RESSAC Project Draft

Micro UAV (muXAV)

Manned/Unmaned Air Vehicle

Summary:
This   is the preliminary Functional Architecture   for muXAV use case of RESSAC project showing the Mission Management System (MMS) generated using SCADE Architect, a SysML tool.

Distribution List: RESSAC Team

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1. General Project Description

This   is the preliminary Functional Architecture   for muXAV use case of RESSAC project showing the Mission Management System (MMS) generated using SCADE Architect, a SysML tool.

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2. System Architecture

2.1. Project Architecture

This section displays the package and block hierarchy of projects.

Project [muXAV_v3](#)
     FunctionalArchitecture
     Mapping Functions on Organic Architecture
     muXAV-Types
          [Types](#)
     [OrganicFunctionsArchitecture](#)
          OrganicFunctions
     [PhysicalSystemsArchitecture](#)
          PhysicalSystems

3. muXAV_v3 Project

Declared as **public model**

3.1. Root Elements

3.2. muXAV_v3::muXAV-Types::Types Package

3.2.1. Types

3.2.1.1. Enumerations

3.2.1.1.1. te_BaySwitch Enumeration

Declared as **public enumeration**

3.2.1.1.1.1. Literals

Table 1: Literals of te_BaySwitch

Name	Visibility	Comments and Information
OPEN	public	
CLOSED	public	

3.2.1.1.2. te_MissionStatus Enumeration

Declared as **public enumeration**

3.2.1.1.2.1. Literals

Table 2: Literals of te_MissionStatus

Name	Visibility	Comments and Information
MissionCOMPLETE	public	**Comments:** Mission is Complete when AV is on the ground with 0 speed
MissionCANCELLED	public	**Comments:** Mission is Cancelled when...
MissionABORTED	public	**Comments:** Mission is Aborted when ...

3.2.1.1.3. te_NavControlMode Enumeration

Declared as **public enumeration**

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3.2.1.1.3.1.   Literals

Table 3: Literals of te_NavControlMode

Name	Visibility	Comments and Information
REMOTE_PILOT	public	**Comments:** Remotely Piloted
AUTONOMOUS	public	**Comments:** Autonomous

3.2.1.1.4.   te_NavRegulOption Enumeration

Declared as **public enumeration**

3.2.1.1.4.1.   Literals

Table 4: Literals of te_NavRegulOption

Name	Visibility	Comments and Information
SPEED_REGUL	public	
ALTITUDE_REGUL	public	
ENERGY_REGUL	public	**Comments:** Energy regulation is an automatic choice between speed or altitude regulation

3.2.1.2.   Structured DataTypes

3.2.1.2.1.   ts_NavParameters Structured DataType

Declared as **public structured datatype**

ts_NavParameters Comments:

- Only one of Speed or Altitude drives navigation, according t...

3.2.1.2.1.1.   Fields

Table 5: Fields of ts_NavParameters

Name	Visibility	Type	Mult.	Properties	Comments and Information
Distance	public	Dimensions-and-Units::Types::t_Length	1		
Speed	public	Dimensions-and-Units::Types::t_Velocity	1		
Altitude	public	Dimensions-and-Units::Types::t_Length	1		

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3.2.1.3.   Typedefs

Table 6: Typedefs of Types

Name	Visibility	Type	Comments and Information
t_Event	public	libscade::bool	**Comments:** An alias for a boolean (transient)
t_Switch	public	libscade::bool	**Comments:** An alias for a boolean (persistent)

3.2.2.   Type Table_Types_1 Type

Table 7: Types Type: Type Table_Types_1

	Field Type	Comment
ts_NavParameters		Only one of Speed or Altitude drives navigation, according t...
Distance	t_Length	
Speed	t_Velocity	
Altitude	t_Length	
te_NavControlMode		
REMOTE_PILOT	te_NavControlMode	Remotely Piloted
AUTONOMOUS	te_NavControlMode	Autonomous
te_NavRegulOption		
SPEED_REGUL	te_NavRegulOption	
ALTITUDE_REGUL	te_NavRegulOption	
ENERGY_REGUL	te_NavRegulOption	Energy regulation is an automatic choice between speed or al...
te_BaySwitch		
OPEN	te_BaySwitch	
CLOSED	te_BaySwitch	
te_MissionStatus		
MissionCOMPLETE	te_MissionStatus	Mission is Complete when AV is on the ground with 0 speed
MissionCANCELLED	te_MissionStatus	Mission is Cancelled when...
MissionABORTED	te_MissionStatus	Mission is Aborted when ...
t_Event		An alias for a boolean (transient)
t_Switch		An alias for a boolean (persistent)

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3.3. muXAV_v3::OrganicFunctionsArchitecture Package

3.3.1. Air_Vehicle Block

Table 8: Air_Vehicle DataSourceTarget: OF_Air_Vehicle_Data

	Block Source	Block Target	Type	Min	Max
p	Air_Vehicle	OF_EL, OF_FC_FlightControl	t_Angle	0.0	100.0
pdot	Air_Vehicle	OF_EL, OF_FC_FlightControl	t_AngularVelocity	22.0	37.0
q	Air_Vehicle	OF_EL, OF_FC_FlightControl	t_Angle		
PropulsionTorque	OF_FC_FlightControl	Air_Vehicle	t_Torque		
BrakingTorque1	OF_FC_FlightControl	Air_Vehicle	t_Torque		

3.3.2. Ground_Station Block

Table 9: Ground_Station DataSourceTarget: OF_Ground_Station_Data

GS_NavControlMode	Ground_Station	OF_MM_MissionManagement	te_NavControlMode		
GS_NavParameters	Ground_Station	OF_MM_MissionManagement	ts_NavParameters		
GS_NavRegulOption	Ground_Station	OF_MM_MissionManagement	te_NavRegulOption		
GS_GO	Ground_Station	OF_MM_MissionManagement	t_Event		
GS_EmergencyLandingCmd	Ground_Station	OF_MM_MissionManagement	t_Event		
MissionREADY	OF_MM_MissionManagement	Ground_Station	t_Event		
MissionCOMPLETED	OF_MM_MissionManagement	Ground_Station	t_Event		
MissionCANCELLED	OF_MM_MissionManagement	Ground_Station	t_Event		
MissionABORTED	OF_MM_MissionManagement	Ground_Station	t_Event		

3.3.3. OF_CM_Comm_MMS Block

Table 10: OF_CM_Comm_MMS Ports-with-Data: I/O Table_F_CM_Comm_MMS_1

	Direction	Related Data	Block Source	Block Target	Comment
Ports					

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	Direction	Related Data	Block Source	Block Target	Comment
GS_Inputs	in	GS_NavControlMode, GS_NavParameters, GS_NavRegulOption, GS_GO, GS_EmergencyLandingCmd			
Related Data					
GS_NavControlMode			Ground_Station	OF_MM_MissionManagement	
GS_NavParameters			Ground_Station	OF_MM_MissionManagement	
GS_NavRegulOption			Ground_Station	OF_MM_MissionManagement	
GS_GO			Ground_Station	OF_MM_MissionManagement	
GS_EmergencyLandingCmd			Ground_Station	OF_MM_MissionManagement	
CP_Inputs	in	CP_ON_OFF_PushButton, CP_Bay_Switch, CP_Rotactor1, CP_Rotactor2, CP_NavControlMode, CP_USB_Key, CP_START_PushButton, CP_USB_NavRegulOption???			
Related Data					
CP_ON_OFF_PushButton			Control_Panel	OF_MM_MissionManagement	
CP_Bay_Switch			Control_Panel	OF_MM_MissionManagement	
CP_Rotactor1			Control_Panel	OF_MM_MissionManagement	
CP_Rotactor2			Control_Panel	OF_MM_MissionManagement	
CP_NavControlMode			Control_Panel	OF_MM_MissionManagement	
CP_USB_Key			Control_Panel	OF_MM_MissionManagement	
CP_START_PushButton			Control_Panel	OF_MM_MissionManagement	

