

## Interface Patterns Project

### Meeting Minutes

**Date/Time:** Friday, June 02, 9:00 – 11:30 AM EST

**Attendees:**

X	Bill Schindel	ICTT System Sciences	<a href="mailto:schindel@icctt.com">schindel@icctt.com</a>	812.232.2062
X	Frank Salvatore	Engility Corp.	<a href="mailto:frank.salvatore@engilitycorp.com">frank.salvatore@engilitycorp.com</a>	973.607.2068
X	Jon Torok	NSWC Crane	<a href="mailto:torokri@gmail.com">torokri@gmail.com</a>	812.854.5247
X	Jason Sherey	ICTT System Sciences	<a href="mailto:sherey@icctt.com">sherey@icctt.com</a>	812.232.5968
X	Stephen Lewis	ICTT System Sciences	<a href="mailto:lewis@icctt.com">lewis@icctt.com</a>	812.231.7930

**Current Work Stream Status:**

Priority work streams: 1, 3, 4, and 6.

*Current status:*

- Work Stream 1: A diagram and related list of definitions (***Interface Pattern Support from S-MTM V1.2.6***) was distributed on March 7. Some of the related content has been subject of discussion in each meeting, as it becomes more familiar. We still need to decide what different form of explanatory media or examples may be needed.
- Work Stream 2: A table of this project’s initial target interface types, along with some of the key elements specific to them

(e.g., specific Input-Outputs, Interactions, Systems of Access, Attributes) was distributed on May 19 (***Target Interface Patterns—Overview V1.2.1***). This constitutes the rough outline for discussion of the set of initial targets to turn into modeled S\*Patterns along the lines described in that table, or otherwise. We agreed earlier that other Work Streams were a higher priority up to this point, but are now reaching the point at which the listed target interface types are in need of being undertaken as project outputs that will be more tangible to others.

- Work Stream 3: An example ICD template document (***ICD Template.doc***) was provided for review on June 2. Additional interface-oriented report/view/document types need to be identified and, as prioritized, illustrated with examples from the targeted interface pattern types.
- Work Stream 4: Examples of typical system life cycle tasks have been verbally discussed, but not yet recorded for the record. Note that this is the real driver for Work Stream 3, so should not lag it—it provides the reason for the views listed in Work Stream 3.
- Work Stream 5: Not yet started, pending other work streams. (Note that this fits in the general Pattern Management Process.)
- Work Stream 6: This work stream (in particular, mappings and conventions specific to SysML and specific tools) has absorbed a significant portion of the team’s time. While this is somewhat understandable, we need to take care that it not overwhelm the other streams listed above.

#### Possible work streams

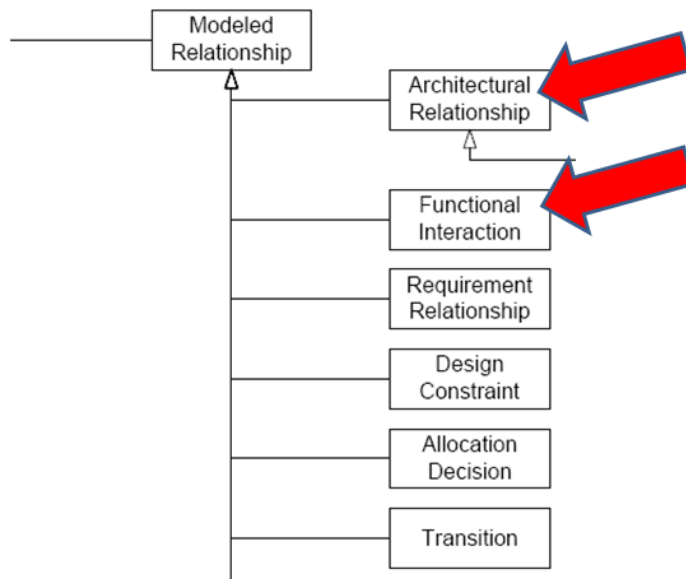
1. Identify interface aspects of the S\*Metamodel (the most abstract interface pattern)
  - List of those aspects
2. Create library of interface patterns of different types (specializations of 1) showing techniques in mechanical, communication, visual, etc.
  - List target interface classes (Jon suggested mounting, communication, ...)
  - And how to use them
3. Identify queries and views that are interface-based (e.g., ICD, etc.)
  - List the views and queries
  - What metadata should appear in each of these (what metadata in an ICD, etc.)(converting these to S\*Metamodel terms is a good way to learn it as well as test it)
4. Identify interface-oriented tasks, activities in the engineering life cycle (the reasons we are doing this stuff)
  - List them
5. Down the road, issues of governance of the resulting patterns, their life cycles
6. Tactical level tool specific items, not necessarily interface-oriented, along with mappings to SysML or specific tools
  - List

