KOSMOS DAY

MODELING KOSMOS COMPONENTS USING MBSE APPROACH

KOSMOS-STUDIO

September, 2026



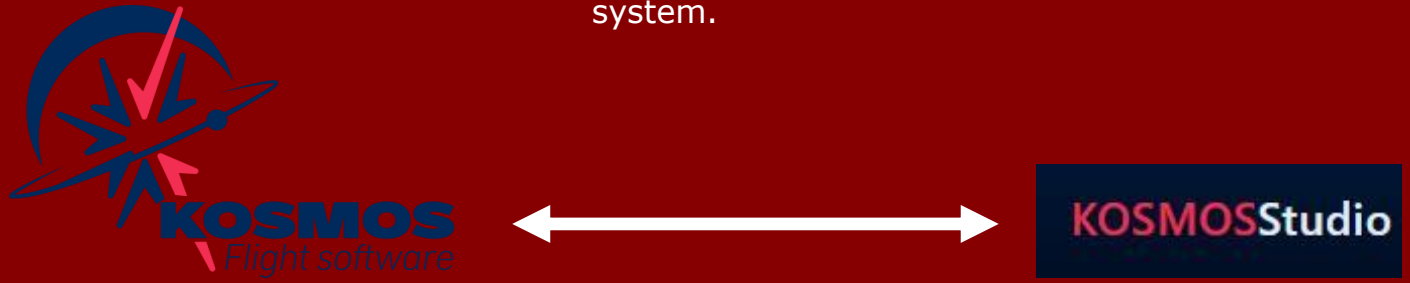


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Objectives

The aim is to link systems engineering (SE) and software development, simplifying and accelerating the process of implementation of KOSMOS in a system.

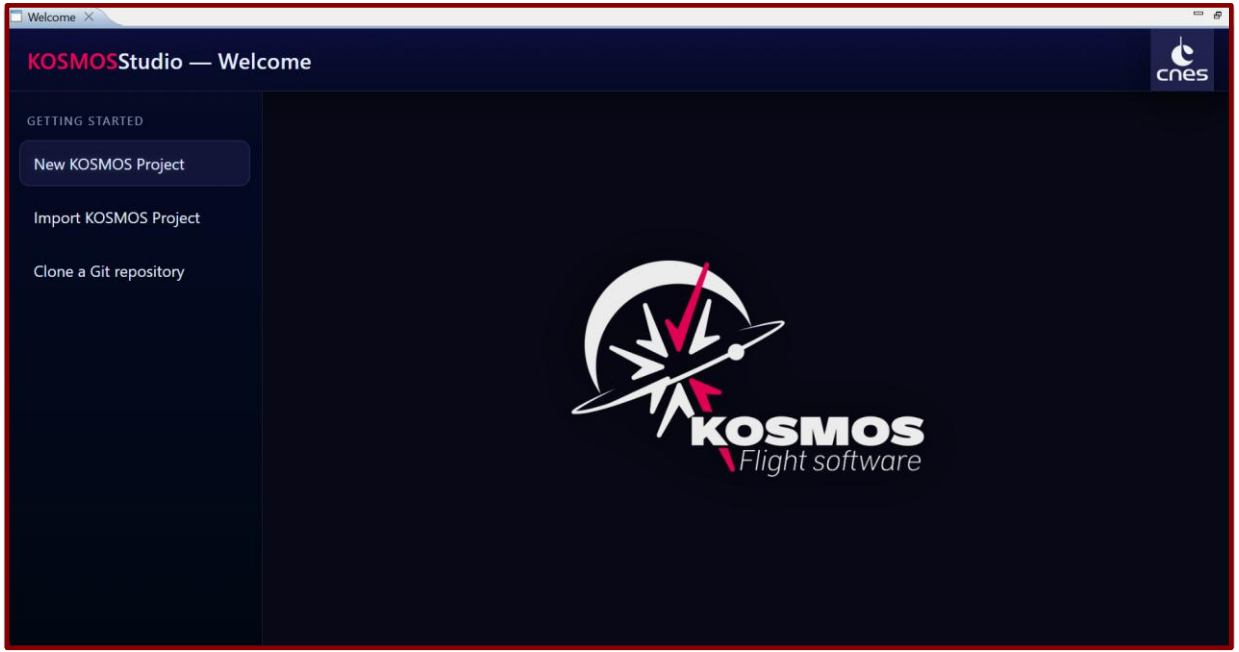


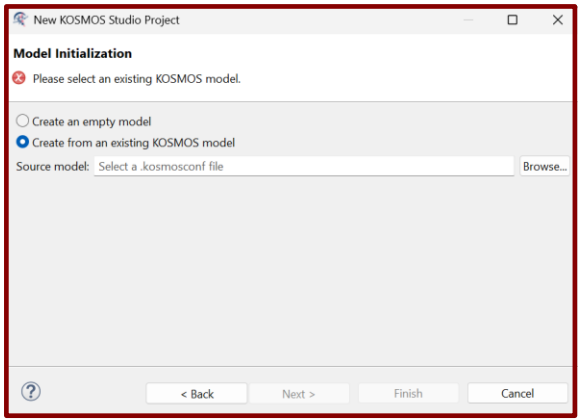
By exploring the capabilities offered by MBSE tools, it offers help to users (mainly FSW architects and developers, but also stakeholders who interact with the FSW) in managing KOSMOS concepts with building blocks in a user-friendly graphical environment, generating all possible parts of the code and offering all the necessary data traceability.

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KOSMOS Studio - Welcome

The **KOSMOS Studio** welcome screen lets users **create** or **import** a project. A project can be started from scratch or based on an existing model, stored as a **.kosmosconf** file.