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	Direction	Related Data	Block Source	Block Target	Comment
CP_USB_NavRegulOption???			Control_Panel	OF_MM_MissionManagement	
AV_PhysicalSensors	in	p, pdot, q			
Related Data					
p			Air_Vehicle	OF_FC_FlightControl	
pdot			Air_Vehicle	OF_FC_FlightControl	
q			Air_Vehicle	OF_FC_FlightControl	
PropulsionTrq	in	PropulsionTorque			
Related Data					
PropulsionTorque			OF_FC_FlightControl	OF_CM_Comm_MMS	
BrakingTrq	in	BrakingTorque			
Related Data					
BrakingTorque			OF_FC_FlightControl	OF_CM_Comm_MMS	
MissionStatus	in	MissionREADY, MissionCOMPLETED, MissionCANCELLED, MissionABORTED			
Related Data					
MissionREADY			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionCOMPLETED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionCANCELLED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionABORTED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
CP_Switches_to_GS	out				

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	Direction	Related Data	Block Source	Block Target	Comment
CP_Displays_to_GS	out	MissionREADY, MissionCOMPLETED, MissionCANCELLED, MissionABORTED			
Related Data					
MissionREADY			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionCOMPLETED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionCANCELLED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionABORTED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
CP_Displays	out	MissionREADY, MissionCOMPLETED, MissionCANCELLED, MissionABORTED			
Related Data					
MissionREADY			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionCOMPLETED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionCANCELLED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionABORTED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
PropulsionEnergy???	out				
GS_Setup	out	GS_NavControlMode, GS_NavParameters, GS_NavRegulOption, GS_GO, GS_EmergencyLandingCmd			
Related Data					

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	Direction	Related Data	Block Source	Block Target	Comment
GS_NavControlMode			Ground_Station	OF_MM_MissionManagement	
GS_NavParameters			Ground_Station	OF_MM_MissionManagement	
GS_NavRegulOption			Ground_Station	OF_MM_MissionManagement	
GS_GO			Ground_Station	OF_MM_MissionManagement	
GS_EmergencyLandingCmd			Ground_Station	OF_MM_MissionManagement	
CP_Setup	out	CP_ON_OFF_PushButton, CP_Bay_Switch, CP_Rotactor1, CP_Rotactor2, CP_NavControlMode, CP_USB_Key, CP_START_PushButton, CP_USB_NavRegulOption???			
Related Data					
CP_ON_OFF_PushButton			Control_Panel	OF_MM_MissionManagement	
CP_Bay_Switch			Control_Panel	OF_MM_MissionManagement	
CP_Rotactor1			Control_Panel	OF_MM_MissionManagement	
CP_Rotactor2			Control_Panel	OF_MM_MissionManagement	
CP_NavControlMode			Control_Panel	OF_MM_MissionManagement	
CP_USB_Key			Control_Panel	OF_MM_MissionManagement	
CP_START_PushButton			Control_Panel	OF_MM_MissionManagement	
CP_USB_NavRegulOption???			Control_Panel	OF_MM_MissionManagement	
AV_PhysicalParams	out	p, pdot, q			
Related Data					
p			Air_Vehicle	OF_FC_FlightControl	

	Direction	Related Data	Block Source	Block Target	Comment
pdot			Air_Vehicle	OF_FC_FlightControl	
q			Air_Vehicle	OF_FC_FlightControl	

3.3.4. OF_EL Block

Table 11: OF_EL DataSourceTarget: DataSourceTarget_F_EL_1

	Block Source	Block Target	Type	Min	Max
EL_BrakingTorque???	OF_EL	OF_EL			
EmergencyLanding1	OF_MM_MissionManagement	OF_EL	t_Event		
p	Air_Vehicle	OF_EL	t_Angle	0.0	100.0
pdot	Air_Vehicle	OF_EL	t_AngularVelocity	22.0	37.0
q	Air_Vehicle	OF_EL	t_Angle		

Table 12: OF_EL Ports-with-Data: I/O Table_F_EL_1

	Direction	Related Data	Block Source	Block Target	Comment
Ports					
EmergencyLanding	in	EmergencyLanding1			
Related Data					
EmergencyLanding1			OF_MM_MissionManagement	OF_EL	
AV_PhysicalSensors	in	p, pdot, q			
Related Data					
p			Air_Vehicle	OF_EL	
pdot			Air_Vehicle	OF_EL	
q			Air_Vehicle	OF_EL	
MissionAbort	out				
BrakingTorque	out	EL_BrakingTorque???			
Related Data					
EL_BrakingTorque???			OF_EL	OF_EL	

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3.3.5.   OF_EM_EnergyViability Block

Table 13: OF_EM_EnergyViability DataSourceTarget: Data Table_F_EM_EnergyViability_1

	Block Source	**Block Target**	**Type**	**Min**	**Max**
RemainingEnergy			t_Energy		
PrimaryInitialCapacity			t_Energy		
SecondaryInitialCapacity			t_Energy		
PropulsionTorque	OF_FC_FlightControl	OF_EM_EnergyViability	t_Torque		
BrakingTorque	OF_FC_FlightControl	OF_EM_EnergyViability	t_Torque		

Table 14: OF_EM_EnergyViability Ports-with-Data: I/O Table_F_EM_EnergyViability_1

	Direction	**Related Data**	**Block Source**	**Block Target**	**Comment**
Ports					
pdot	in				
PropulsionTrq	in	PropulsionTorque			
Related Data					
PropulsionTorque			OF_FC_FlightControl	OF_EM_EnergyViability	
BrakingTrq	in	BrakingTorque			
Related Data					
BrakingTorque			OF_FC_FlightControl	OF_EM_EnergyViability	
EnergyLeft	out				
Primary%Left	out				
Secondary%Left	out				

3.3.6.   OF_FC_FlightControl Block

Table 15: OF_FC_FlightControl DataSourceTarget: Data Table_F_FC_FlightControl_1

	Block Source	**Block Target**	**Type**	**Min**	**Max**
PropulsionTorque	OF_FC_FlightControl	OF_EM_EnergyViability, Air_Vehicle, OF_CM_Comm _MMS	t_Torque		

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	Block Source	Block Target	Type	Min	Max
BrakingTorque	OF_FC_FlightControl	OF_EM_EnergyViability, Air_Vehicle, OF_CM_Comm_MMS	t_Torque		
CurrentAltitude	OF_FC_FlightControl	OF_MM_MissionManagement	t_Length		
CurrentSpeed	OF_FC_FlightControl	OF_MM_MissionManagement	t_Velocity		
CurrentDistance	OF_FC_FlightControl	OF_MM_MissionManagement	t_Length		
OperatingAltitude	OF_MM_MissionManagement	OF_FC_FlightControl	t_Length		
OperatingSpeed	OF_MM_MissionManagement	OF_FC_FlightControl	t_Velocity		
OperatingOption	OF_MM_MissionManagement	OF_FC_FlightControl	te_NavRegulOption		
OperatingDistance	OF_MM_MissionManagement	OF_FC_FlightControl	t_Length		
OperatingMass	OF_MM_MissionManagement	OF_FC_FlightControl	t_Mass		
StartTakeOff	OF_MM_MissionManagement	OF_FC_FlightControl	t_Event		
StartLanding	OF_MM_MissionManagement	OF_FC_FlightControl	t_Event		
p	Air_Vehicle	OF_FC_FlightControl	t_Angle	0.0	100.0
pdot	Air_Vehicle	OF_FC_FlightControl	t_AngularVelocity	22.0	37.0
q	Air_Vehicle	OF_FC_FlightControl	t_Angle		

