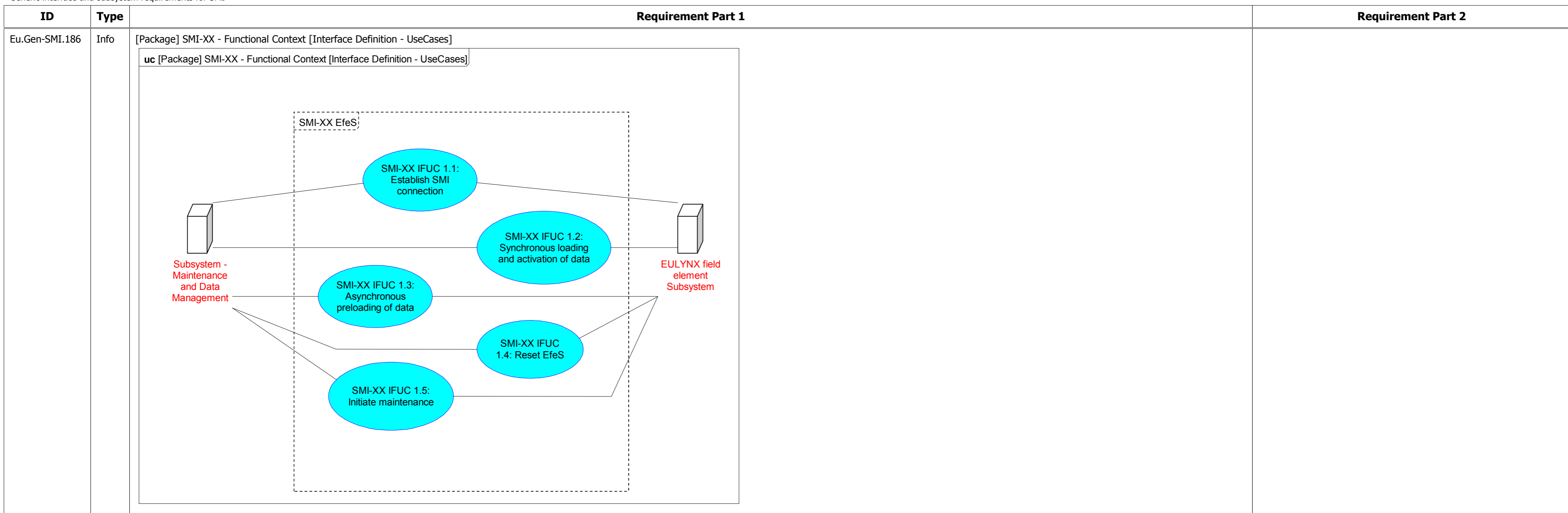
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ID	Type	Requirement Part 1	Requirement Part 2
Eu.Gen-SMI.1	Head	1 Introduction	
Eu.Gen-SMI.2	Head	1.1 Release information	
Eu.Gen-SMI.3	Info	[Eu.Doc.120] EULYNX Generic interface and subsystem requirements for SMI CENELEC Phase: 4 Version: 1.0 (3.A) Approval date: 15.06.2023	
Eu.Gen-SMI.4	Info	Version history	
Eu.Gen-SMI.176	Info	version number: 1.0 (0.A) date: 16.05.2022 author: Dennis Kunz, Filip Giering generic profile version: 18 review: CCB changes: EUAR-508, EUAR-510, EUAR-512, EUAR-520, EUAR-521, EUAR-523, EUAR-524, EUAR-527, EUAR-528, EUAR-532, EUAR-535	
Eu.Gen-SMI.185	Info	version number: 1.0 (1.A) date: 04.04.2023 author: Filip Giering generic profile version: 21 review: changes: EUAR-553, EUAR-564	
Eu.Gen-SMI.187	Info	version number: 1.0 (2.A) date: 11.05.2023 author: Filip Giering, Dominik Smajgl model version: 22 review: cluster changes: EUAR-589, EUAR-590	
Eu.Gen-SMI.189	Info	version number: 1.0 (3.A) date: 28.06.2023 author: Filip Giering model version: 22 review: TACS Mirror Group changes: EUAR-586, EUAR-594, EUAR-602, EUAR-606, EUAR-612, EUAR-613	
Eu.Gen-SMI.6	Head	1.2 Impressum	
Eu.Gen-SMI.7	Info	Publishers: Europe's Rail Joint Undertaking https://rail-research.europa.eu EULYNX Initiative A full list of the EULYNX Partners can be found on www.eulynx.eu/index.php/members	
Eu.Gen-SMI.8	Info	Responsible for this document: EU-Rail System Pillar Trackside Assets Control and Supervision domain	
Eu.Gen-SMI.9	Info	Copyright EULYNX Partners All information included or disclosed in this document is licensed under the European Union Public Licence EUPL, Version 1.2 or later.	
Eu.Gen-SMI.10	Head	1.3 Purpose	
Eu.Gen-SMI.11	Info	The purpose of the document is the specification of generic requirements for the development of the EULYNX System. The generic requirements complement the specific interface and subsystem requirements.	
Eu.Gen-SMI.12	Info	This document describes: <ul style="list-style-type: none"> generic functional requirements for the interface SMI-XX between an EULYNX field element Subsystem and Subsystem - Maintenance and Data Management 	
Eu.Gen-SMI.13	Info	This document is intended for the following users: <ul style="list-style-type: none"> safety authorities infrastructure managers safety assessors signalling system suppliers validators 	
Eu.Gen-SMI.14	Info	This document is the basis for the implementation by the supplier and for approval by the infrastructure manager.	