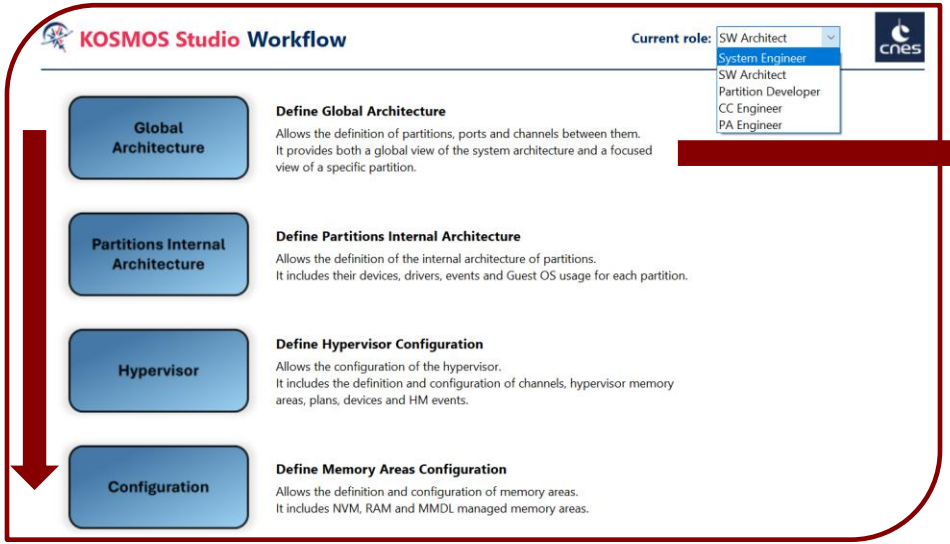


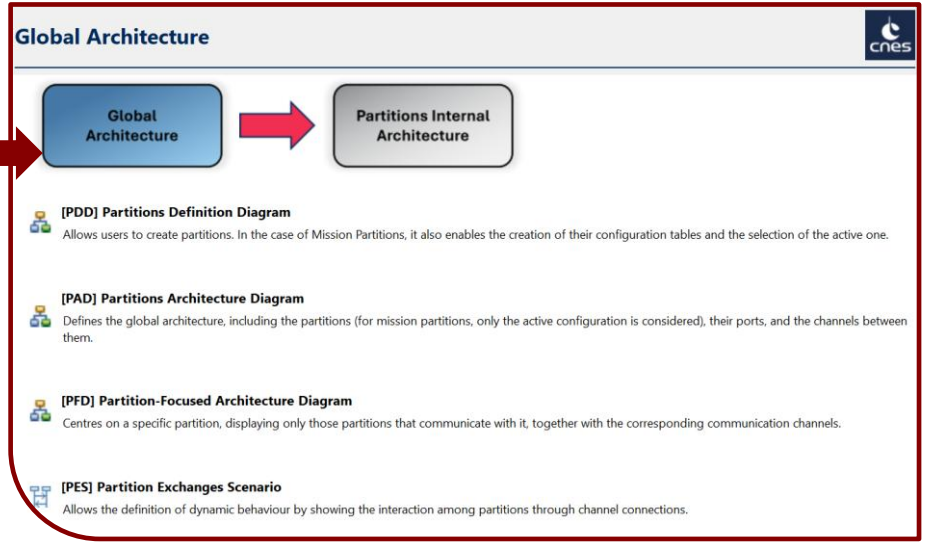
Note: Just as **lv_root** serves as a base for **KOSMOS** software development, **lv_root.kosmosconf** serves as a foundation for **KOSMOS Studio**.

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KOSMOS Studio - Workflow

KOSMOS Studio includes a built-in workflow that **guides** development. It also serves as the primary source for the diagram's and table's definitions and allows their creation. To access it, right click your projects .aird file.

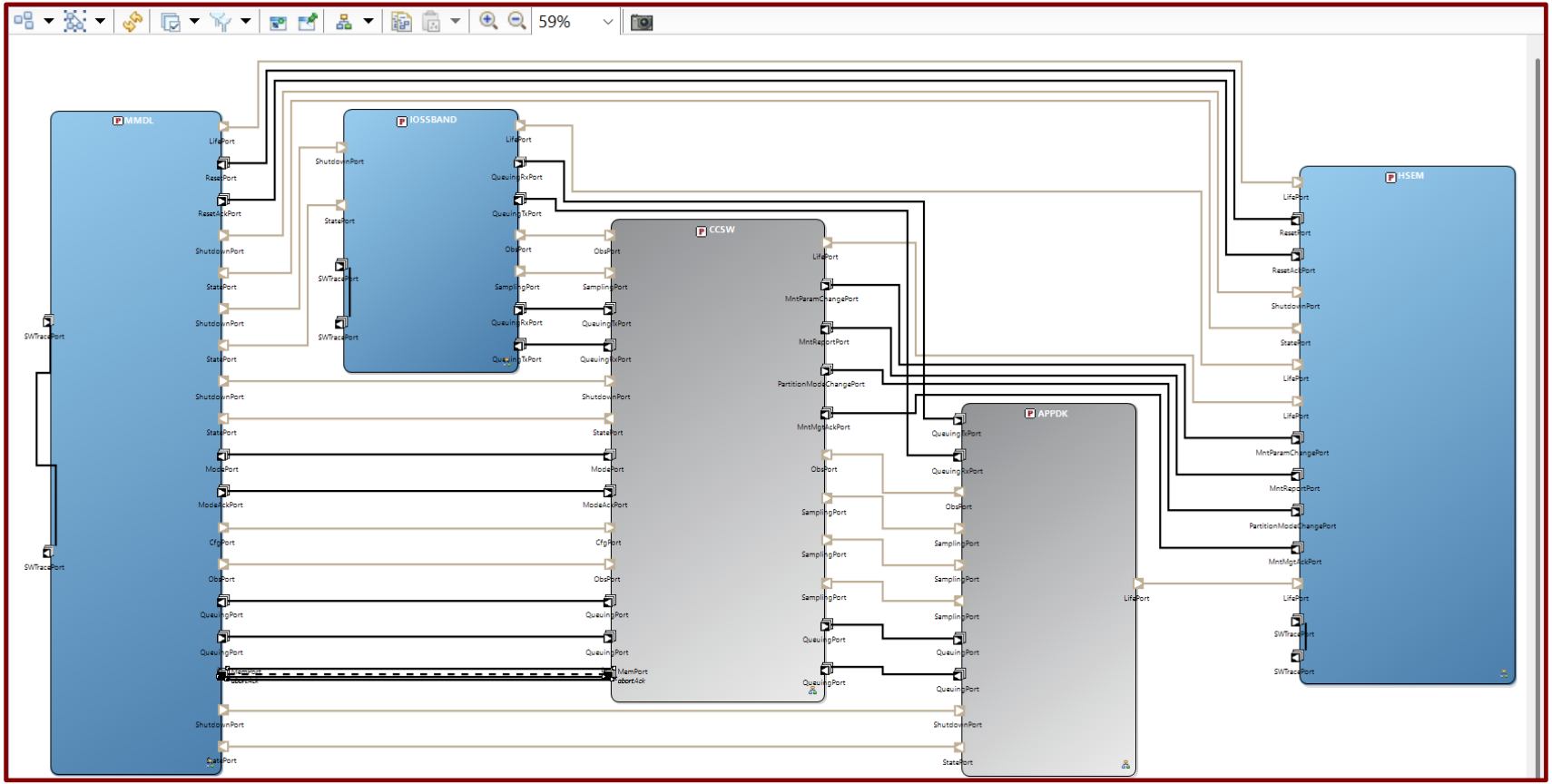




Note: It is good practice to revisit this workflow and verify that all steps have been completed.