Table 16: OF_FC_FlightControl Ports-with-Data: I/O Table_F_FC_FlightControl_1

	Direction	Related Data	Block Source	Block Target	Comment
Ports					
AV_PhysicalParams	in	p, pdot, q			
Related Data					
p			Air_Vehicle	OF_FC_FlightControl	
pdot			Air_Vehicle	OF_FC_FlightControl	
q			Air_Vehicle	OF_FC_FlightControl	

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	Direction	Related Data	Block Source	Block Target	Comment
OperatingPoint	in	OperatingAltitude, OperatingSpeed, OperatingOption, OperatingDistance, OperatingMass			
Related Data					
OperatingAltitude			OF_MM_MissionManagement	OF_FC_FlightControl	
OperatingSpeed			OF_MM_MissionManagement	OF_FC_FlightControl	
OperatingOption			OF_MM_MissionManagement	OF_FC_FlightControl	
OperatingDistance			OF_MM_MissionManagement	OF_FC_FlightControl	
OperatingMass			OF_MM_MissionManagement	OF_FC_FlightControl	
MM_Cmds	in	StartTakeOff, StartLanding			
Related Data					
StartTakeOff			OF_MM_MissionManagement	OF_FC_FlightControl	
StartLanding			OF_MM_MissionManagement	OF_FC_FlightControl	
PropulsionTrq	out	PropulsionTorque			
Related Data					
PropulsionTorque			OF_FC_FlightControl	OF_EM_EnergyViability, Air_Vehicle, OF_CM_Comm _MMS	
BrakingTrq	out	BrakingTorque			
Related Data					
BrakingTorque			OF_FC_FlightControl	OF_EM_EnergyViability, Air_Vehicle, OF_CM_Comm _MMS	
CurrentPoint	out	CurrentAltitude, CurrentSpeed, CurrentDistance			
Related Data					

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	Direction	Related Data	Block Source	Block Target	Comment
CurrentAltitude			OF_FC_FlightControl	OF_MM_MissionManagement	
CurrentSpeed			OF_FC_FlightControl	OF_MM_MissionManagement	
CurrentDistance			OF_FC_FlightControl	OF_MM_MissionManagement	

3.3.7. OF_MM_MissionManagement Block

Table 17: OF_MM_MissionManagement DataSourceTarget: Data Table_F_MM_MissionManagement_1

	Block Source	Block Target	Type	Min	Max
OperatingAltitude	OF_MM_MissionManagement	OF_FC_FlightControl	t_Length		
OperatingSpeed	OF_MM_MissionManagement	OF_FC_FlightControl	t_Velocity		
OperatingOption	OF_MM_MissionManagement	OF_FC_FlightControl	te_NavRegulOption		
OperatingDistance	OF_MM_MissionManagement	OF_FC_FlightControl	t_Length		
OperatingMass	OF_MM_MissionManagement	OF_FC_FlightControl	t_Mass		
StartTakeOff	OF_MM_MissionManagement	OF_FC_FlightControl	t_Event		
StartLanding	OF_MM_MissionManagement	OF_FC_FlightControl	t_Event		
EmergencyLanding	OF_MM_MissionManagement	OF_EL	t_Event		
MissionREADY	OF_MM_MissionManagement	Ground_Station, Control_Panel	t_Event		
MissionCOMPLETED	OF_MM_MissionManagement	Ground_Station, Control_Panel	t_Event		
MissionCANCELLED	OF_MM_MissionManagement	Ground_Station, Control_Panel	t_Event		
MissionABORTED	OF_MM_MissionManagement	Ground_Station, Control_Panel	t_Event		
CurrentAltitude	OF_FC_FlightControl	OF_MM_MissionManagement	t_Length		
CurrentSpeed	OF_FC_FlightControl	OF_MM_MissionManagement	t_Velocity		
CurrentDistance	OF_FC_FlightControl	OF_MM_MissionManagement	t_Length		
GS_NavControlMode	Ground_Station	OF_MM_MissionManagement	te_NavControlMode		
GS_NavParameters	Ground_Station	OF_MM_MissionManagement	ts_NavParameters		
GS_NavRegulOption	Ground_Station	OF_MM_MissionManagement	te_NavRegulOption		

	Block Source	Block Target	Type	Min	Max
GS_GO	Ground_Station	OF_MM_MissionManagement	t_Event		
GS_EmergencyLandingCmd	Ground_Station	OF_MM_MissionManagement	t_Event		
CP_ON_OFF_PushButton	Control_Panel	OF_MM_MissionManagement	t_Event		
CP_Bay_Switch	Control_Panel	OF_MM_MissionManagement	te_BaySwitch		
CP_Rotactor1	Control_Panel	OF_MM_MissionManagement	int		
CP_Rotactor2	Control_Panel	OF_MM_MissionManagement	int		
CP_NavControlMode	Control_Panel	OF_MM_MissionManagement	te_NavControlMode		
CP_USB_Key	Control_Panel	OF_MM_MissionManagement	ts_NavParameters		
CP_START_PushButton	Control_Panel	OF_MM_MissionManagement	t_Event		
CP_USB_NavRegulOption???	Control_Panel	OF_MM_MissionManagement	te_NavRegulOption		

Table 18: OF_MM_MissionManagement Ports-with-Data: I/O Table_F_MM_MissionManagement_1

	Direction	Related Data	Block Source	Block Target	Comment
Ports					
EnergyLevel	in				
PrimarySource	in				
SecondarySource	in				
GS_Setup	in	GS_NavControlMode, GS_NavParameters, GS_NavRegulOption, GS_GO, GS_EmergencyLandingCmd			
Related Data					
GS_NavControlMode			Ground_Station	OF_MM_MissionManagement	
GS_NavParameters			Ground_Station	OF_MM_MissionManagement	
GS_NavRegulOption			Ground_Station	OF_MM_MissionManagement	
GS_GO			Ground_Station	OF_MM_MissionManagement	

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	Direction	**Related Data**	**Block Source**	**Block Target**	**Comment**
GS_EmergencyLandingCmd			Ground_Station	OF_MM_MissionManagement	
CP_Setup	in	CP_ON_OFF_PushButton, CP_Bay_Switch, CP_Rotactor1, CP_Rotactor2, CP_NavControlMode, CP_USB_Key, CP_START_PushButton, CP_USB_NavRegulOption???			
Related Data					
CP_ON_OFF_PushButton			Control_Panel	OF_MM_MissionManagement	
CP_Bay_Switch			Control_Panel	OF_MM_MissionManagement	
CP_Rotactor1			Control_Panel	OF_MM_MissionManagement	
CP_Rotactor2			Control_Panel	OF_MM_MissionManagement	
CP_NavControlMode			Control_Panel	OF_MM_MissionManagement	
CP_USB_Key			Control_Panel	OF_MM_MissionManagement	
CP_START_PushButton			Control_Panel	OF_MM_MissionManagement	
CP_USB_NavRegulOption???			Control_Panel	OF_MM_MissionManagement	
CurrentPoint	in	CurrentAltitude, CurrentSpeed, CurrentDistance			
Related Data					
CurrentAltitude			OF_FC_FlightControl	OF_MM_MissionManagement	
CurrentSpeed			OF_FC_FlightControl	OF_MM_MissionManagement	
CurrentDistance			OF_FC_FlightControl	OF_MM_MissionManagement	
pdot	out				