Eu.Gen-SMI.188	Info	This document is applicable for both the EU-Rail System Pillar target architecture and the EULYNX architecture. The document is delivered as a single specification fitting both the System Pillar documentation sets and the EULYNX documentation sets. EU-Rail System Pillar is the technical authority for this document.	
Eu.Gen-SMI.15	Head	1.4 Applicable standards and regulations	
Eu.Gen-SMI.16	Info	A list of applicable standards and regulations used in EULYNX is listed in the EULYNX Reference Document List [Eu.Doc.12].	
Eu.Gen-SMI.17	Head	1.5 Applicable documents	
Eu.Gen-SMI.18	Info	The current versions of documents used as input or related to this document are listed in the EULYNX Documentation Plan [Eu.Doc.11]. The relationships between the documents are displayed in the Appendix A1 Documentation plan and structure [Eu.Doc.11_A1].	
Eu.Gen-SMI.19	Head	1.6 Terms and abbreviations	
Eu.Gen-SMI.20	Info	The terms and abbreviations are listed in the EULYNX Glossary [Eu.Doc.9].	
Eu.Gen-SMI.21	Head	1.7 Variability management	

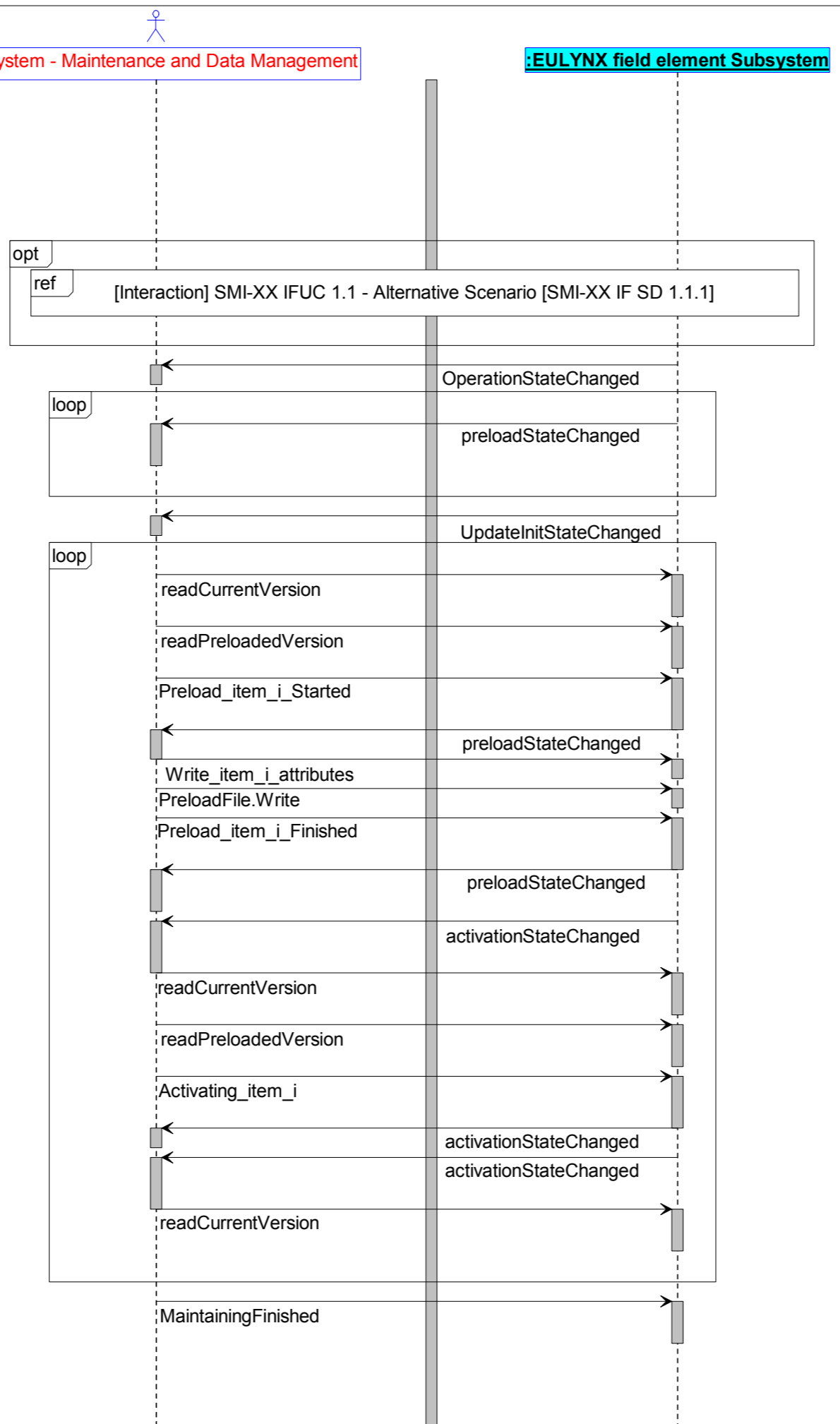
ID	Type	Requirement Part 1	Requirement Part 2
Eu.Gen-SMI.22	Info	This document describes harmonised requirements. Variability management is not applicable. The specific applicability of requirements is captured in individual interface specifications.	