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KOSMOS Studio – [PAD] Partition Architecture Diagram



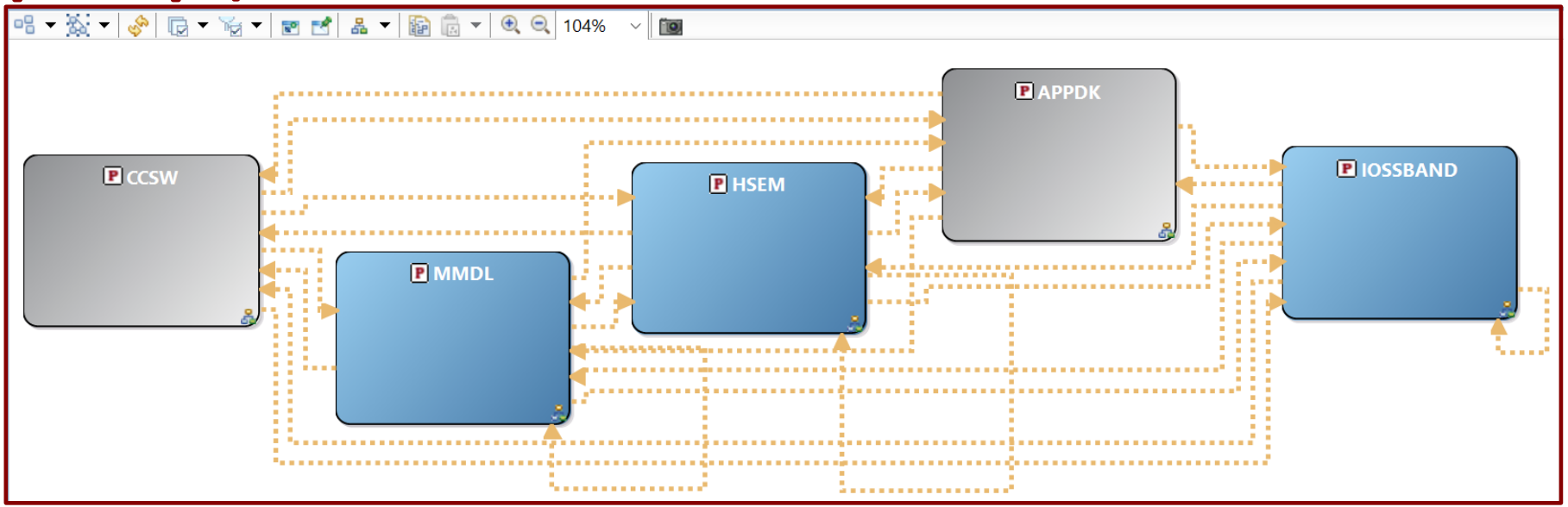
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KOSMOS Studio – [PAD] Partition Architecture Diagram