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	Direction	Related Data	Block Source	Block Target	Comment
MissionStatus	out	MissionREADY, MissionCOMPLETED, MissionCANCELLED, MissionABORTED			
Related Data					
MissionREADY			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionCOMPLETED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionCANCELLED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionABORTED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
to_F_EL	out	EmergencyLanding			
Related Data					
EmergencyLanding			OF_MM_MissionManagement	OF_EL	
OperatingPoint	out	OperatingAltitude, OperatingSpeed, OperatingOption, OperatingDistance, OperatingMass			
Related Data					
OperatingAltitude			OF_MM_MissionManagement	OF_FC_FlightControl	
OperatingSpeed			OF_MM_MissionManagement	OF_FC_FlightControl	
OperatingOption			OF_MM_MissionManagement	OF_FC_FlightControl	
OperatingDistance			OF_MM_MissionManagement	OF_FC_FlightControl	
OperatingMass			OF_MM_MissionManagement	OF_FC_FlightControl	
FC_Cmds	out	StartTakeOff, StartLanding			
Related Data					

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	Direction	**Related Data**	**Block Source**	**Block Target**	**Comment**
StartTakeOff			OF_MM_MissionManagement	OF_FC_FlightControl	
StartLanding			OF_MM_MissionManagement	OF_FC_FlightControl	

3.3.8.   OF_MMS_SW Block

Table 19: OF_MMS_SW DataSourceTarget: OF_MissionManagementSystem_Data

	Block Source	**Block Target**	**Type**	**Min**	**Max**
EL_BrakingTorque???	OF_EL				
EmergencyLanding1	OF_MM_MissionManagement	OF_EL	t_Event		
PropulsionTorque	OF_FC_FlightControl	Air_Vehicle	t_Torque		
BrakingTorque	OF_FC_FlightControl	Air_Vehicle	t_Torque		
MissionREADY	OF_MM_MissionManagement , OF_MM_MissionManagement	Ground_Station, Control_Panel	t_Event		
MissionCOMPLETED	OF_MM_MissionManagement , OF_MM_MissionManagement	Ground_Station, Control_Panel	t_Event		
MissionCANCELLED	OF_MM_MissionManagement , OF_MM_MissionManagement	Ground_Station, Control_Panel	t_Event		
MissionABORTED	OF_MM_MissionManagement , OF_MM_MissionManagement	Ground_Station, Control_Panel	t_Event		
p	Air_Vehicle	OF_FC_FlightControl, OF_EL	t_Angle	0.0	100.0
pdot	Air_Vehicle	OF_FC_FlightControl, OF_EL	t_AngularVelocity	22.0	37.0
q	Air_Vehicle	OF_FC_FlightControl, OF_EL	t_Angle		
GS_NavControlMode	Ground_Station	OF_MM_MissionManagement	te_NavControlMode		
GS_NavParameters	Ground_Station	OF_MM_MissionManagement	ts_NavParameters		
GS_NavRegulOption	Ground_Station	OF_MM_MissionManagement	te_NavRegulOption		
GS_GO	Ground_Station	OF_MM_MissionManagement	t_Event		
GS_EmergencyLandingCmd	Ground_Station	OF_MM_MissionManagement	t_Event		

<Corporate Info>

	Block Source	Block Target	Type	Min	Max
CP_ON_OFF_PushButton	Control_Panel	OF_MM_MissionManagement	t_Event		
CP_Bay_Switch	Control_Panel	OF_MM_MissionManagement	te_BaySwitch		
CP_Rotactor1	Control_Panel	OF_MM_MissionManagement	int		
CP_Rotactor2	Control_Panel	OF_MM_MissionManagement	int		
CP_NavControlMode	Control_Panel	OF_MM_MissionManagement	te_NavControlMode		
CP_USB_Key	Control_Panel	OF_MM_MissionManagement	ts_NavParameters		
CP_START_PushButton	Control_Panel	OF_MM_MissionManagement	t_Event		
CP_USB_NavRegulOption???	Control_Panel	OF_MM_MissionManagement	te_NavRegulOption		

Table 20: OF_MMS_SW Ports-with-Data: OF_MissionManagementSystem_Interface

	Direction	Related Data	Block Source	Block Target	Comment
Ports					
GS_Inputs	in	GS_NavControlMode, GS_NavParameters, GS_NavRegulOption, GS_GO, GS_EmergencyLandingCmd			
Related Data					
GS_NavControlMode			Ground_Station	OF_MM_MissionManagement	
GS_NavParameters			Ground_Station	OF_MM_MissionManagement	
GS_NavRegulOption			Ground_Station	OF_MM_MissionManagement	
GS_GO			Ground_Station	OF_MM_MissionManagement	
GS_EmergencyLandingCmd			Ground_Station	OF_MM_MissionManagement	

<Corporate Info>

	Direction	**Related Data**	**Block Source**	**Block Target**	**Comment**
CP_Inputs	in	CP_ON_OFF_PushButton, CP_Bay_Switch, CP_Rotactor1, CP_Rotactor2, CP_NavControlMode, CP_USB_Key, CP_START_PushButton, CP_USB_NavRegulOption???			
Related Data					
CP_ON_OFF_PushButton			Control_Panel	OF_MM_MissionManagement	
CP_Bay_Switch			Control_Panel	OF_MM_MissionManagement	
CP_Rotactor1			Control_Panel	OF_MM_MissionManagement	
CP_Rotactor2			Control_Panel	OF_MM_MissionManagement	
CP_NavControlMode			Control_Panel	OF_MM_MissionManagement	
CP_USB_Key			Control_Panel	OF_MM_MissionManagement	
CP_START_PushButton			Control_Panel	OF_MM_MissionManagement	
CP_USB_NavRegulOption???			Control_Panel	OF_MM_MissionManagement	
AV_PhysicalSensors	in	p, pdot, q			
Related Data					
p			Air_Vehicle	OF_FC_FlightControl, OF_EL	
pdot			Air_Vehicle	OF_FC_FlightControl, OF_EL	
q			Air_Vehicle	OF_FC_FlightControl, OF_EL	
PropulsionTrq	out	PropulsionTorque			
Related Data					
PropulsionTorque			OF_FC_FlightControl	Air_Vehicle	
BrakingTrq	out	BrakingTorque			

<Corporate Info>

	Direction	Related Data	Block Source	Block Target	Comment
Related Data					
BrakingTorque			OF_FC_FlightControl	Air_Vehicle	
CP_Switches_to_GS	out				
CP_Displays_to_GS	out	MissionREADY, MissionCOMPLETED, MissionCANCELLED, MissionABORTED			
Related Data					
MissionREADY			OF_MM_MissionManagement, OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionCOMPLETED			OF_MM_MissionManagement, OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionCANCELLED			OF_MM_MissionManagement, OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionABORTED			OF_MM_MissionManagement, OF_MM_MissionManagement	Ground_Station, Control_Panel	
CP_Displays	out	MissionREADY, MissionCOMPLETED, MissionCANCELLED, MissionABORTED			
Related Data					
MissionREADY			OF_MM_MissionManagement, OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionCOMPLETED			OF_MM_MissionManagement, OF_MM_MissionManagement	Ground_Station, Control_Panel	

