

Interfaces

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Outline

- Overview
- Interfaces in SysML
 - Ports
 - Interface hierarchy
 - Connecting ports, conjugation
 - Flow properties
 - Item flows
- SKA Interface stereotype



Overview

- The integrated modelling environment provided by CSM allows interfaces to be precisely defined and communicated in a consistent way
- Interface specifications can be stored in a read only library so both sides use the same definitions
- The model can be used as a tool to check against the ICDs to ensure that all the interfaces have been captured correctly



SysML – Ports

- Ports are used to represent interfaces
- Two types of port:
 - Full - represents physical parts e.g. an electrical connector
 - Proxy – exposes features of its owning block or parts, allows hierarchy to be defined
- Currently in the consortia model, only proxy ports are used

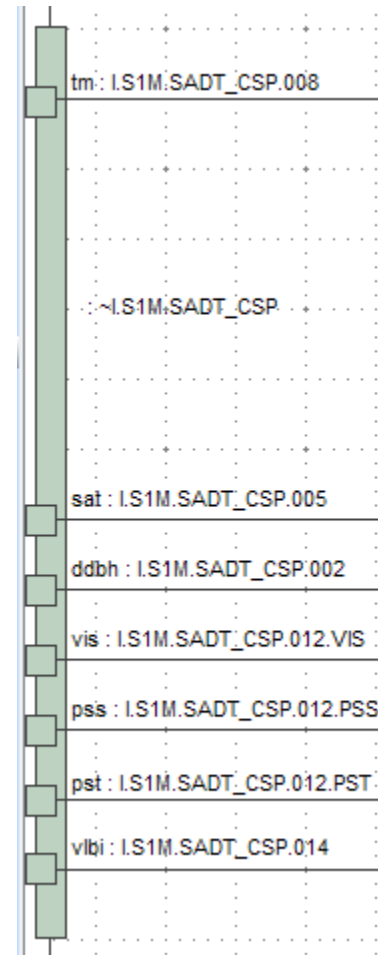
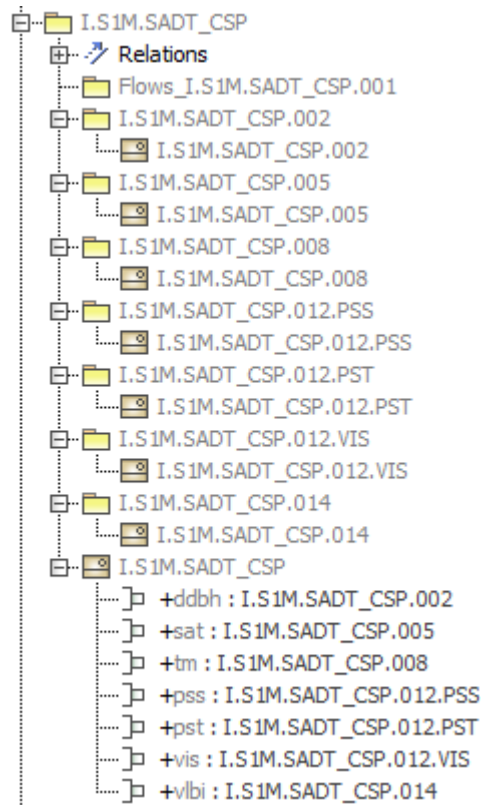


SysML – Interface hierarchy 1

- Proxy ports are typed by interface blocks (specialised blocks with no internal structure)
- This allows a hierarchy of interface layers to be created and developed as the design progresses
- In the model interfaces are defined in the SKAO Library to ensure consistency