Reorganize layout

Layers/High-Level Partitions Connections

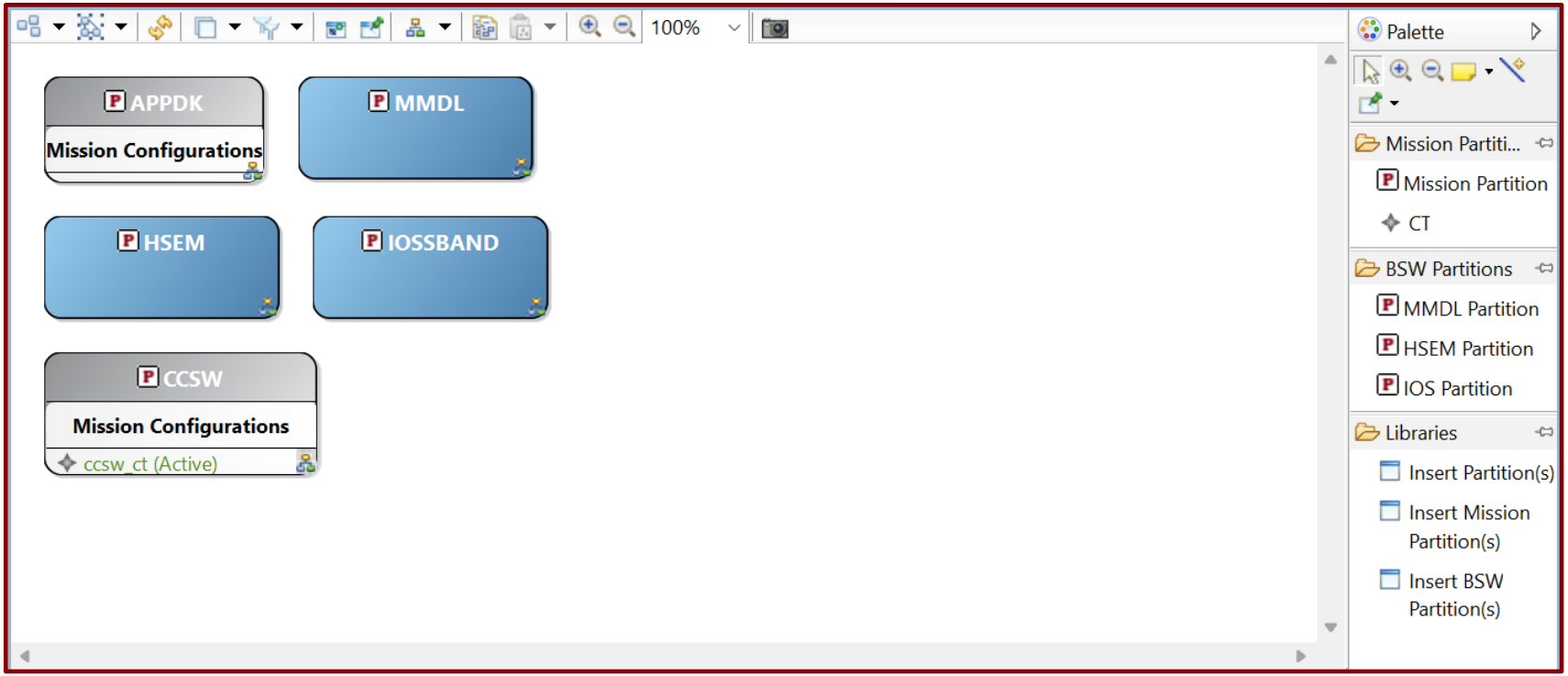
Filter data



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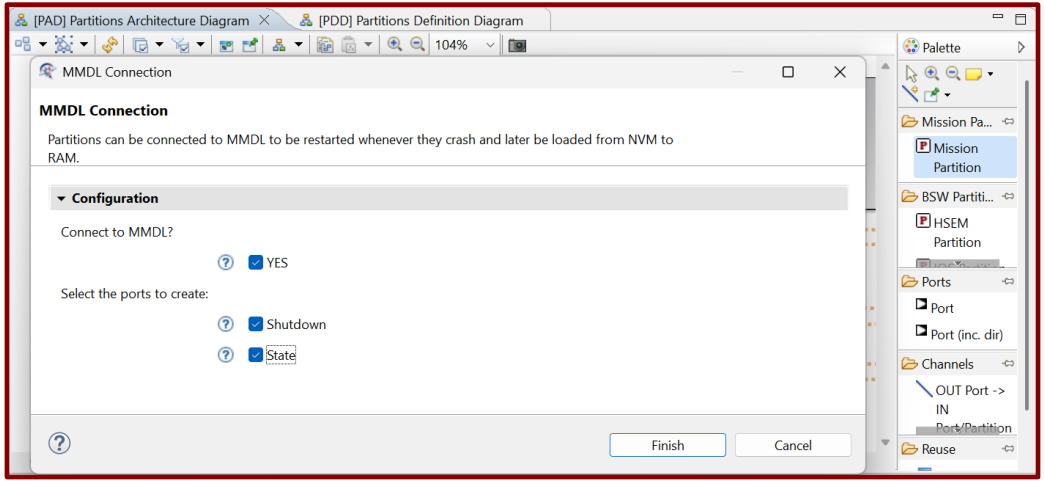
KOSMOS Studio – [PDD] Partition Definition Diagram

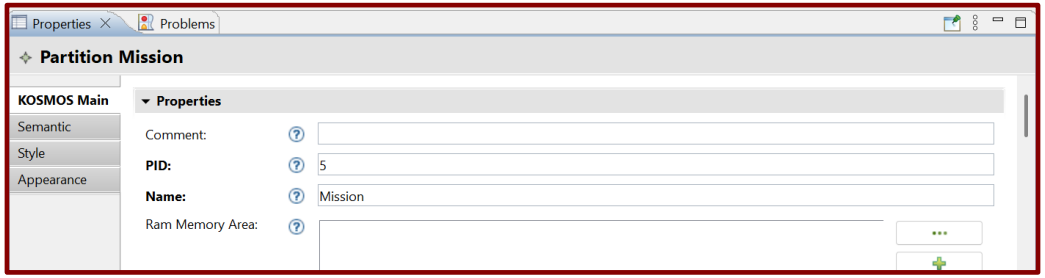
Each diagram has its own **Palette** of functions that can be added to it.

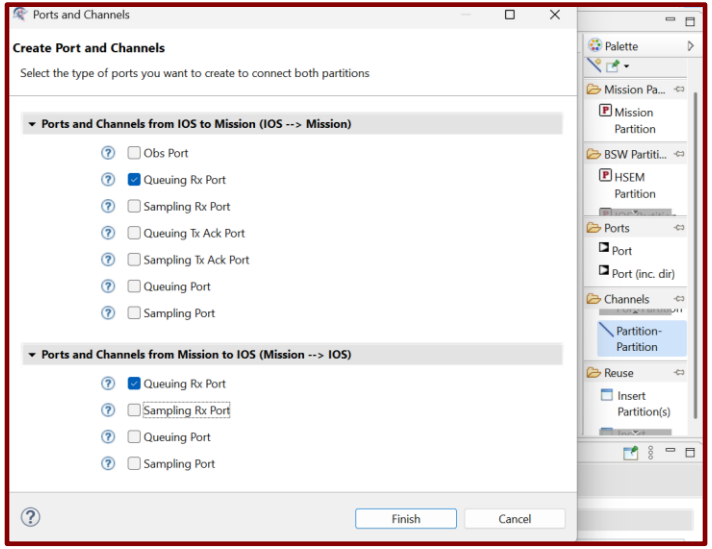


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KOSMOS Studio – Partition and Channel Creations