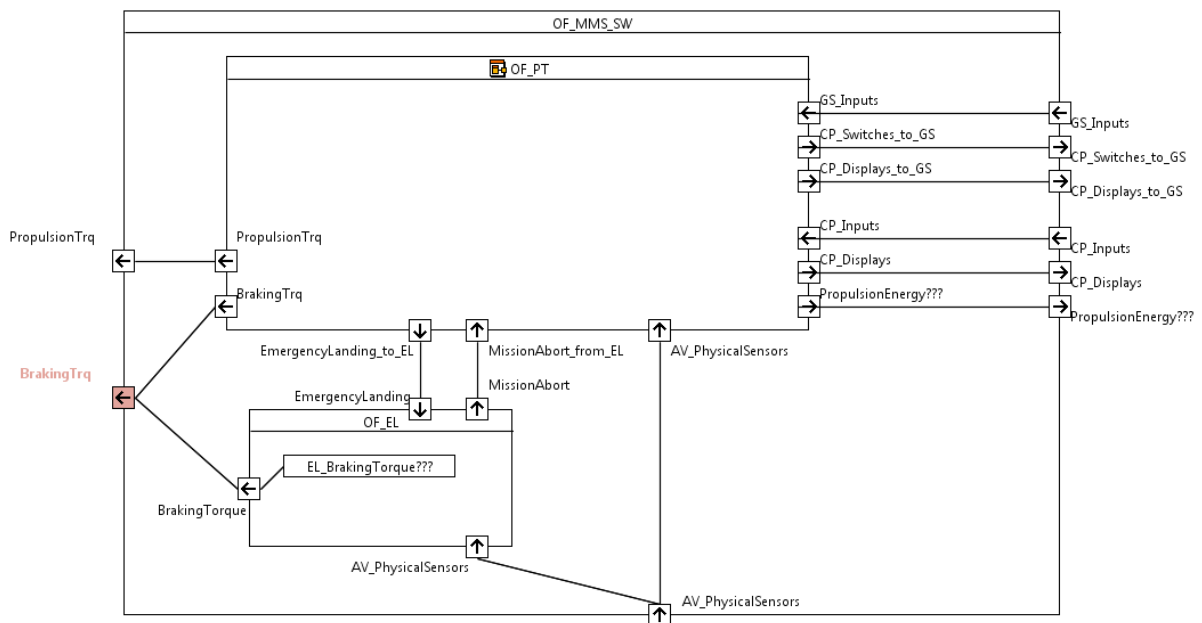|	Direction	Related Data	Block Source	Block Target	Comment
MissionCANCELLED			OF_MM_MissionManagement, OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionABORTED			OF_MM_MissionManagement, OF_MM_MissionManagement	Ground_Station, Control_Panel	
PropulsionEnergy???	out				

3.3.8.1.   Diagrams

Figure 1: Internal Block Diagram - OF_MissionManagementSystem_Diagram

<Corporate Info>

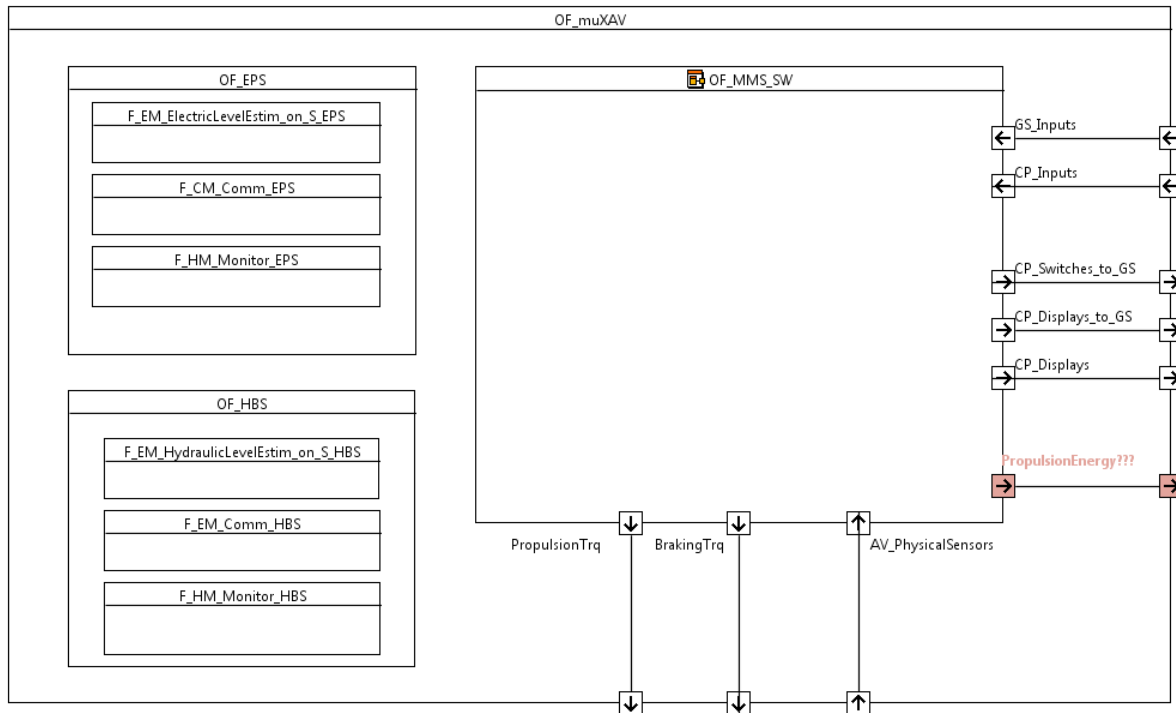### 3.3.9.   OF_muXAV Block

3.3.9.1.   Diagrams

Figure 2: Internal Block Diagram - OF_muXAV_Diagram

3.3.10.   OF_PT Block

Table 21: OF_PT DataSourceTarget: OF_PayloadTransport_Data

	Block Source	Block Target	Type	Min	Max
EmergencyLanding1	OF_MM_MissionManagement	OF_EL	t_Event		
OperatingAltitude	OF_MM_MissionManagement	OF_FC_FlightControl	t_Length		
OperatingSpeed	OF_MM_MissionManagement	OF_FC_FlightControl	t_Velocity		
OperatingOption	OF_MM_MissionManagement	OF_FC_FlightControl	te_NavReguloption		
OperatingDistance	OF_MM_MissionManagement	OF_FC_FlightControl	t_Length		
OperatingMass	OF_MM_MissionManagement	OF_FC_FlightControl	t_Mass		
StartTakeOff	OF_MM_MissionManagement	OF_FC_FlightControl	t_Event		
StartLanding	OF_MM_MissionManagement	OF_FC_FlightControl	t_Event		
CurrentAltitude	OF_FC_FlightControl	OF_MM_MissionManagement	t_Length		
CurrentSpeed	OF_FC_FlightControl	OF_MM_MissionManagement	t_Velocity		
CurrentDistance	OF_FC_FlightControl	OF_MM_MissionManagement	t_Length		