SysML – Interface hierarchy 2

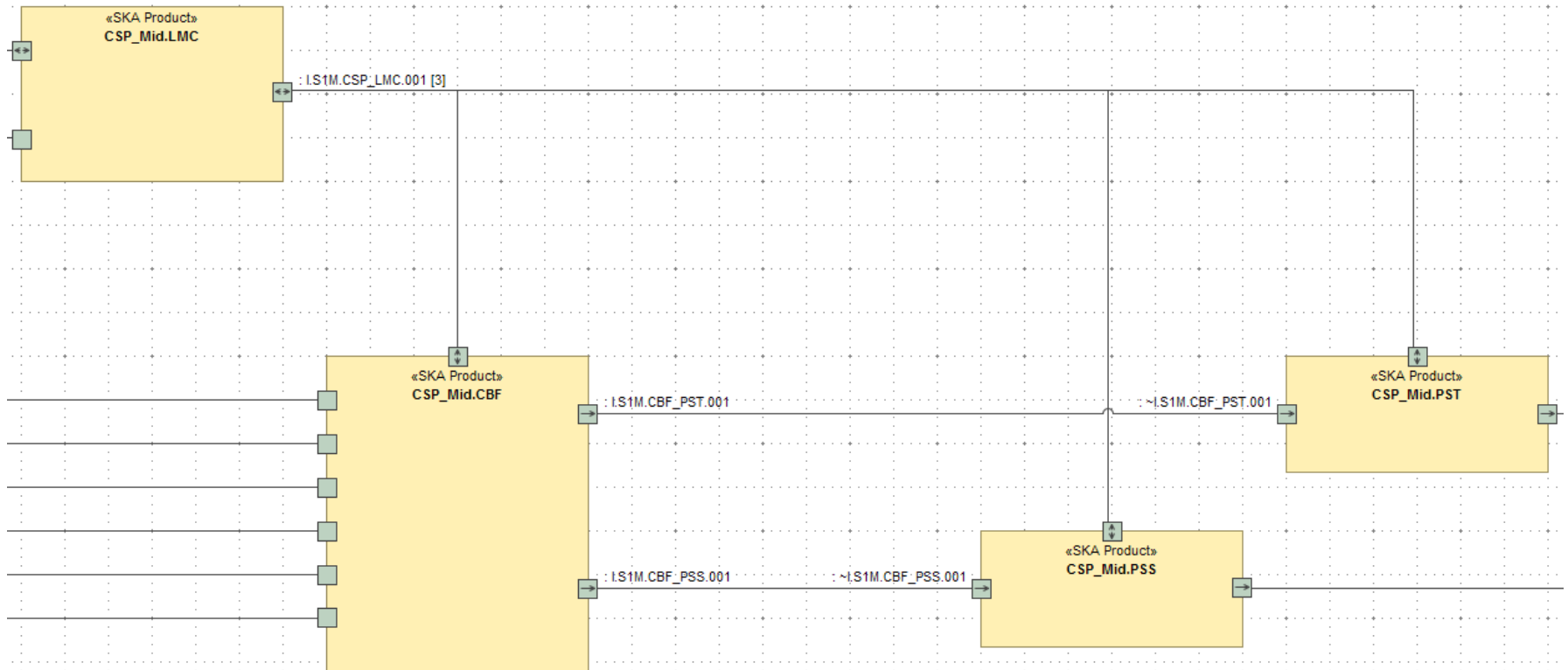


SysML – Connecting ports 1

- Ports are joined using connectors
- To avoid creating separate specifications for ports which exchange similar items but in opposite directions, a port can be conjugated. Conjugating a port reverses the direction of flow properties and behavioral features.

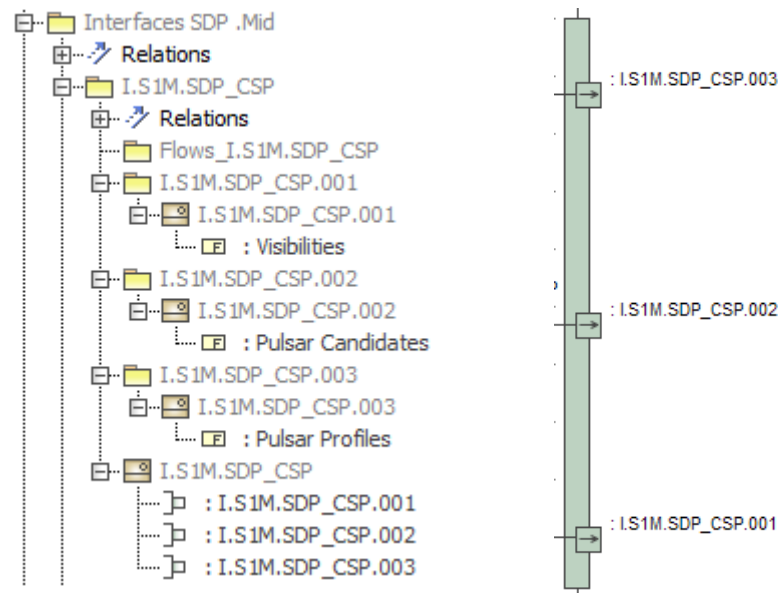


SysML – Connecting ports



SysML – Flow properties

- Ports can have associated flow properties which specify what can flow through a port and the direction of that flow