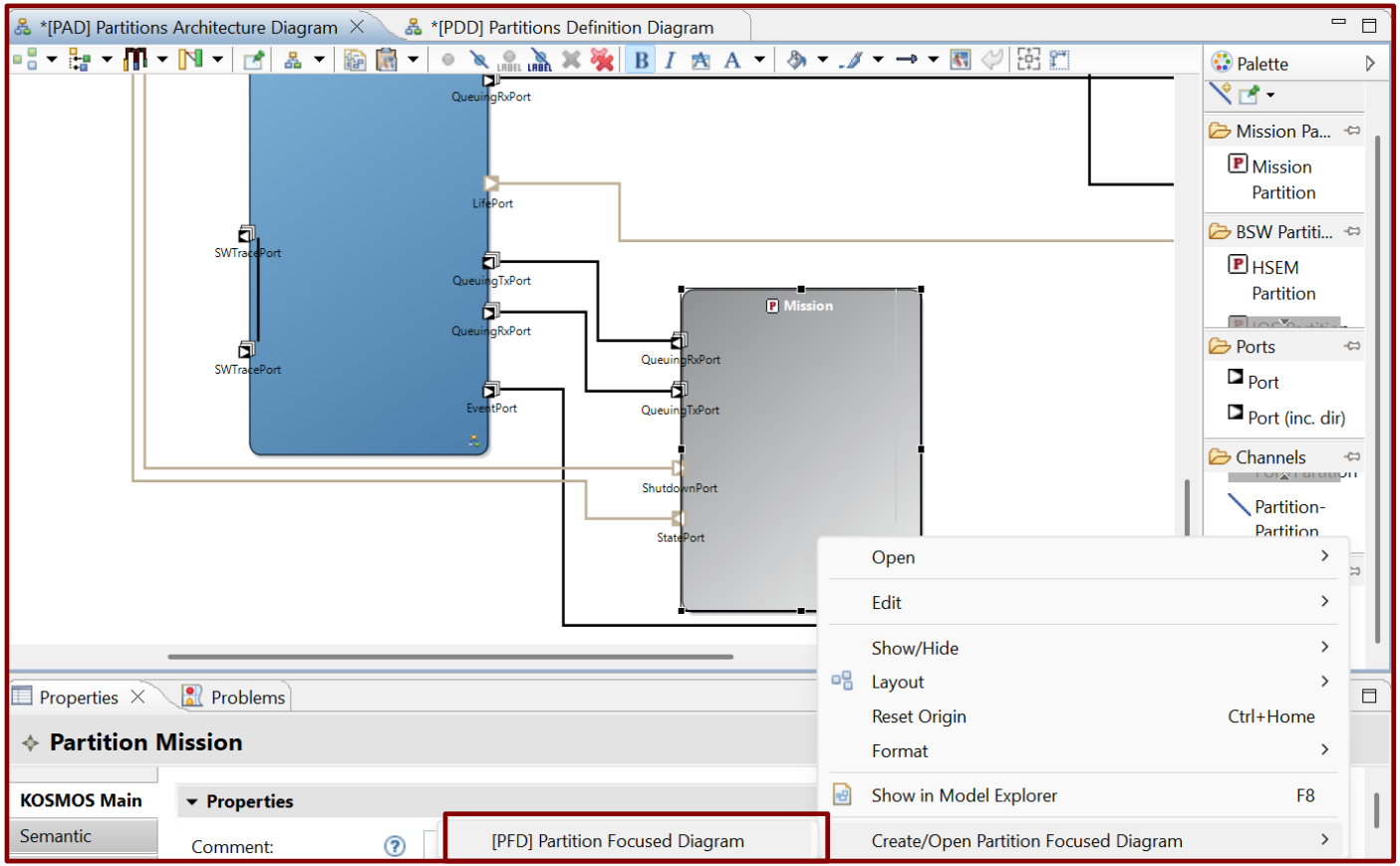




The **Properties** menu allows users to modify the parameters of the selected object (partitions, channels or ports)

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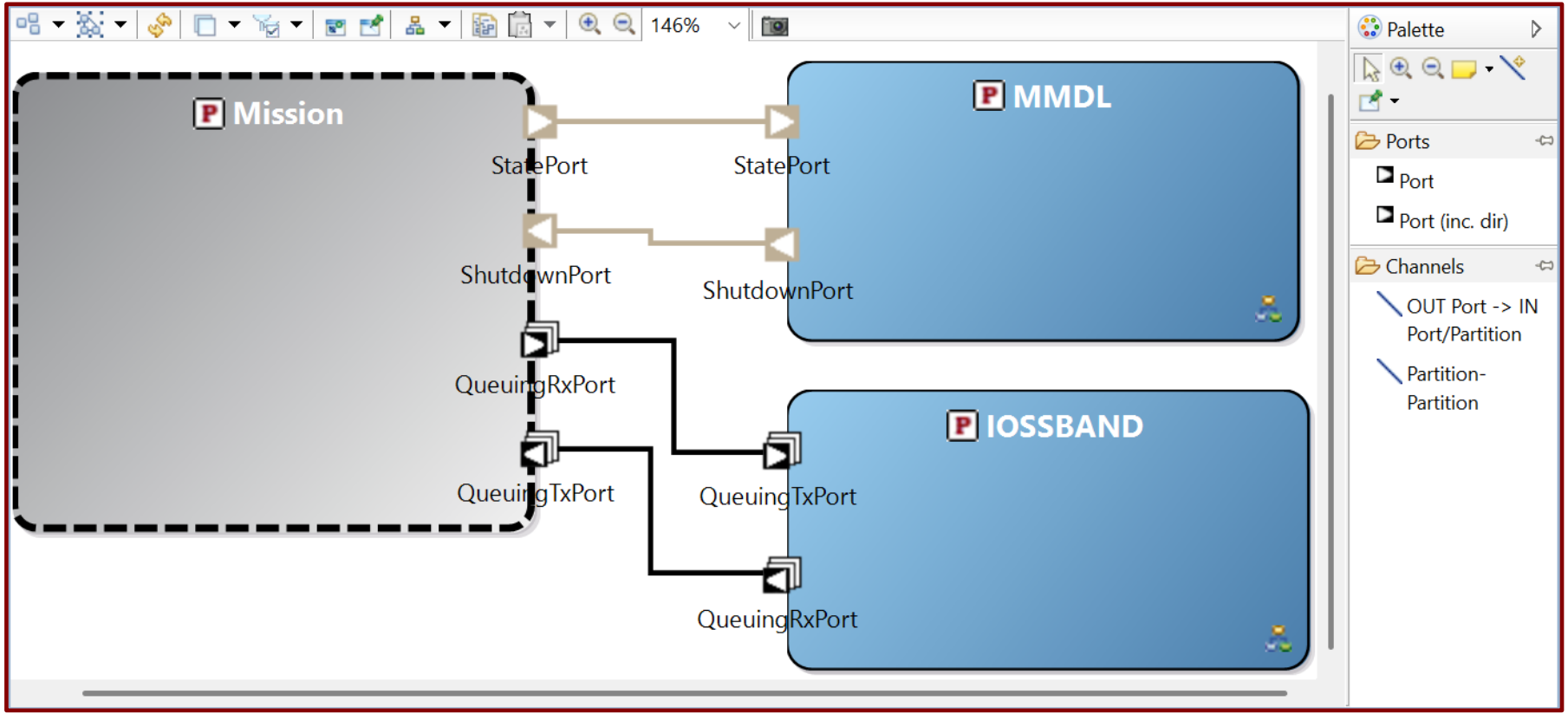
KOSMOS Studio – [PFD] Partition Focused Diagram