Eu.Gen-SMI.23	Head	1.8 Definition of object types	
Eu.Gen-SMI.24	Info	The following definition for object types is applied in this document:	
Eu.Gen-SMI.25	Info	<ul style="list-style-type: none"> "Req" - This denotes a mandatory requirement. 	
Eu.Gen-SMI.26	Info	<ul style="list-style-type: none"> "Info" - This denotes additional information to help understand the specification. These objects do not specify any additional requirements. 	
Eu.Gen-SMI.27	Info	<ul style="list-style-type: none"> "Head" - This denotes chapter headings. 	
Eu.Gen-SMI.28	Head	1.9 Modelling	
Eu.Gen-SMI.29	Info	The section "Generic requirements for SMI" follows a model based systems engineering process using Systems Modelling Language (SysML) and defines the functional system requirements for the EULYNX field element Subsystem in stimulus-response form. Furthermore the information objects (stimuli and responses) exchanged over the interfaces of the EULYNX field element Subsystem, Subsystem - Electronic Interlocking and the adjacent systems are defined.	
Eu.Gen-SMI.30	Info	The diagrams presented in this document are modelled in SysML [SysML].	
Eu.Gen-SMI.31	Info	The rules for the interpretation of the model based parts of specification are defined in [Eu.Doc.29].	
Eu.Gen-SMI.32	Info	In chapter 3 "Generic requirements for SMI" the functional system requirements, defined in the form of a SysML model in the PTC Integrity Modeler are depicted as a surrogate of this model in the form of DOORS-objects.	
Eu.Gen-SMI.33	Info	A requirement thereby consists of the respective SysML model element, for instance a SysML diagram, and if necessary an additional extension of the requirement.	
Eu.Gen-SMI.34	Info	In the column "Requirement Part 1" the particular SysML model element is depicted and in the column "Requirement Part 2" the corresponding extension of the definition is given. The stated object type normally applies both to "Requirement Part 1" and to "Requirement Part 2".	
Eu.Gen-SMI.35	Info	There are requirements with type "Req" given, where the column "Requirement Part 2" or a part of it is provided with the heading "Information". In this case, the defined type only applies to the column "Requirement Part 1" and the part of "Requirement Part 2", which is not labelled as "Information".	
Eu.Gen-SMI.36	Head	2 Conditions of use	
Eu.Gen-SMI.37	Info	The specifications defined in this document shall follow the requirements of the EULYNX System Architecture Specification [Eu.Doc.16].	
Eu.Gen-SMI.175	Req	All references to Eu.Doc.20 refer to Generic interface and subsystem requirements version 4.0 (3.A).	
Eu.Gen-SMI.38	Head	3 Generic requirements for SMI	
Eu.Gen-SMI.162	Head	3.1 EULYNX field element Subsystems	
Eu.Gen-SMI.39	Head	3.1.1 Interface to Subsystem - Maintenance and Data Management (SMI-XX EfeS)	
Eu.Gen-SMI.153	Head	3.1.1.1 SMI-XX EfeS - Logical Viewpoint	
Eu.Gen-SMI.155	Head	3.1.1.1.1 SMI-XX EfeS - Logical Context	
Eu.Gen-SMI.156	Info	<p>[Package] SMI-XX EfeS - Logical Context [Logical Viewpoint - Interface Definition]</p>	
Eu.Gen-SMI.144	Head	3.1.1.2 SMI-XX EfeS - Information Flows	
Eu.Gen-SMI.145	Info	The InformationFlows between F_EST_EfeS and F_SMI_EfeS are specified in Eu.Doc.20.	
Eu.Gen-SMI.146	Info	Subsystem_MDM_M	Definition of the InformationFlow (by FlowSpecification) for the data for the interface SMI-XX to Subsystem - Maintenance and Data Management.
Eu.Gen-SMI.147	Info	Activating_item_i	Event from Subsystem - Maintenance and Data Management to EULYNX field element Subsystem indicating that the activation of the updateable item is triggered.
Eu.Gen-SMI.148	Info	Maintaining_finished	Event from Subsystem - Maintenance and Data Management to EULYNX field element Subsystem indicating that the maintaining is finished.
Eu.Gen-SMI.149	Info	Preload_item_i_finished	Event from Subsystem - Maintenance and Data Management to EULYNX field element Subsystem indicating that the preloading of the updateable item has been completed.
Eu.Gen-SMI.150	Info	Preload_item_i_started	Event from Subsystem - Maintenance and Data Management to EULYNX field element Subsystem indicating that the preloading of the updateable item has started.
Eu.Gen-SMI.152	Info	Update_process_aborted	Event from Subsystem - Maintenance and Data Management to EULYNX field element Subsystem indicating that the MDM has aborted the update process.

ID	Type	Requirement Part 1	Requirement Part 2
Eu.Gen-SMI.169	Info	MDM_Request_Reset	Event from Subsystem - Maintenance and Data Management to EULYNX field element Subsystem to perform a remote reset. The remote reset is only applied if the EfeS is in state FALLBACK_MODE.
Eu.Gen-SMI.170	Info	MDM_Safe_Maintenance	Event from Subsystem - Maintenance and Data Management to EULYNX field element Subsystem to perform maintenance. The data update will start if the the EfeS was safely released from railway operation before.