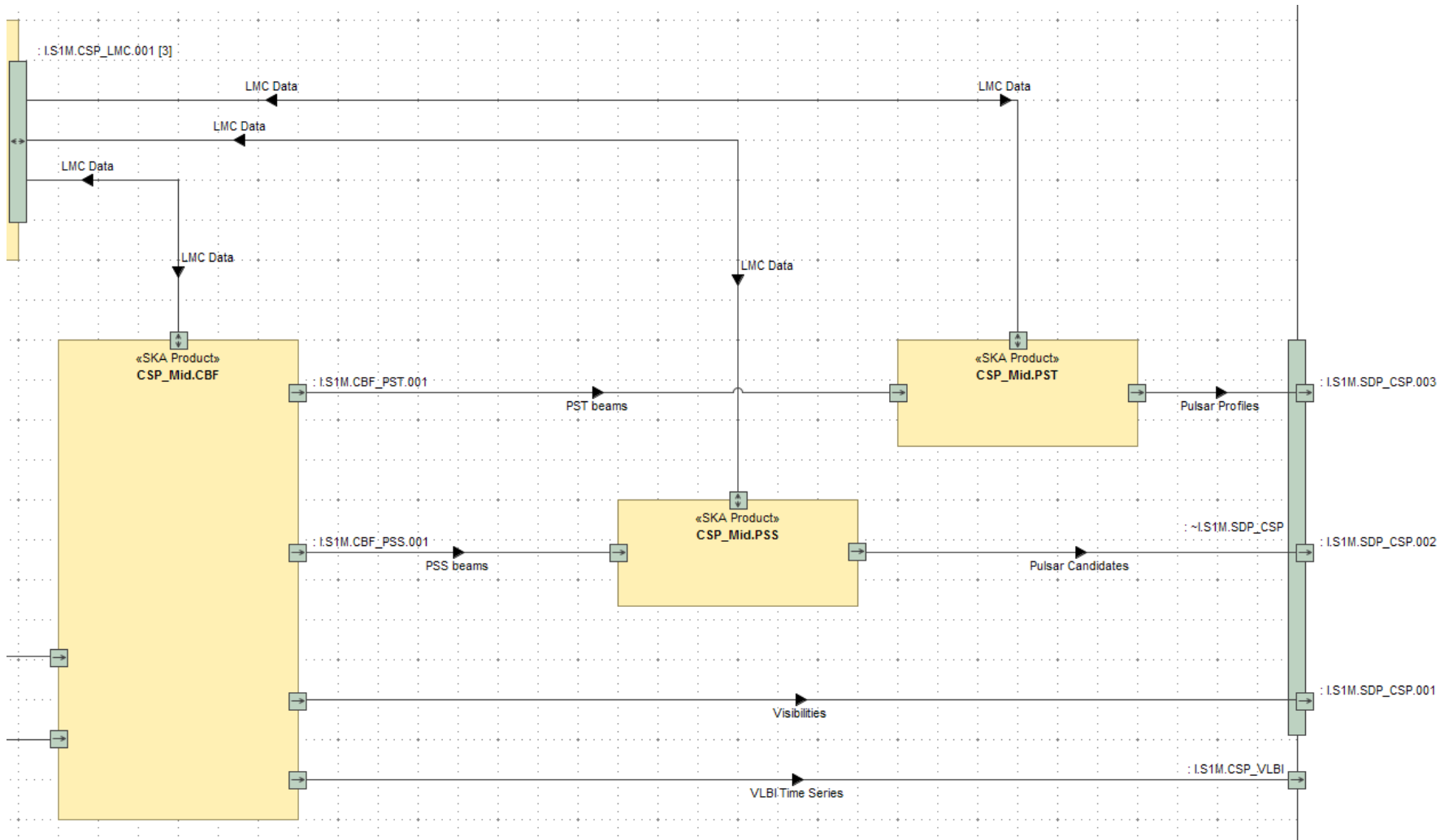


SysML – Item flows 1

- Item flows specify what is actually flowing along a connector between two ports. For a valid connection the item flow must match or be a generalisation of the flow properties associated with the ports.
- In the model Item Flows are defined in the SKAO Library to help ensure consistency