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	Block Source	Block Target	Type	Min	Max
PropulsionTorque	OF_FC_FlightControl	Air_Vehicle, OF_EM_EnergyViability, OF_CM_Comm_MMS	t_Torque		
BrakingTorque	OF_FC_FlightControl	Air_Vehicle, OF_EM_EnergyViability, OF_CM_Comm_MMS	t_Torque		
MissionREADY	OF_MM_MissionManagement	Ground_Station, Control_Panel	t_Event		
MissionCOMPLETED	OF_MM_MissionManagement	Ground_Station, Control_Panel	t_Event		
MissionCANCELLED	OF_MM_MissionManagement	Ground_Station, Control_Panel	t_Event		
MissionABORTED	OF_MM_MissionManagement	Ground_Station, Control_Panel	t_Event		
p	Air_Vehicle	OF_FC_FlightControl	t_Angle	0.0	100.0
pdot	Air_Vehicle	OF_FC_FlightControl	t_AngularVelocity	22.0	37.0
q	Air_Vehicle	OF_FC_FlightControl	t_Angle		
GS_NavControlMode	Ground_Station	OF_MM_MissionManagement	te_NavControlMode		
GS_NavParameters	Ground_Station	OF_MM_MissionManagement	ts_NavParameters		
GS_NavRegulOption	Ground_Station	OF_MM_MissionManagement	te_NavRegulOption		
GS_GO	Ground_Station	OF_MM_MissionManagement	t_Event		
GS_EmergencyLandingCmd	Ground_Station	OF_MM_MissionManagement	t_Event		
CP_ON_OFF_PushButton	Control_Panel	OF_MM_MissionManagement	t_Event		
CP_Bay_Switch	Control_Panel	OF_MM_MissionManagement	te_BaySwitch		
CP_Rotactor1	Control_Panel	OF_MM_MissionManagement	int		
CP_Rotactor2	Control_Panel	OF_MM_MissionManagement	int		
CP_NavControlMode	Control_Panel	OF_MM_MissionManagement	te_NavControlMode		
CP_USB_Key	Control_Panel	OF_MM_MissionManagement	ts_NavParameters		
CP_START_PushButton	Control_Panel	OF_MM_MissionManagement	t_Event		
CP_USB_NavRegulOption???	Control_Panel	OF_MM_MissionManagement	te_NavRegulOption		

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Table 22: OF_PT Ports-with-Data: OF_PayloadTransport_Interface

	Direction	**Related Data**	**Block Source**	**Block Target**	**Comment**
Ports					
GS_Inputs	in	GS_NavControlMode, GS_NavParameters, GS_NavRegulOption, GS_GO, GS_EmergencyLandingCmd			
Related Data					
GS_NavControlMode			Ground_Station	OF_MM_MissionManagement	
GS_NavParameters			Ground_Station	OF_MM_MissionManagement	
GS_NavRegulOption			Ground_Station	OF_MM_MissionManagement	
GS_GO			Ground_Station	OF_MM_MissionManagement	
GS_EmergencyLandingCmd			Ground_Station	OF_MM_MissionManagement	
CP_Inputs	in	CP_ON_OFF_PushButton, CP_Bay_Switch, CP_Rotactor1, CP_Rotactor2, CP_NavControlMode, CP_USB_Key, CP_START_PushButton, CP_USB_NavRegulOption???			
Related Data					
CP_ON_OFF_PushButton			Control_Panel	OF_MM_MissionManagement	
CP_Bay_Switch			Control_Panel	OF_MM_MissionManagement	
CP_Rotactor1			Control_Panel	OF_MM_MissionManagement	
CP_Rotactor2			Control_Panel	OF_MM_MissionManagement	
CP_NavControlMode			Control_Panel	OF_MM_MissionManagement	
CP_USB_Key			Control_Panel	OF_MM_MissionManagement	

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	Direction	Related Data	Block Source	Block Target	Comment
CP_START_PushButton			Control_Panel	OF_MM_MissionManagement	
CP_USB_NavRegulOption???			Control_Panel	OF_MM_MissionManagement	
AV_PhysicalSensors	in	p, pdot, q			
Related Data					
p			Air_Vehicle	OF_FC_FlightControl	
pdot			Air_Vehicle	OF_FC_FlightControl	
q			Air_Vehicle	OF_FC_FlightControl	
MissionAbort_from_EL	in				
CP_Switches_to_GS	out				
CP_Displays_to_GS	out	MissionREADY, MissionCOMPLETED, MissionCANCELLED, MissionABORTED			
Related Data					
MissionREADY			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionCOMPLETED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionCANCELLED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
MissionABORTED			OF_MM_MissionManagement	Ground_Station, Control_Panel	
CP_Displays	out	MissionREADY, MissionCOMPLETED, MissionCANCELLED, MissionABORTED			
Related Data					
MissionREADY			OF_MM_MissionManagement	Ground_Station, Control_Panel	

	Direction	Related Data	Block Source	Block Target	Comment
MissionCOMPL ETED			OF_MM_Missio nManagement	Ground_Statio n, Control_Panel	
MissionCANCE LLED			OF_MM_Missio nManagement	Ground_Statio n, Control_Panel	
MissionABORT ED			OF_MM_Missio nManagement	Ground_Statio n, Control_Panel	
PropulsionEne rgy???	out				
PropulsionTrq	out	PropulsionTor que			
Related Data					
PropulsionTor que			OF_FC_FlightC ontrol	Air_Vehicle, OF_EM_Energ yViability, OF_CM_Comm _MMS	
BrakingTrq	out	BrakingTorque			
Related Data					
BrakingTorque			OF_FC_FlightC ontrol	Air_Vehicle, OF_EM_Energ yViability, OF_CM_Comm _MMS	
EmergencyLan ding_to_EL	out	EmergencyLan ding1			
Related Data					
EmergencyLan ding1			OF_MM_Missio nManagement	OF_EL	

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3.3.10.1.   Diagrams
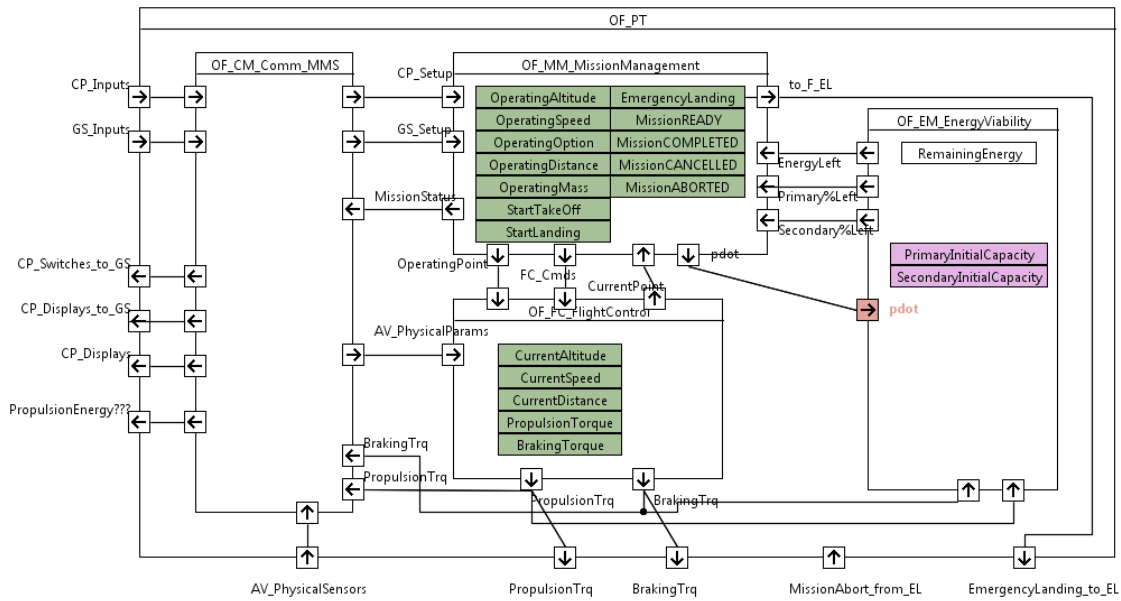
Figure 3: Internal Block Diagram - OF_PayloadTransport_Diagram