Eu.Gen-SMI.171	Info	Registrations_Ready	Event from Subsystem - Maintenance and Data Management to EULYNX field element Subsystem to inform the EfeS that the registration of OPC UA status variables has been finished.
Eu.Gen-SMI.173	Info	Start_Async_Preload	Event from Subsystem - Maintenance and Data Management to EULYNX field element Subsystem to start a transfer that can be performed in parallel to the safe railway operation of an EfeS. Note: This functionality is optional. National specifications shall indicate whether this functionality needs to be supported. In future phases of the System Pillar, national specifications will be replaced by harmonised specifications.
Eu.Gen-SMI.40	Head	3.1.1.3 SMI-XX EfeS - Functional Viewpoint	
Eu.Gen-SMI.163	Head	3.1.1.3.1 Definition of time values	
Eu.Gen-SMI.164	Req	Con_tmax_DataInstallation	After the termination of loading the Engineering Data and Configuration Data from Subsystem - Maintenance and Data Management, the installation of the data shall be completed on the particular EULYNX field element Subsystem within Con_tmax_DataInstallation. If the configured period for installation Con_tmax_DataInstallation is exceeded, a diagnostic telegram shall be sent by the EULYNX field element Subsystem. The default value for the configurable period Con_tmax_DataInstallation is 60 s.
Eu.Gen-SMI.165	Req	Con_tmax_DataTransmission	If the transmission of Engineering Data and Configuration Data from Subsystem - Maintenance and Data Management cannot be completed within Con_tmax_DataTransmission, the transmission of the configuration and engineering or new Device Software shall be restarted. The default value for the configurable period Con_tmax_DataTransmission is 300 s.
Eu.Gen-SMI.166	Req	Con_tmax_Response_MDM	If, on the interface SMI-XX the Subsystem - Maintenance and Data Management doesn't perform any action on the EULYNX field element Subsystem during Con_tmax_Response_MDM, an attempt shall be made to establish a connection between Subsystem - Electronic Interlocking and EULYNX field element Subsystem. The default value for the configurable period Con_tmax_Response_MDM is 10 s.
Eu.Gen-SMI.167	Req	Con_tmax_SMI_Connection	If the Subsystem - Maintenance and Data Management doesn't establish the connection on the interface SMI-XX to the EULYNX field element Subsystem within Con_tmax_SMI_Connection, an attempt shall be made to establish a connection between Subsystem - Electronic Interlocking and EULYNX field element Subsystem. The default value for the configurable period Con_tmax_SMI_Connection is 20 s.
Eu.Gen-SMI.41	Head	3.1.1.3.2 SMI-XX EfeS - Functional Context	



ID	Type	Requirement Part 1	Requirement Part 2
Eu.Gen-SMI.44	Info	<p>SMI-XX IF SD 1.1.2</p> <p>sd [Interaction] SMI-XX IFUC 1.1 - Alternative Scenario [SMI-XX IF SD 1.1.2]</p> <p>Alternative Scenario: MDM triggered connection</p> <p>Precondition:</p> <p>Interaction 1.1.2.A:</p> <ol style="list-style-type: none"> 1. Subsystem - Maintenance and Data Management initiated OPC UA connect. 2. Subsystem - Maintenance and Data Management detects, that OPC UA connection is established. <p>loop (for each Config Item in List)</p> <ol style="list-style-type: none"> 3. Subsystem - Maintenance and Data Management sends subscription regarding "PreloadState". 4. Subsystem - Maintenance and Data Management reads "PreloadState". 5. Subsystem - Maintenance and Data Management sends subscription regarding "ActivationState". 6. Subsystem - Maintenance and Data Management reads "ActivationState". <p>end loop</p> <ol style="list-style-type: none"> 7. Subsystem - Maintenance and Data Management sends subscription regarding "UpdateIniStateChanged". 8. Subsystem - Maintenance and Data Management reads "UpdateIniStateChanged". 9. Subsystem - Maintenance and Data Management sends subscription regarding "OperationState". 10. Subsystem - Maintenance and Data Management reads "OperationState". 11. Subsystem - Maintenance and Data Management sends "registrations_ready". <p>Postcondition: SMI connection is established.</p>	
Eu.Gen-SMI.45	Info	SMI-XX IFUC 1.2: Synchronous loading and activation of data	

ID	Type	Requirement Part 1	Requirement Part 2
Eu.Gen-SMI.46	Info	<p>SMI-XX IF SD 1.2.1</p> <p>sd [Interaction] SMI-XX IFUC 1.2 - Alternative Scenario [SMI-XX IF SD 1.2.1]</p> <p>Alternative Scenario: Synchronous loading and activation of data</p> <p>Precondition: EULYNX field element Subsystem is in state WAITING_FOR_DATA_UPDATE.