## Summary of This Meeting:

1. We discussed a partial (S\*Interface related) S\*Metamodel inserted by Jon into MD/CM as an application model and not just a profile, illustrating a possible way to document as well as generate some related reports or views.
2. We reviewed the rationale of why some elements (System of Access, for example) appear as classes and not just relationship roles.
3. We discussed SysML mapping options for certain S\*Metamodel items, including S\*Architectural Relationship, S\*Functional Interaction, S\*Interface, and S\*Port.
4. Frank provided an example of a general Interface Control Document (ICD) template document for various types of interfaces.
5. We briefly discussed what we learned at the previous week's No Magic Symposium concerning Team Work Cloud (which we are planning to use for some of the collaboration of this project) versus Team Work Server (which is apparently on the way out).
6. We agreed on action items, and the next meeting will be on Friday, June 19, 9:00 AM EST.

## Details:

7. In discussing the conceptual difference between (or sameness of) S\*Functional Interaction and S\*Architectural Relationship, we noted that in the S\*Metamodel, both of these are types of S\*Modeled Relationship. In that sense they are "the same" at a high enough level of abstraction, but at a more specific level, one of them denotes the detailed dynamical behavioral exchange of an interaction, versus the overall static relationship established by that (and possibly other additional) interaction(s):



**Figure 1: From the S\*Metamodel**

(An earlier discussion of why System of Access is shown as a specific class instead of a role end of a relationship could be understood in a similar way: SOA is a type of Logical System.)

- We discussed a partial (S\*Interface related) S\*Metamodel inserted by Jon into MD/CM as an application model and not just a profile, illustrating a possible way to document as well as generate some related reports or views:

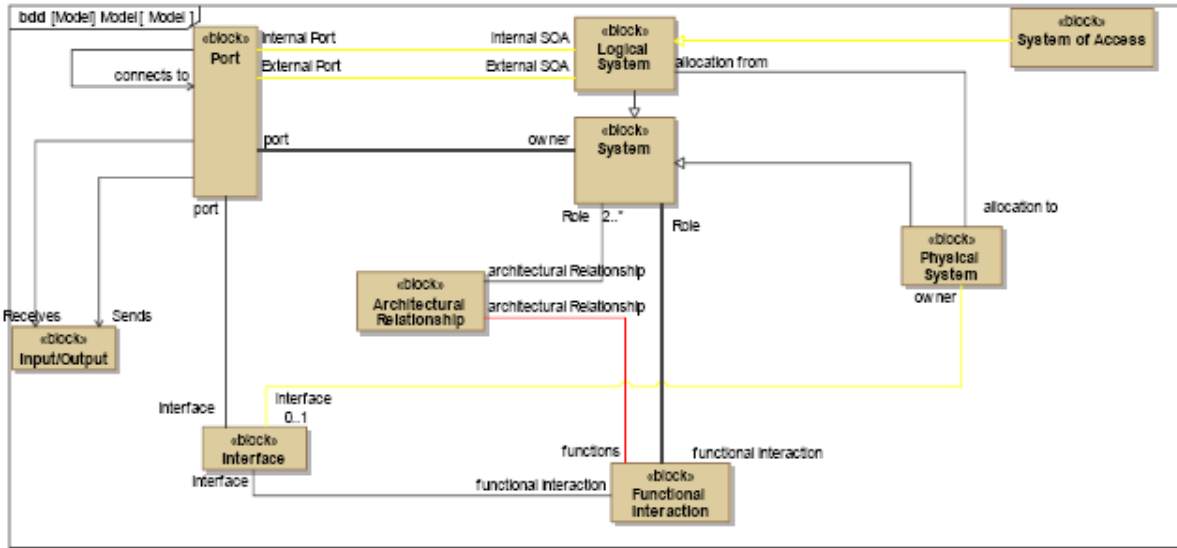
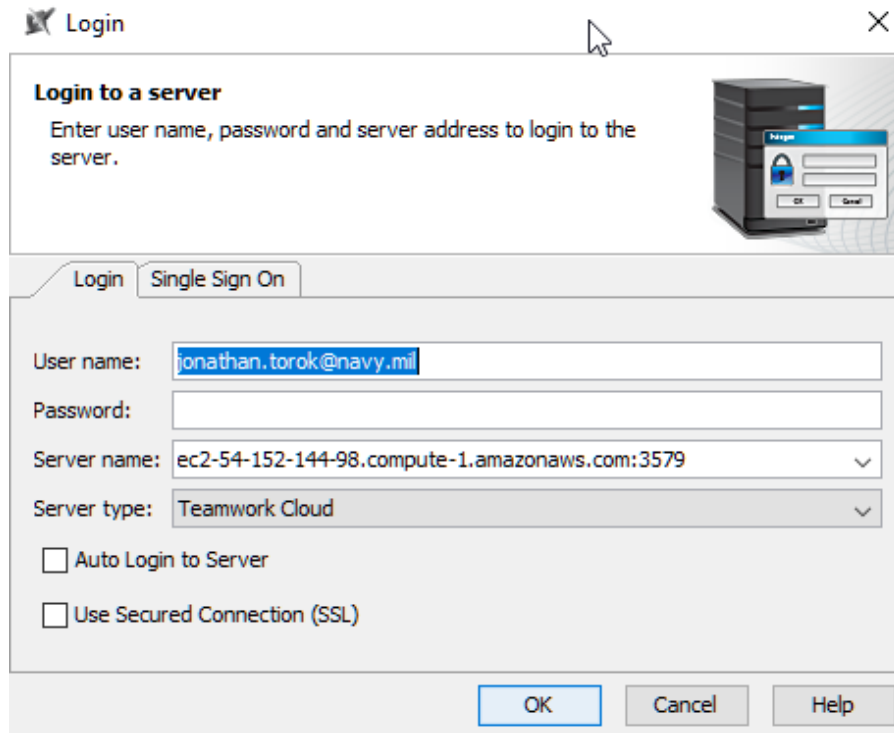