By right clicking the new partitions you can generate a **PFD**

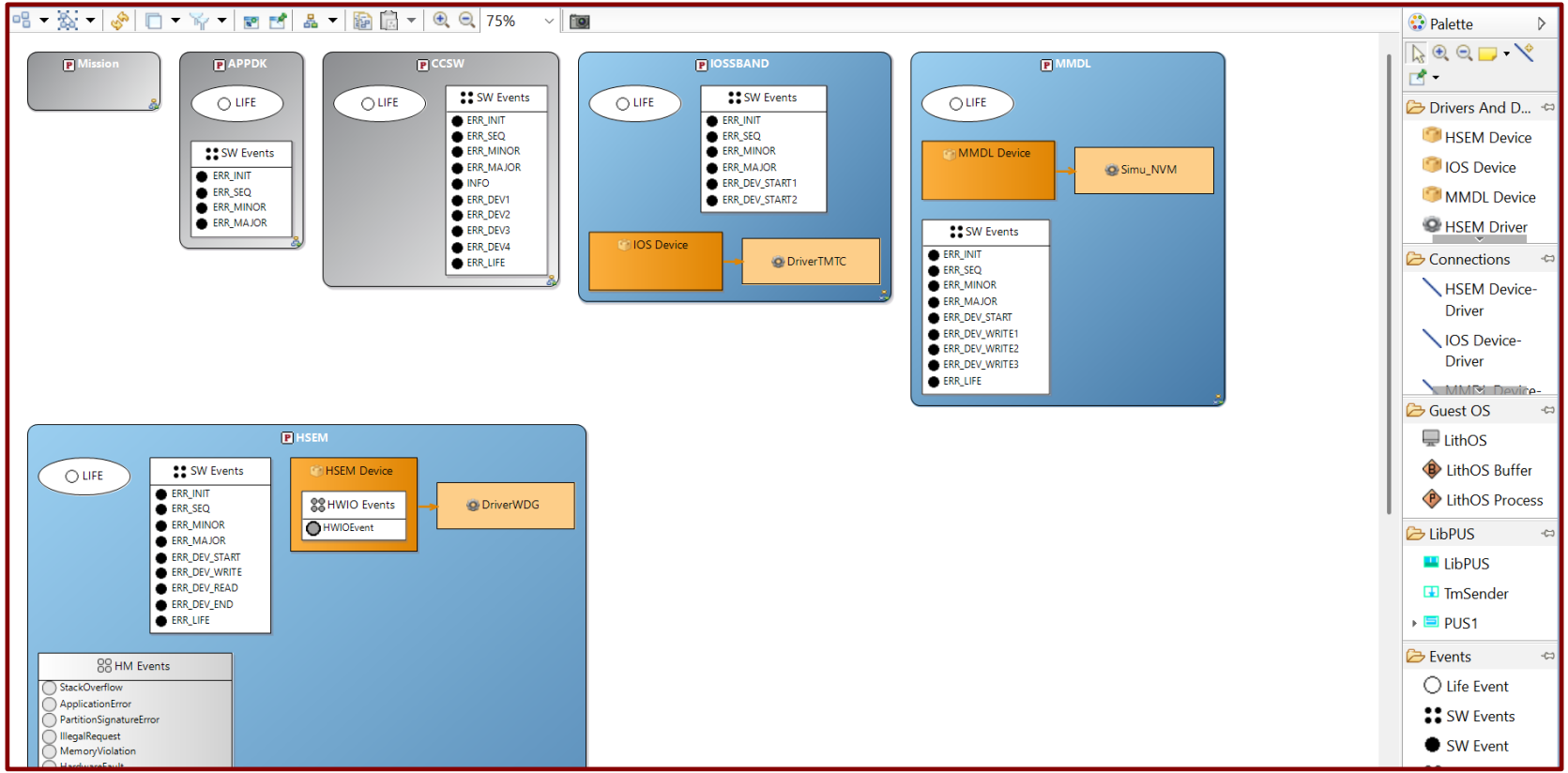
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KOSMOS Studio – [PFD] Partition Focused Diagram



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KOSMOS Studio – [PID] Partition Internal Diagram



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KOSMOS Studio – [CHT] Channels Table

ChannelQueuing	**TM_APPDK**	APPDK	CCSW	**56**	560	5506736	***0x5406b0***		**10**	SQ_43_TM
ChannelQueuing	**SWTrace**	MMDL	MMDL	**16**	1600	5507296	***0x5408e0***		**100**	MmdlSwTrace
ChannelQueuing	**SWTrace**	HSEM	HSEM	**16**	1600	5508896	***0x540f20***		**100**	HSEMSwTrace
ChannelQueuing	**SWTrace**	IOSSBAND	IOSSBAND	**16**	320	5510496	***0x541560***		**20**	IOSSwTrace
ChannelQueuing	**MEMREQ**	CCSW	MMDL	**4096**	81920	5510816	***0x5416a0***		**20**	MMDLMemIn
ChannelQueuing	**MEMOUT**	MMDL	CCSW	**4096**	81920	0	***0x0***		**20**	MMDLMemOut
ChannelQueuing	**MEMABORT**	CCSW	MMDL	**16**	16	81920	***0x14000***		**1**	CCSW_ABORT
ChannelQueuing	**MEMABORTACK**	MMDL	CCSW	**56**	56	81936	***0x14010***		**1**	abortAck
ChannelSampling	**Shutdown**	MMDL	[Mission]	**16**				**1000000**		ShutdownPort
ChannelSampling	**State**	Mission	[MMDL]	**24**				**1000000**		MissionStatePort
ChannelQueuing	**QueuingRx**	IOSSBAND	Mission	**1036**					**10**	QueuingRxPort
ChannelQueuing	**QueuingRx**	Mission	IOSSBAND	**1036**					**10**	QueuingRxPort

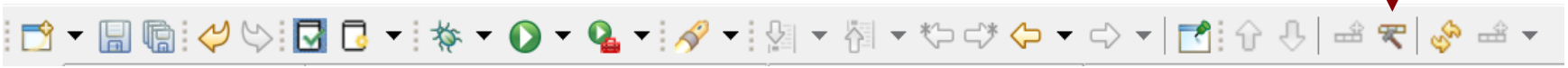


ChannelQueuing	**TM_APPDK**	APPDK	CCSW	**56**	560	5506736	***0x5406b0***		**10**	SQ_43_TM
ChannelQueuing	**SWTrace**	MMDL	MMDL	**16**	1600	5507296	***0x5408e0***		**100**	MmdlSwTrace
ChannelQueuing	**SWTrace**	HSEM	HSEM	**16**	1600	5508896	***0x540f20***		**100**	HSEMSwTrace
ChannelQueuing	**SWTrace**	IOSSBAND	IOSSBAND	**16**	320	5510496	***0x541560***		**20**	IOSSwTrace
ChannelQueuing	**MEMREQ**	CCSW	MMDL	**4096**	81920	5510816	***0x5416a0***		**20**	MMDLMemIn
ChannelQueuing	**MEMOUT**	MMDL	CCSW	**4096**	81920	5592736	***0x5556a0***		**20**	MMDLMemOut
ChannelQueuing	**MEMABORT**	CCSW	MMDL	**16**	16	5674656	***0x5696a0***		**1**	CCSW_ABORT
ChannelQueuing	**MEMABORTACK**	MMDL	CCSW	**56**	56	5674672	***0x5696b0***		**1**	abortAck
ChannelSampling	**Shutdown**	MMDL	[Mission]	**16**	32	5674728	***0x5696e8***	**1000000**		ShutdownPort
ChannelSampling	**State**	Mission	[MMDL]	**24**	48	5674760	***0x569708***	**1000000**		MissionStatePort
ChannelQueuing	**QueuingRx**	IOSSBAND	Mission	**1036**	10360	5674808	***0x569738***		**10**	QueuingRxPort
ChannelQueuing	**QueuingRx**	Mission	IOSSBAND	**1036**	10360	5685168	***0x56bfb0***		**10**	QueuingRxPort