</p> <p>Interaction 1.2.1.A:</p> <p>opt [SMI connection is not established]</p> <ol style="list-style-type: none"> The EULYNX field element Subsystem initiates the establishment of the SMI connection. <p>end opt</p> <ol style="list-style-type: none"> EULYNX field element Subsystem sends operation state "maintenance". <p>loop (for each Config Item in List)</p> <ol style="list-style-type: none"> EULYNX field element Subsystem sends preload state "ReadyForPreloading". <p>end loop</p> <ol style="list-style-type: none"> EULYNX field element Subsystem sends that initialisation is done. <p>loop (for each Config Item in List)</p> <ol style="list-style-type: none"> Subsystem - Maintenance and Data Management reads "CurrentVersion". Subsystem - Maintenance and Data Management reads "PreloadedVersion". Subsystem - Maintenance and Data Management sends information about start of item preload. EULYNX field element Subsystem sends preload state "Preloading". Subsystem - Maintenance and Data Management writes item attributes. Subsystem - Maintenance and Data Management writes preload file. Subsystem - Maintenance and Data Management informs about finished preload item. EULYNX field element Subsystem sends preload state "NotYetPreloadable". EULYNX field element Subsystem sends activation state "ReadyForActivation". Subsystem - Maintenance and Data Management reads "CurrentVersion". Subsystem - Maintenance and Data Management reads "PreloadedVersion". Subsystem - Maintenance and Data Management informs about activating item. EULYNX field element Subsystem sends activation state "Activating". EULYNX field element Subsystem sends activation state "NotYetActivatable". Subsystem - Maintenance and Data Management reads "CurrentVersion". <p>end loop</p> <ol style="list-style-type: none"> Subsystem - Maintenance and Data Management informs about "MaintainingFinished". <p>Postcondition: Data update complete SMI connection is established</p>	<p>„ Write_item_i_attributes” refers to several write actions for several attributes of item_i node in the OPC UA information model. The affected attributes are:</p> <ul style="list-style-type: none"> ·ConfigurationItemId ·IsSafetyRelevant ·ChecksumValue



ID	Type	Requirement Part 1	Requirement Part 2
Eu.Gen-SMI.47	Info	<p>SMI-XX IF SD 1.2.2</p> <p>sd [Interaction] SMI-XX IFUC 1.2 - Alternative Scenario [SMI-XX IF SD 1.2.2]</p> <p>Alternative Scenario: Synchronous preloading of data</p> <p>Precondition: EULYNX field element Subsystem is in state WAITING_FOR_DATA_UPDATE.</p> <p>Interaction 1.2.2.A:</p> <p>opt [SMI connection is not established]</p> <ol style="list-style-type: none"> The EULYNX field element Subsystem initiates the establishment of the SMI connection. <p>end opt</p> <ol style="list-style-type: none"> EULYNX field element Subsystem sends operation state "maintenance". <p>loop (for each Config Item in List)</p> <ol style="list-style-type: none"> EULYNX field element Subsystem sends preload state "ReadyForPreloading". <p>end loop</p> <ol style="list-style-type: none"> EULYNX field element Subsystem sends that initialisation is done. <p>loop (for each Config Item in List)</p> <ol style="list-style-type: none"> Subsystem - Maintenance and Data Management reads "CurrentVersion". Subsystem - Maintenance and Data Management reads "PreloadedVersion". Subsystem - Maintenance and Data Management sends information about start of item preload. EULYNX field element Subsystem sends preload state "Preloading". Subsystem - Maintenance and Data Management writes item attributes. Subsystem - Maintenance and Data Management writes preload file. Subsystem - Maintenance and Data Management informs about finished preload item. EULYNX field element Subsystem sends preload state "NotYetPreloadable". EULYNX field element Subsystem sends activation state "ReadyForActivation". <p>end loop</p> <ol style="list-style-type: none"> Subsystem - Maintenance and Data Management informs about "MaintainingFinished". <p>Postcondition: Data update process complete SMI connection is established</p>	<p>„ Write_item_i_attributes“ refers to several write actions for several attributes of item_i node in the OPC UA information model. The affected attributes are:</p> <ul style="list-style-type: none"> ·ConfigurationItemId ·IsSafetyRelevant ·ChecksumValue

ID	Type	Requirement Part 1	Requirement Part 2
Eu.Gen-SMI.48	Info	<p>SMI-XX IF SD 1.2.3</p> <p>sd [Interaction] SMI-XX IFUC 1.2 - Alternative Scenario [SMI-XX IF SD 1.2.3]</p> <p>Alternative Scenario: Synchronous activation of data</p> <p>Precondition: EULYNX field element Subsystem is in state WAITING_FOR_DATA_UPDATE.</p> <p>Interaction 1.2.3.A:</p> <p>opt [SMI connection is not established]</p> <ol style="list-style-type: none"> The EULYNX field element Subsystem initiates the establishment of the SMI connection. <p>end opt</p> <ol style="list-style-type: none"> EULYNX field element Subsystem sends operation state "maintenance". <p>loop (for each Config Item in List)</p> <ol style="list-style-type: none"> EULYNX field element Subsystem sends preload state "NotYetPreloadable". EULYNX field element Subsystem sends activation state "ReadyForActivation". <p>end loop</p> <ol style="list-style-type: none"> EULYNX field element Subsystem sends that initialisation is done. <p>loop (for each Config Item in List)</p> <ol style="list-style-type: none"> Subsystem - Maintenance and Data Management reads "PreloadedVersion". Subsystem - Maintenance and Data Management informs about activating item. EULYNX field element Subsystem sends activation state "Activating". EULYNX field element Subsystem sends activation state "NotYetActivatable". Subsystem - Maintenance and Data Management reads "CurrentVersion". <p>end loop</p> <ol style="list-style-type: none"> Subsystem - Maintenance and Data Management informs about "MaintainingFinished". <p>Postcondition: Data update process complete SMI connection is established</p>	