Figure 2: Discussion diagram from Jon

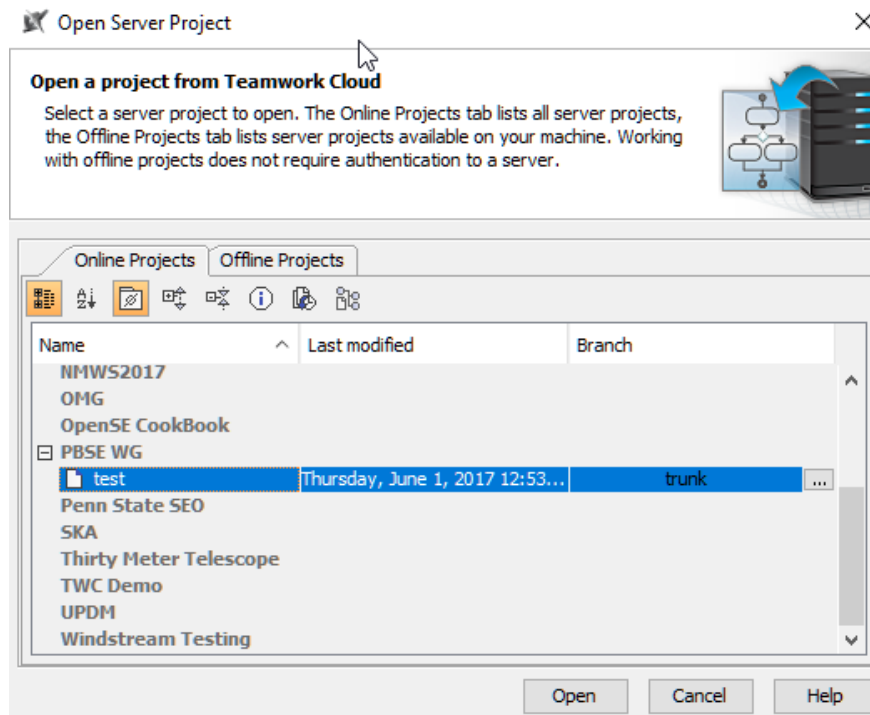
1	Architectural Relationship	An Architectural Relationship is a relationship that summarizes the architectural significance of a set of interactions between systems. A Functional Interaction is an interaction of two or more Systems. Interaction means that one system affects the state of another system. All interactions are relationships between systems, expressing the externally visible behavioral outcome (requirement) of the interactions. A Functional Interaction is also sometimes called a Collaboration. An Input/Output is that which is exchanged between interacting systems.	<ul style="list-style-type: none"> <li>Role : System [2..*]</li> <li>functions : Functional Interaction</li> </ul>
2	Functional Interaction		<ul style="list-style-type: none"> <li>Role : System</li> <li>Interface : Interface</li> <li>architectural Relationship : Architectural Relationship</li> </ul>
3	Input/Output		
4	Interface	An Interface is an association of Input/Outputs, Functional Interactions, Systems of Access (SOAs), and Architectural Relationships through which a system interacts with other systems. Each interface is owned by that system.	<ul style="list-style-type: none"> <li>port : Port</li> <li>functional Interaction : Functional Interaction</li> <li>owner : Physical System</li> </ul>
5	System	A system is a collection of interacting components. A component can itself be a System, called a sub-system. Information about the purpose or configuration of a system is recorded into the metaclasses associated with the System (e.g., Feature).	<ul style="list-style-type: none"> <li>functional interaction : Functional Interaction</li> <li>port : Port</li> <li>architectural Relationship : Architectural Relationship</li> <li>allocation from : Logical System</li> <li>Interface : Interface</li> </ul>
6	Physical System	A Physical System is System defined based upon its identity or physical compositions, but not its behavior. Physical systems may be given proper names, such as names of commercial products, corporate systems, people, organizations, buildings, etc. Physical Systems are Design Components that build the Functional Roles (Logical Systems) allocated to them through an	<ul style="list-style-type: none"> <li>Internal SOA : Logical System</li> <li>owner : System</li> </ul>
7	Port	is a specific relationship between a received and sent Input/Output, Internal and external Systems of Access (SOAs), Internal and external Architectural Relationship, and a Functional Interaction.	<ul style="list-style-type: none"> <li>Interface : Interface [0..1]</li> <li>External Port : Physical System</li> <li>Receives : Input/Output</li> <li>Sends : Input/Output</li> <li>connects to : Port</li> <li>allocation to : Physical System</li> <li>External Port : Port</li> <li>Internal Port : Port</li> <li>functional Interaction : Functional Interaction</li> <li>port : Port</li> <li>architectural Relationship : Architectural Relationship</li> <li>functional interaction : Functional Interaction</li> <li>port : Port</li> <li>architectural Relationship : Architectural Relationship</li> <li>allocation to : Physical System</li> <li>External Port : Port</li> <li>Internal Port : Port</li> </ul>
8	System of Access	A System of Access (SOA) is the system which allows other systems to interact (impact each other's state).	
9	Logical System		

Figure 3: Illustration of machine-generated table report from model

- Each team member needs to test access to the Team Work Cloud system, using access information below plus individual security information provided previously:



**Figure 4: Log On**



**Figure 5: Select project to open**

10. Plans for next activities:

- a. Next meeting: Friday, June 16, 9:00 AM EST
- b. Actions before next meeting: See Action Items

**Action Items:**

Work Stream 2:

11. Provide an example Interface S\*Pattern before the June 16 meeting. (Jason)

Work Streams 3, 4:

12. Review the example ICD document template provided by Frank. (All)
13. Identify list of views, queries, reports, or displays (e.g., ICD, levels/scope of Interfaces, etc.) that we should pursue as interface-related, against related ISO 15288/15289 or other frameworks. (Frank, Jason, Jon)

Work Stream 6:

14. Provide an example Interface S\*Pattern mapped to MD/CSM SysML, along with that mapping's description, before the June 16 meeting. The mapping to SysML will be initially documented using the current tabular mapping document method, but also will have documentation generated from the meta-model, a profile, and the mapping between them in MD/CSM. (Jason)
15. Identify list of remaining mapping issues for mapping to SysML/Magic Draw, in the Interface area of S\*Metamodel. (Jon, Jason)
16. Replace or resolve meaning of the "NA's" in S\*Metamodel Mapping Document detail table for Magic Draw, or what additional action is required, if any. (Stephen)
17. Update profile provided to Jon, accordingly (Stephen, Jason)

Other:

18. Send out repeating meeting calendar invitation (Bill)
19. Post minutes and materials to project web site (Bill)
20. Test and start meetings with modeling tools and/or drawing tools so as to better share visual discussions over web meeting, which otherwise are local to some and not visible to all (Bill)
21. Try to log on to Team Work Cloud using the new access provided, to verify access (All)

**Reference Materials:** (These may be down loaded from the following project web site)

22. Project web site: [http://www.omgwiki.org/MBSE/doku.php?id=mbse:patterns:interface\\_patterns\\_team](http://www.omgwiki.org/MBSE/doku.php?id=mbse:patterns:interface_patterns_team)  
Pages easily added under that location. Files can be inserted there when appropriate (see same)
23. Interface Patterns Project Charter, INCOSE Patterns Working Group, V1.3.2
24. Abbreviated S\*Metamodel Glossary, V4.3.1, ICTT System Sciences, 2017.
25. Extract from S\*Metamodel: Interface Related Elements, 03.07.2017, V1.2.6, ICTT
26. Shames, Sarrel, Friedenthal, "A Representative Application of a Layered Interface Modeling Pattern", Proc. of INCOSE International Symposium 2016, Edinburgh, UK; paper + slides:  
[http://www.omgsysml.org/A\\_modeling\\_pattern\\_for\\_layered\\_system\\_interfaces-INCOSE%20IS15\\_paper-sarrel-shames.pdf](http://www.omgsysml.org/A_modeling_pattern_for_layered_system_interfaces-INCOSE%20IS15_paper-sarrel-shames.pdf)  
[http://www.omgwiki.org/OMGSysML/lib/exe/fetch.php?media=sysml-roadmap:a\\_representative\\_application\\_of\\_a\\_layered\\_interface\\_modeling\\_2016-07-11.pptx](http://www.omgwiki.org/OMGSysML/lib/exe/fetch.php?media=sysml-roadmap:a_representative_application_of_a_layered_interface_modeling_2016-07-11.pptx)
27. Shames, Sarrel, Friedenthal, "Modeling Systems of Systems Interfaces with SysML", AIAA 2016 Conference, SpaceOps Conference, (AIAA 2016-2500) <http://dx.doi.org/10.2514/6.2016-2500>
28. OMG SysML 2.0 Interface Concepts Team web site:  
[http://www.omgwiki.org/OMGSysML/doku.php?id=sysml-roadmap:interface\\_concepts\\_modeling\\_core\\_team](http://www.omgwiki.org/OMGSysML/doku.php?id=sysml-roadmap:interface_concepts_modeling_core_team)
29. JPL MBEE Project wiki: <https://github.com/Open-MBEE/ProjectWiki>