3.3.11.   OrganicFunctions Block
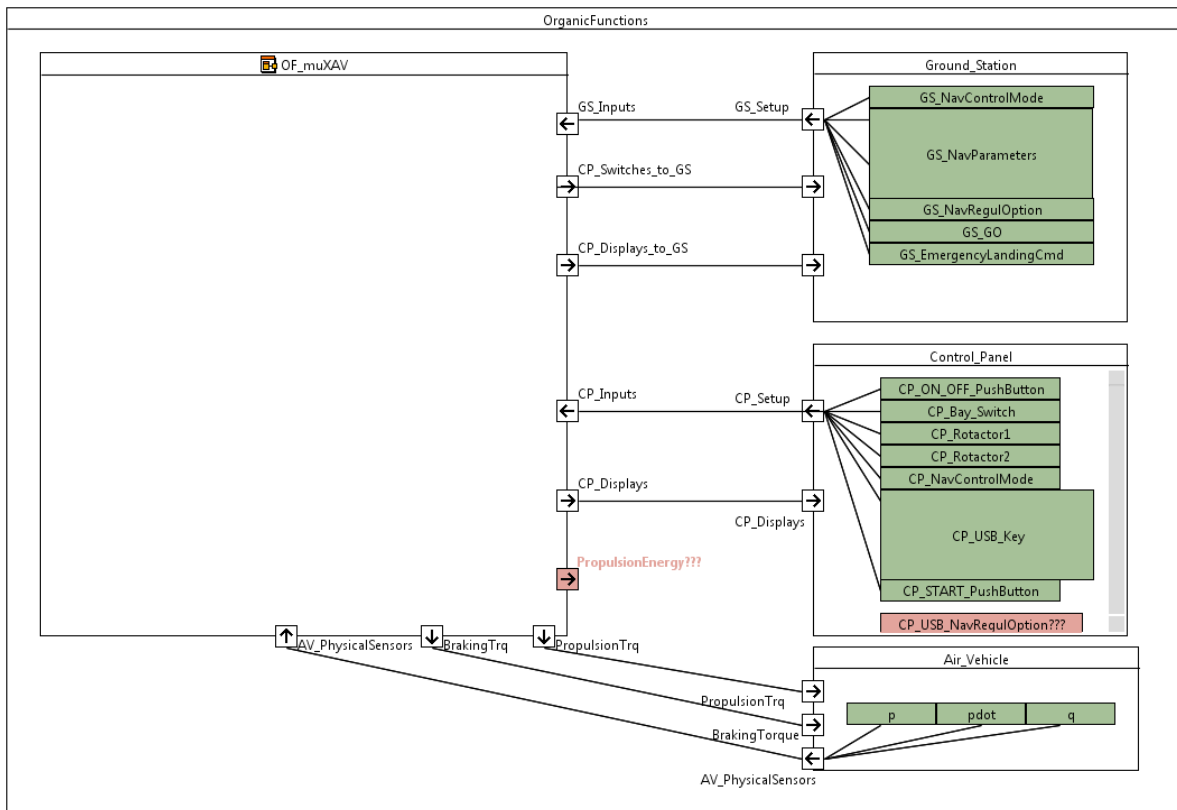
3.3.11.1.   Diagrams

Figure 4: Internal Block Diagram - OrganicFunctions_Diagram

<Corporate Info>

3.4. muXAV_v3::PhysicalSystemsArchitecture Package

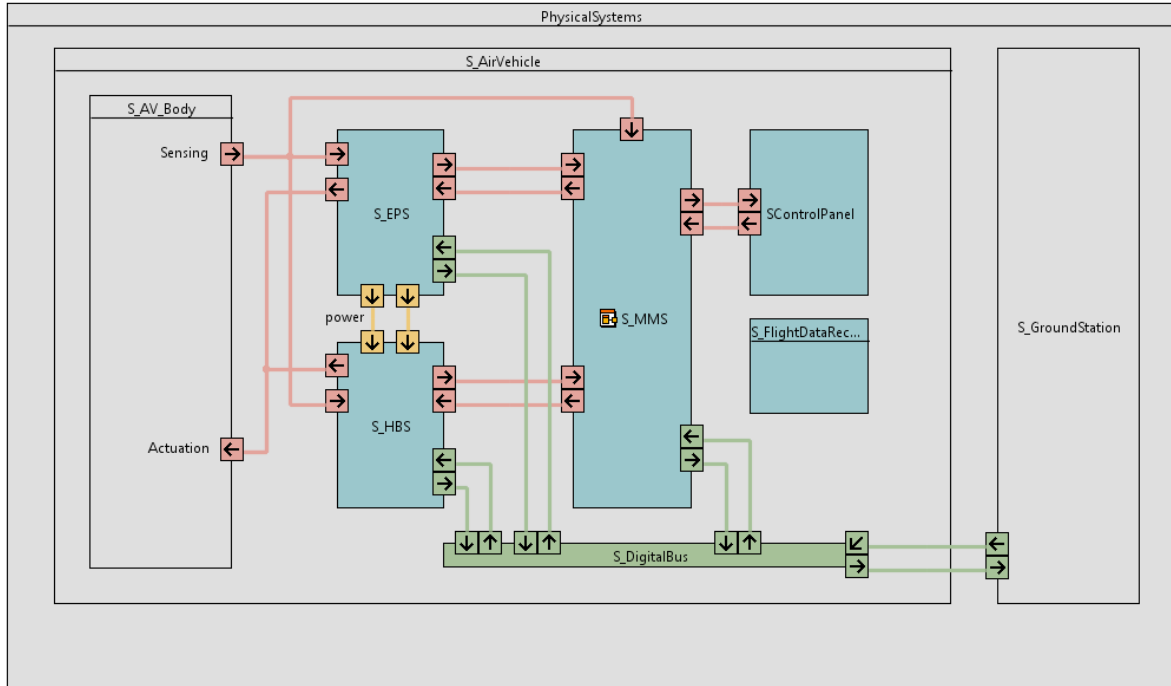### 3.4.1.   PhysicalSystems Block

3.4.1.1.   Diagrams

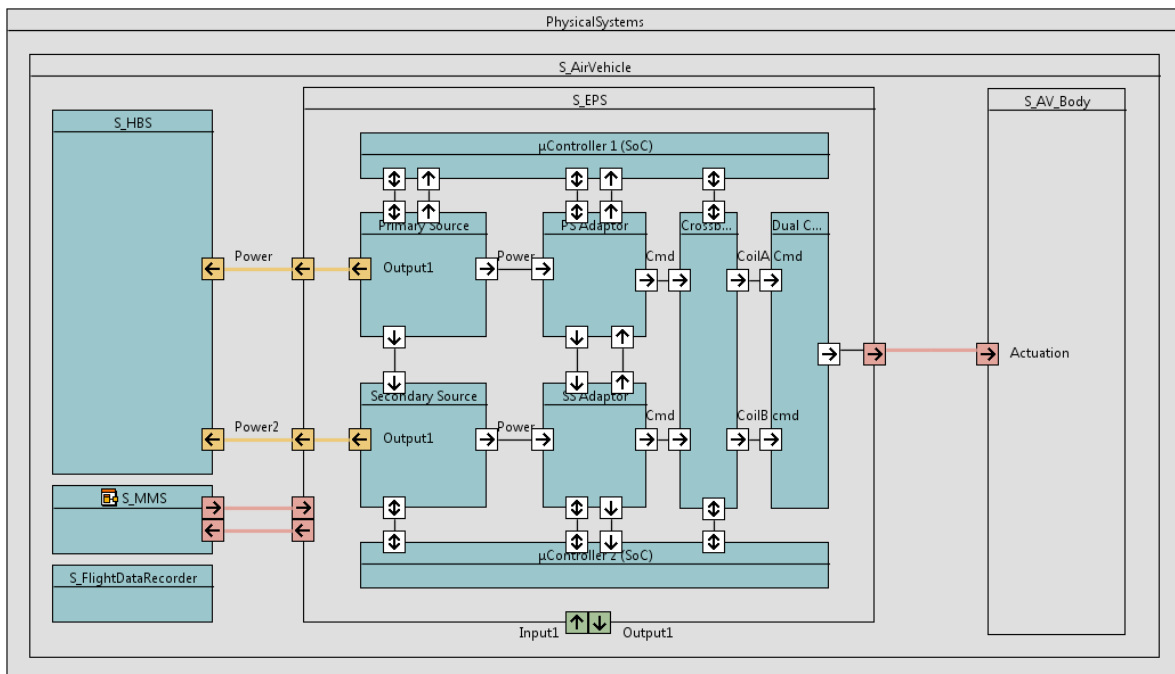

Figure 5: Internal Block Diagram - Communication_System