Eu.Gen-SMI.49	Info	SMI-XX IFUC 1.3: Asynchronous preloading of data	

ID	Type	Requirement Part 1	Requirement Part 2
Eu.Gen-SMI.50	Info	<p>SMI-XX IF SD 1.3.1</p> <p>sd [Interaction] SMI-XX IFUC 1.3 - Alternative Scenario [SMI-XX IF SD 1.3.1]</p> <p>Alternative Scenario: Asynchronous preloading of data</p> <p>Precondition: SMI connection is established</p> <p>Interaction 1.3.1.A:</p> <ol style="list-style-type: none"> 1. Subsystem - Maintenance and Data Management starts asynchronous preload. 2. EULYNX field element Subsystem sends preload state "ReadyForPreloading". <p>end loop</p> <ol style="list-style-type: none"> 3. EULYNX field element Subsystem sends that initialisation is done. <p>loop (for each Config Item in List)</p> <ol style="list-style-type: none"> 4. Subsystem - Maintenance and Data Management reads "CurrentVersion". 5. Subsystem - Maintenance and Data Management reads "PreloadedVersion". 6. Subsystem - Maintenance and Data Management sends information about start of item preload. 7. EULYNX field element Subsystem sends preload state "Preloading". 8. Subsystem - Maintenance and Data Management writes item attributes. 9. Subsystem - Maintenance and Data Management writes preload file. 10. Subsystem - Maintenance and Data Management informs about finished preload item. 11. EULYNX field element Subsystem sends preload state "NotYetPreloadable". 12. EULYNX field element Subsystem sends activation state "ReadyForActivation". <p>end loop</p> <ol style="list-style-type: none"> 12. Subsystem - Maintenance and Data Management informs about "MaintainingFinished". <p>Postcondition: Data preloaded.</p>	<p>" Write_item_i_attributes" refers to several write actions for several attributes of item_i node in the OPC UA information model. The affected attributes are:</p> <ul style="list-style-type: none"> ·ConfigurationItemId ·IsSafetyRelevant ·ChecksumValue <p>Note: This functionality is optional. National specifications shall indicate whether this functionality needs to be supported. In future phases of the System Pillar, national specifications will be replaced by harmonised specifications.</p>
Eu.Gen-SMI.177	Info	<p>SMI-XX IFUC 1.4: Reset EfeS</p>	
Eu.Gen-SMI.178	Info	<p>SMI-XX IF SD 1.4.1</p> <p>sd [Interaction] SMI-XX IFUC 1.4 - Main Success Scenario [SMI-XX IF SD 1.4.1]</p> <p>Main Success Scenario: Requested reset by MDM</p> <p>Precondition: SMI connection is established. The EULYNX field element Subsystem is in the state FALLBACK_MODE.</p> <p>Interaction 1.4.1.A:</p> <ol style="list-style-type: none"> 1. Subsystem - Maintenance and Data Management requests a reset. <p>Postcondition: The EULYNX field element Subsystem is in the state BOOTING.</p>	<p>This reset is only possible if the device is having a working SMI connection while in the state FALLBACK_MODE.</p>
Eu.Gen-SMI.179	Info	<p>SMI-XX IFUC 1.5: Initiate maintenance</p>	

ID	Type	Requirement Part 1	Requirement Part 2
Eu.Gen-SMI.180	Info	<p>SMI-XX IF SD 1.5.1</p> <p>sd [Interaction] SMI-XX IFUC 1.5 - Main Success Scenario [SMI-XX IF SD 1.5.1]</p> <p>Main Success Scenario: Set EfeS to maintenance</p> <p>Precondition: SMI connection is established. The EULYNX field element Subsystem is in the state <code>WAITING_FOR_PDI_OR_MAINTENANCE</code>.</p> <p>Interaction 1.5.1.A:</p> <ol style="list-style-type: none"> Subsystem - Maintenance and Data Management sets EULYNX field element Subsystem to safe maintenance. <p>Postcondition: The EULYNX field element Subsystem is in the state <code>WAITING_FOR_DATA_UPDATE</code>.</p>	
Eu.Gen-SMI.51	Head	3.1.1.3.3 SMI-XX EfeS - Functional Entities	
Eu.Gen-SMI.52	Info	F_SMI_EfeS	
Eu.Gen-SMI.53	Info	<p>[Block] F_SMI_EfeS [Functional Viewpoint - Interface Requirements - Functional Entity]</p> <p>ibd [Block] F_SMI_EfeS [Functional Viewpoint - Interface Requirements - Functional Entity]</p>	
Eu.Gen-SMI.54	Info	Update_performed := FALSE;	cOp1_init
Eu.Gen-SMI.131	Info	T1in_Maintaining_finished	The port T1in_Maintaining_finished refines the FlowProperty Maintaining_finished.
Eu.Gen-SMI.133	Info	T2in_Preload_item_i_started	The port T2in_Preload_item_i_started refines the FlowProperty Preload_item_i_started.
Eu.Gen-SMI.138	Info	T3in_Preload_item_i_finished	The port T3in_Preload_item_i_finished refines the FlowProperty Preload_item_i_finished.
Eu.Gen-SMI.139	Info	T4in_Activating_item_i	The port T4in_Activating_item_i refines the FlowProperty Activating_item_i.

ID	Type	Requirement Part 1	Requirement Part 2
Eu.Gen-SMI.140	Info	T5in_Data_installation_item_i_finished	The port T5in_Data_installation_item_i_finished signals that the installation of an item i on EfeS has been successfully done.