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KOSMOS Studio – [MATN] Memory Areas Table NVM

NVMMemoryArea	**MMDL_CT**	527237120	***0x1f6d0000***	**256**	**KB**	[MMDL]	no	1
NVMMemoryArea	**MMDL**	527499264	***0x1f710000***	**256**	**KB**	[MMDL]	no	1
NVMMemoryArea	**HSEM_CT**	527761408	***0x1f750000***	**256**	**KB**	[HSEM]	no	1
NVMMemoryArea	**HSEM**	528023552	***0x1f790000***	**256**	**KB**	[HSEM]	no	1
NVMMemoryArea	**HYP_CT**	528285696	***0x1f7d0000***	**256**	**KB**	[]	no	1
NVMMemoryArea	**HYP**	1	***0x1***	**256**	**KB**	[]	no	1
NVMMemoryArea	**RESET_CTX**	536866816	***0x1ffff000***	**4**	**KB**	[]	no	1
NVMMemoryArea	**Mission**			**256**	**KB**	[]	no	1

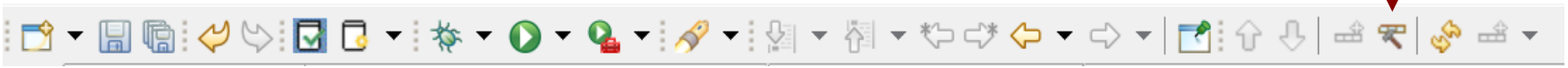


NVMMemoryArea	**MMDL**	527499264	***0x1f710000***	**256**	**KB**	[MMDL]	no	1
NVMMemoryArea	**HSEM_CT**	527761408	***0x1f750000***	**256**	**KB**	[HSEM]	no	1
NVMMemoryArea	**HSEM**	528023552	***0x1f790000***	**256**	**KB**	[HSEM]	no	1
NVMMemoryArea	**HYP_CT**	528285696	***0x1f7d0000***	**256**	**KB**	[]	no	1
NVMMemoryArea	**HYP**	528547840	***0x1f810000***	**256**	**KB**	[]	no	1
NVMMemoryArea	**RESET_CTX**	528809984	***0x1f850000***	**4**	**KB**	[]	no	1
NVMMemoryArea	**Mission**	528814080	***0x1f851000***	**256**	**KB**	[]	no	1

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KOSMOS Studio – [MATR] Memory Areas Table RAM

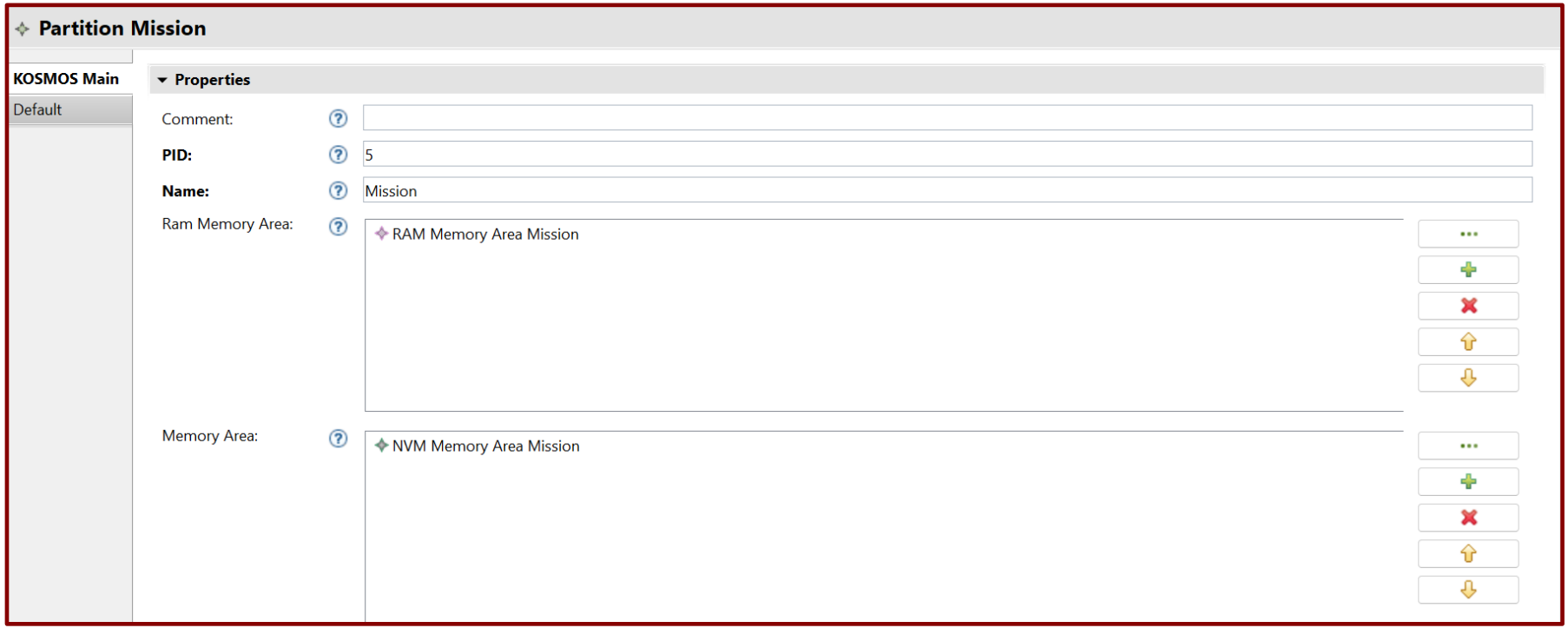
RAMMemoryArea	**IOSSBAND**	41943040	***0x2800000***	**4**	**MB**	[IOSSBAND]	no	1
RAMMemoryArea	**IOSSBAND_CT**	46137344	***0x2c00000***	**512**	**KB**	[IOSSBAND]	no	1
RAMMemoryArea	**IOSSBAND_TMTC_R**	46661632	***0x2c80000***	**1**	**MB**	[]	no	0
RAMMemoryArea	**IOSSBAND_TMTC_T**	47710208	***0x2d80000***	**1**	**MB**	[]	no	0
RAMMemoryArea	**CCSW**	48758784	***0x2e80000***	**4**	**MB**	[CCSW]	no	1
RAMMemoryArea	**CCSW_CT**	52953088	***0x3280000***	**1**	**MB**	[CCSW]	no	1
RAMMemoryArea	**APPDK**	54001664	***0x3380000***	**1**	**MB**	[APPDK]	no	1
RAMMemoryArea	**Mission**			**1**	**MB**	[]	no	0