Figure 6: Internal Block Diagram - Electrical_Propulsion_System
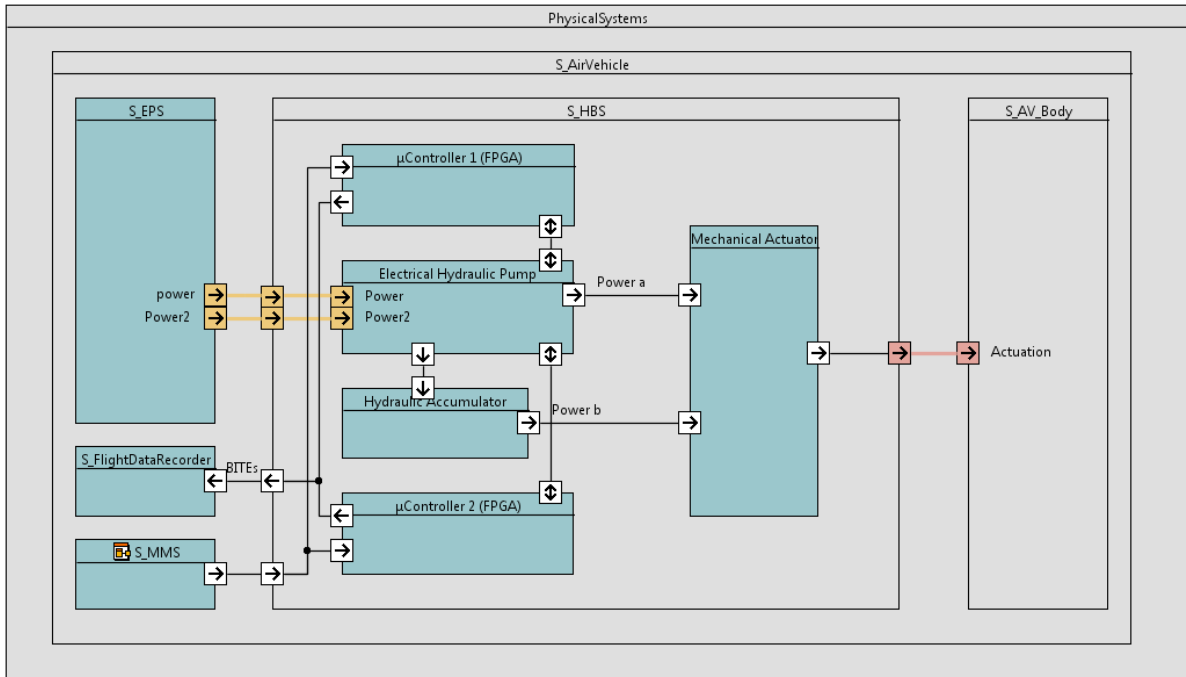
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Figure 7: Internal Block Diagram - Hydraulic_Braking_System

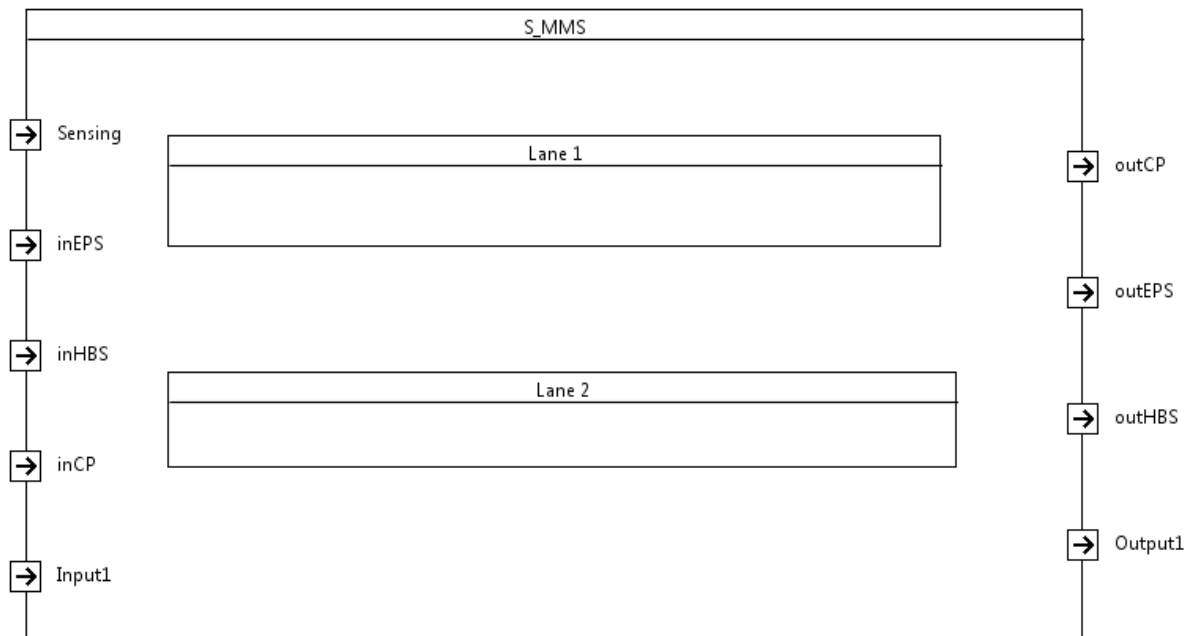## 3.4.2.   S_MMS Block

3.4.2.1.   Diagrams

Figure 8: Internal Block Diagram - MMS_System_Diagram

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