Eu.Gen-SMI.141	Info	T6in_Update_process_aborted	The port T6in_Update_process_aborted refines the FlowProperty Update_process_aborted.
Eu.Gen-SMI.130	Info	T19in_Start_async_preload	The port T19in_Start_async_preload refines the FlowProperty Start_Async_Preload.
Eu.Gen-SMI.132	Info	T23in_SMI_Connection_closed	The port T23in_SMI_Connection_closed represents the event of the closed SMI connection.
Eu.Gen-SMI.134	Info	T30in_MDM_Request_Reset	The port T30in_MDM_Request_Reset refines the FlowProperty MDM_Request_Reset.
Eu.Gen-SMI.135	Info	T32in_Registrations_Ready	The port T32in_Registrations_Ready refines the FlowProperty Registrations_Ready.
Eu.Gen-SMI.137	Info	T36in_MDM_Safe_Maintenance	The port T36in_MDM_Safe_Maintenance refines the FlowProperty MDM_Safe_Maintenance.
Eu.Gen-SMI.57	Info	D25in_Con_tmax_DataTransmission	The port D25in_Con_tmax_DataTransmission refines the time value Con_tmax_DataTransmission.
Eu.Gen-SMI.58	Info	D26in_Con_tmax_DataInstallation	The port D26in_Con_tmax_DataInstallation refines the time value Con_tmax_DataInstallation.
Eu.Gen-SMI.59	Info	D28in_Direct_Reboot_necessary	The port D28in_Direct_Reboot_necessary signals that the installation of an item i on EfeS requires a reboot of the EfeS.
Eu.Gen-SMI.60	Info	D2in_Con_tmax_Response_MDM	The port D2in_Con_tmax_Response_MDM refines the time value Con_tmax_Response_MDM.
Eu.Gen-SMI.62	Info	D3in_Con_tmax_SMI_Connection	The port D3in_Con_tmax_SMI_Connection refines the time value Con_tmax_SMI_Connection.
Eu.Gen-SMI.56	Info	D22in_item_I_activation_readiness	The port D22in_item_I_activation_readiness signals that an activation of an item i on EfeS is possible.
Eu.Gen-SMI.142	Info	T8out_Preload_State	The port T8out_Preload_State represents the preload state change.
Eu.Gen-SMI.143	Info	T9out_Activation_State	The port T9out_Activation_State represents the activation state change.
Eu.Gen-SMI.128	Info	T10out_Operation_State	The port T10out_Operation_State represents the operation state change.
Eu.Gen-SMI.129	Info	T17out_Start_SMI_Connection	The port T17out_Start_SMI_Connection represents event of the start of the SMI connection.
Eu.Gen-SMI.136	Info	T33out_Initialisation_done	The port T33out_Initialisation_done represents the event that initialisation is done.
Eu.Gen-SMI.63	Info	D8out_State	The port D8out_State represents the preload state.
Eu.Gen-SMI.64	Info	D9out_State	The port D9out_State represents the activation state.
Eu.Gen-SMI.55	Info	D10out_State	The port D10out_State represents the operation state.
Eu.Gen-SMI.168	Info	d52in_EST_EfeS_init_SubState	
Eu.Gen-SMI.127	Info	p3inout	
Eu.Gen-SMI.65	Info	F_SMI_EfeS - Behaviour	

ID	Type	Requirement Part 1	Requirement Part 2
Eu.Gen-SMI.122	Req	/{SMI_CONNECTION_ESTABLISHED - ESTABLISH_SMI_CONNECTION}	
Eu.Gen-SMI.123	Req	EST_Ready_For_Maintenance/T10out_Operation_State := TRUE; D10out_State := "Maintenance";{SMI_CONNECTION_ESTABLISHED - DATA_UPDATE}	
Eu.Gen-SMI.124	Info	when(T19in_Start_async_preload)/{SMI_CONNECTION_ESTABLISHED - DATA_UPDATE}	Note: This functionality is optional. National specifications shall indicate whether this functionality needs to be supported. In future phases of the System Pillar, national specifications will be replaced by harmonised specifications.