RAMMemoryArea	**IOSSBAND_CT**	46137344	***0x2c00000***	**512**	**KB**	[IOSSBAND]	no	1
RAMMemoryArea	**IOSSBAND_TMTC_R**	46661632	***0x2c80000***	**1**	**MB**	[]	no	0
RAMMemoryArea	**IOSSBAND_TMTC_T**	47710208	***0x2d80000***	**1**	**MB**	[]	no	0
RAMMemoryArea	**CCSW**	48758784	***0x2e80000***	**4**	**MB**	[CCSW]	no	1
RAMMemoryArea	**CCSW_CT**	52953088	***0x3280000***	**1**	**MB**	[CCSW]	no	1
RAMMemoryArea	**APPDK**	54001664	***0x3380000***	**1**	**MB**	[APPDK]	no	1
RAMMemoryArea	**Mission**	55050240	***0x3480000***	**1**	**MB**	[]	no	0

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Make sure to add those memory configurations to the partition's properties



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KOSMOS Studio – [MMAT] MMDL Managed Memory Areas Table

	Load RAM Memory Area	Load RAM Address (hex)	Referenced Memory Area	Referenced Address (hex)	Binary Type
ManagedMemoryArea	**RAM Memory Area HYP_CT**	0x200000	**NVM Memory Area HYP**	0x1f810000	**HYPERVISOR_CT**
ManagedMemoryArea	**RAM Memory Area HYP**	0x100000	**NVM Memory Area HYP_CT**	0x1f7d0000	**HYPERVISOR_COD**
ManagedMemoryArea	**RAM Memory Area MMDL**	0x2200000	**NVM Memory Area MMDL**	0x1f710000	**PARTITION_CODE**
ManagedMemoryArea	**RAM Memory Area MMDL_CT**	0x2400000	**NVM Memory Area MMDL_CT**	0x1f6d0000	**PARTITION_CT**
ManagedMemoryArea	**RAM Memory Area HSEM**	0x1a00000	**NVM Memory Area HSEM**	0x1f790000	**PARTITION_CODE**
ManagedMemoryArea	**RAM Memory Area HSEM_CT**	0x1b00000	**NVM Memory Area HSEM_CT**	0x1f750000	**PARTITION_CT**
ManagedMemoryArea	**RAM Memory Area IOSSBAND**	0x2800000	**NVM Memory Area IOSSBAND**	0x1f690000	**PARTITION_CODE**
ManagedMemoryArea	**RAM Memory Area IOSSBAND_CT**	0x2c00000	**NVM Memory Area IOSSBAND_CT**	0x1f650000	**PARTITION_CT**
ManagedMemoryArea	**RAM Memory Area CCSW**	0x2e80000	**NVM Memory Area CCSW**	0x1f450000	**PARTITION_CODE**
ManagedMemoryArea	**RAM Memory Area CCSW_CT**	0x3280000	**NVM Memory Area CCSW_CT**	0x1f430000	**PARTITION_CT**
ManagedMemoryArea	**RAM Memory Area APPDK**	0x3380000	**NVM Memory Area APPDK**	0x1f3f0000	**PARTITION_CODE**
ManagedMemoryArea	**RAM Memory Area Mission**	0x3480000	**NVM Memory Area Mission**	0x1f851000	**PARTITION_CODE**

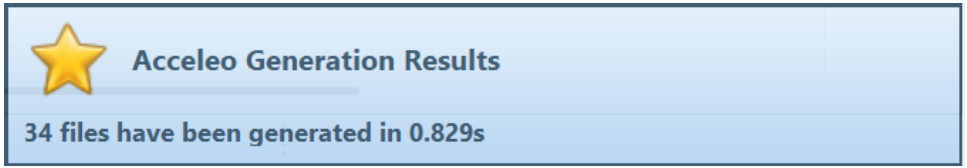
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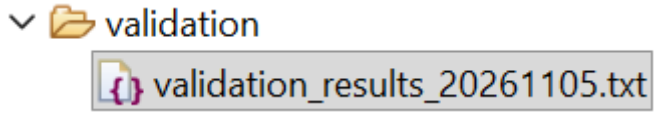
KOSMOS Studio – Model Validation and Code Generation

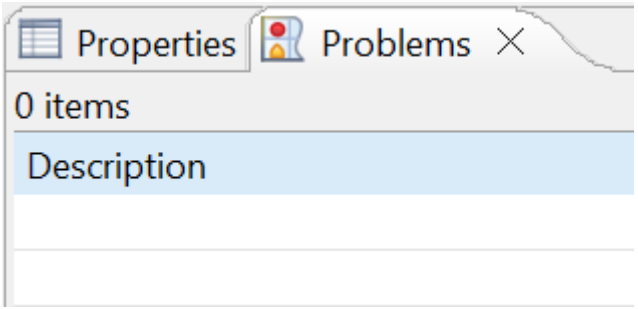


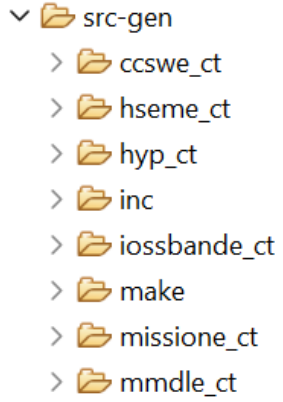
Code Generation

Model Validation









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Merci

KOSMOS-STUDIO Team

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