SysML – Item flows 2

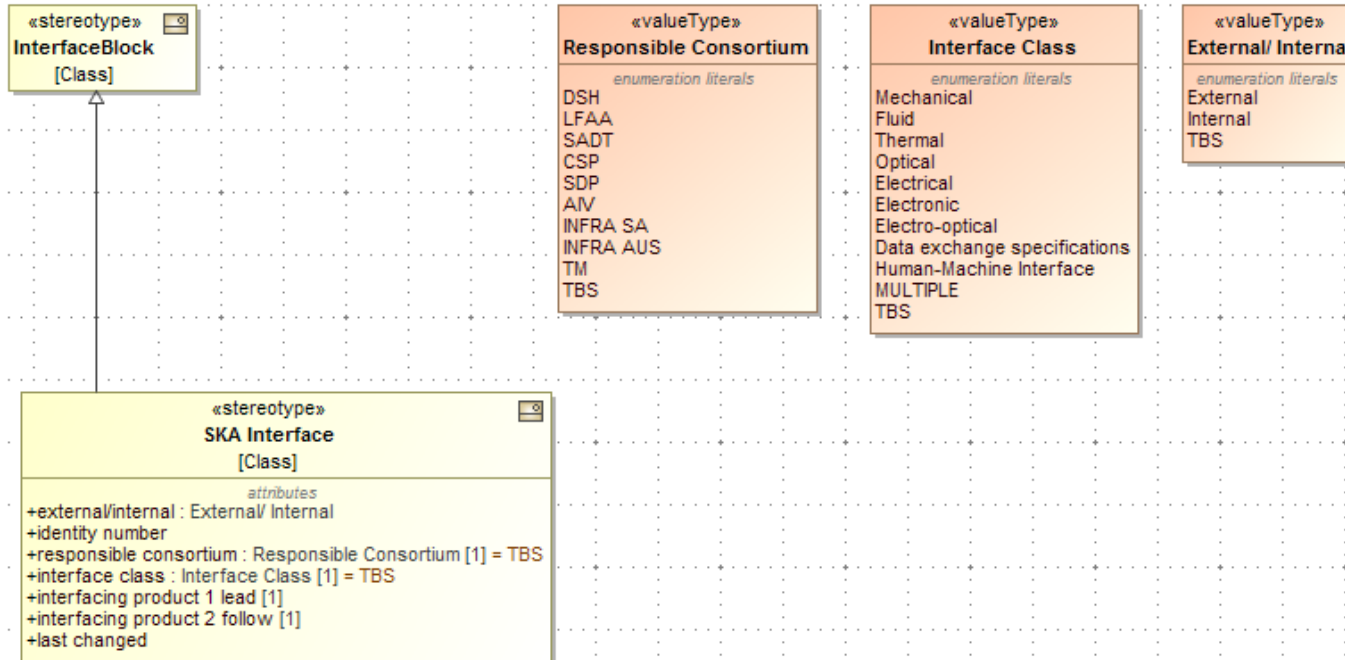


SKA Interface Stereotype 1

- The model defines an ‘SKA Interface’ stereotype encapsulating a variety of information associated with interfaces including interface class, leading and following parties, identity number etc and can be extended as needed
- The SKA Interface stereotype is applied to all interface blocks defined in the SKA Library



SKA Interface Stereotype 2



Identity number	I.S1L.CSP_INFRA
Is Encapsulated	<input type="checkbox"/> <undefined>
External/internal	External
Interface class	MULTIPLE
Interfacing product 1 lead	CSP .Low
Last changed	
Responsible consortium	CSP
Interfacing product 2 follow	INFRA .Low



Questions?



Points for discussion

- How should the model be used in conjunction with existing ICDs?
 - Creation of N-squared diagrams
 - Using association blocks
 - Adding constraints to support engineering analysis e.g. network capacity and power



Tip: Multi-valued enumerations

- Multi-valued enumeration properties can be created by setting the property multiplicity to [0..*]. This saves adding 'MULTIPLE' to the enumeration type.