Eu.Gen-SMI.125	Req	when(T23in_SMI_Connection_closed)/{SMI_CONNECTION_ESTABLISHED - NO_SMI_CONNECTION}	
Eu.Gen-SMI.126	Req	when(T36in_MDM_Safe_Maintenance)/ send MDM_Commanded_Maintenance to p3inout;{SMI_CONNECTION_ESTABLISHED - SMI_CONNECTION_ESTABLISHED}	
Eu.Gen-SMI.160	Req	when(T30in_MDM_Request_Reset)/ send MDM_Triggered_Reset to p3inout;{State-internal in SMI_CONNECTION_ESTABLISHED}	
Eu.Gen-SMI.108	Info	ESTABLISH_SMI_CONNECTION	
Eu.Gen-SMI.109	Req	after(D3in_Con_tmax_SMI_Connection)/ send Data_Update_Finished to p3inout;{ESTABLISH_SMI_CONNECTION - NO_SMI_CONNECTION}	
Eu.Gen-SMI.110	Req	when(T32in_Registrations_Ready)/ T10out_Operation_State := TRUE; D10out_State := "Maintenance";{ESTABLISH_SMI_CONNECTION - DATA_UPDATE}	
Eu.Gen-SMI.159	Req	entry/T17out_Start_SMI_Connection := TRUE;{State-internal in ESTABLISH_SMI_CONNECTION}	
Eu.Gen-SMI.66	Info	DATA_UPDATE	
Eu.Gen-SMI.67	Req	/send Data_Update_Finished to p3inout;{DATA_UPDATE - SMI_CONNECTION_ESTABLISHED}	
Eu.Gen-SMI.68	Req	Data_Update_Stop/ send Data_Update_Finished to p3inout;{DATA_UPDATE - SMI_CONNECTION_ESTABLISHED}	
Eu.Gen-SMI.70	Info	Initial1	
Eu.Gen-SMI.71	Req	/{Initial1 - INITIALIZATION}	
Eu.Gen-SMI.72	Info	INITIALIZATION	
Eu.Gen-SMI.73	Req	/T33out_Initialisation_done := TRUE;{INITIALIZATION - MDM_INTERACTION_FOR_ITEM_i}	
Eu.Gen-SMI.157	Req	entry/For all i: T8out_Preload_State := TRUE; D8out_State := "ReadyForPreload"; if (D22in_item_i_activation_readiness = TRUE) T9out_Activation_State := TRUE; D9out_State := "readyForActivation"; else T9out_Activation_State := TRUE; D9out_State := "NotYetActivatable";{State-internal in INITIALIZATION}	
Eu.Gen-SMI.74	Info	MDM_INTERACTION_FOR_ITEM_i	
Eu.Gen-SMI.75	Req	after(D2in_Con_tmax_Response_MDM)/{MDM_INTERACTION_FOR_ITEM_i - Final0}	
Eu.Gen-SMI.76	Req	entry/For all i;{State-internal in MDM_INTERACTION_FOR_ITEM_i}	
Eu.Gen-SMI.77	Req	when(T1in_Maintaining_finished;)[Update_performed]/ T14_Data_installation_item_i := TRUE;{MDM_INTERACTION_FOR_ITEM_i - Final0}	
Eu.Gen-SMI.79	Req	when(T1in_Maintaining_finished;)/{MDM_INTERACTION_FOR_ITEM_i - Final0}	
Eu.Gen-SMI.80	Req	when(T2in_Preload_item_i_started)/{MDM_INTERACTION_FOR_ITEM_i - PRELOADING}	
Eu.Gen-SMI.81	Req	when(T4in_Activating_item_i [d52in_EST_EfeS_init_SubState = "WAITING_FOR_DATA_UPDATE"])/{MDM_INTERACTION_FOR_ITEM_i - ACTIVATING}	
Eu.Gen-SMI.69	Info	Final0	
Eu.Gen-SMI.82	Info	UPDATE_ITEM_i	
Eu.Gen-SMI.83	Req	/{UPDATE_ITEM_i - MDM_INTERACTION_FOR_ITEM_i}	
Eu.Gen-SMI.84	Info	ACTIVATING	
Eu.Gen-SMI.85	Req	after(D26in_Con_tmax_DataInstallation)/ T9out_Activation_State := TRUE; D9out_State := "ActivationAborted";{ACTIVATING - Final1}	
Eu.Gen-SMI.86	Req	entry/Item_i.T9out_Activation_State := TRUE; D9out_State := "Activating";{State-internal in ACTIVATING}	
Eu.Gen-SMI.87	Req	when(D28in_Direct_Reboot_necessary := TRUE;)/ send Reboot_Required to p3inout;{ACTIVATING - SMI_CONNECTION_ESTABLISHED}	
Eu.Gen-SMI.88	Req	when(T5in_Data_installation_item_i_finished [D28in_Direct_Reboot_necessary = FALSE]/ D9out_State := "NotYetActivatable";{ACTIVATING - Final1}	
Eu.Gen-SMI.89	Req	when(T6in_Update_process_aborted)/ T9out_Activation_State := TRUE; D9out_State := "ActivationAborted";{ACTIVATING - Final1}	
Eu.Gen-SMI.94	Info	PRELOADING	
Eu.Gen-SMI.95	Req	after(D25in_Con_tmax_DataTransmission)/ Item_i.T8out_Preload_State := TRUE; D8out_State := "PreloadingAborted";{PRELOADING - Final1}	

ID	Type	Requirement Part 1	Requirement Part 2
Eu.Gen-SMI.96	Req	entry/Item_i.T8out_Preload_State := TRUE; D8out_State := "Preloading";{State-internal in PRELOADING}	
Eu.Gen-SMI.98	Req	when(T3in_Preload_item_i_finished)/ Item_i.T8out_Preload_State := TRUE; D8out_State := "NotYetPreloadable"; Item_i.T9out_Activation_State := TRUE; D9out_State := "ReadyForActivation";{PRELOADING - Final1}	
Eu.Gen-SMI.99	Req	when(T6in_Update_process_aborted)/ Item_i.T8out_Preload_State := TRUE; D8out_State := "PreloadingAborted";{PRELOADING - Final1}	
Eu.Gen-SMI.91	Info	Final1	
Eu.Gen-SMI.181	Head	3.1.1.3.3.1 Additional requirements for the behaviour	
Eu.Gen-SMI.182	Req	After the preloading the data the EfeS shall validate the given checksum against calculated checksum of the transferred data.	
Eu.Gen-SMI.183	Req	If the checksum validation fails, then the configuration item cannot be activated.	
Eu.Gen-SMI.184	Req	Using the checksum mechanism for the transferred data is mandatory for transferring firmware and optional for configuration data.	