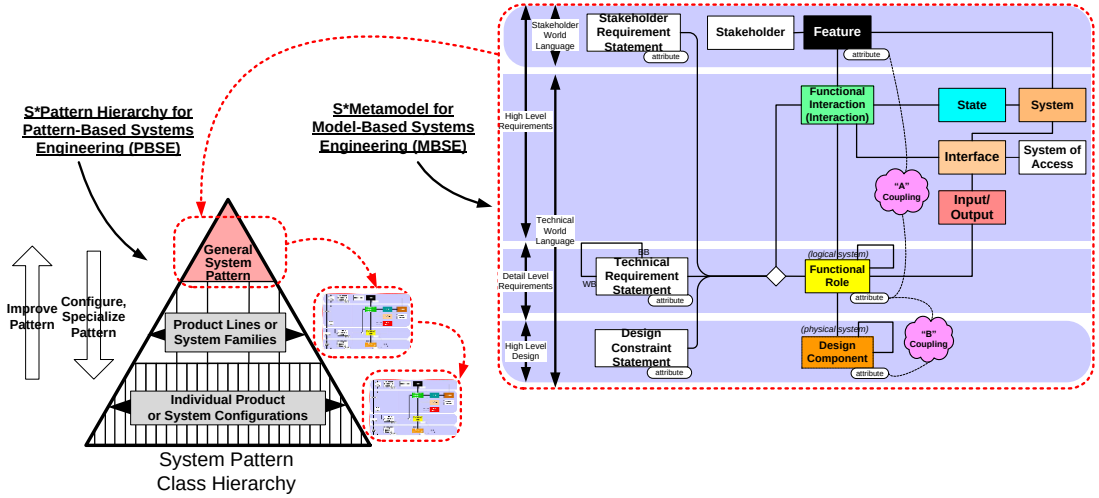
26th annual INCOSE international symposium

Edinburgh, UK

July 18 - 21, 2016



MBSE Patterns Working Group

CAB Briefing, July 16, 2016

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MBSE Patterns Working Group

- A “3-Year-Old Newborn” with a Mission
- Patterns in Science and Engineering
- Models Strong Enough for Effective Patterns
- INCOSE/OMG MBSE Initiative
- Model-Based Transformation of SE Discipline
- Joint Projects with Others
- Invitation to CAB Members
- Advice from the CAB, Questions, Discussion
- References

A “3-Year-Old Newborn” with a Mission

- MBSE Patterns Challenge Team:
  - Chartered and started in 2013 as part of the INCOSE/OMG MBSE Initiative
  - Three years of successful team history
  - Re-chartered as INCOSE WG in June, 2016
- Continuing Mission: *Advance the availability and awareness of practices and resources for creation, application, and learned improvement of MBSE Patterns over multiple system life cycles*.

Patterns in Science & Engineering

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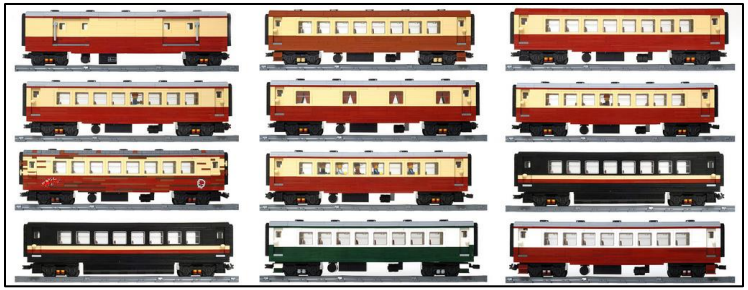
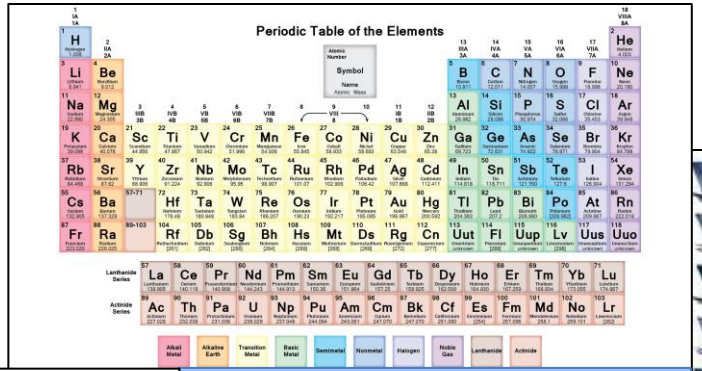
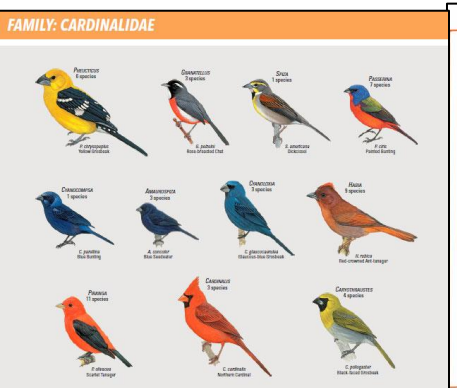
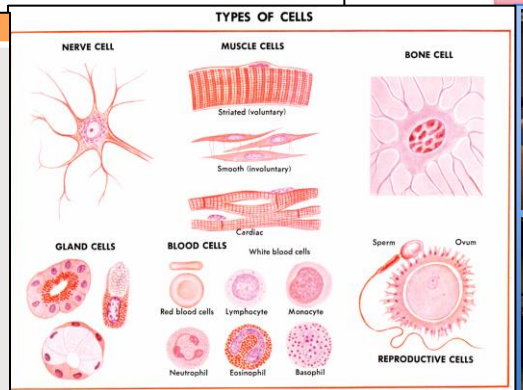
Patterns are recurring regularities observed across multiple instances, with both fixed and variable aspects:









Patterns in Science & Engineering

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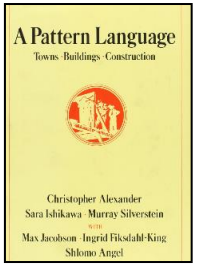
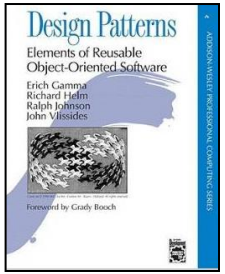
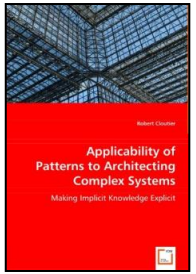
- The MBSE Patterns WG focuses on concerns of a certain type, for patterns of a certain nature:
  - Expressed as system models (hence the “MBSE” in our name)
  - Using the smallest possible models sufficient for purposes of engineering (specifically, all of ISO 15288) and science (specifically, all of the physical sciences)
- “Smallest possible model” has two important practical impacts:
  - Big enough scope to cover everything in the above, but . . .
  - Small enough to not be extraneous or redundant.

History of Patterns in Engineering & Science

- We respect the lengthy and distinguished history of patterns in engineering, including those which are not explicit models, or of more limited scope, or otherwise:



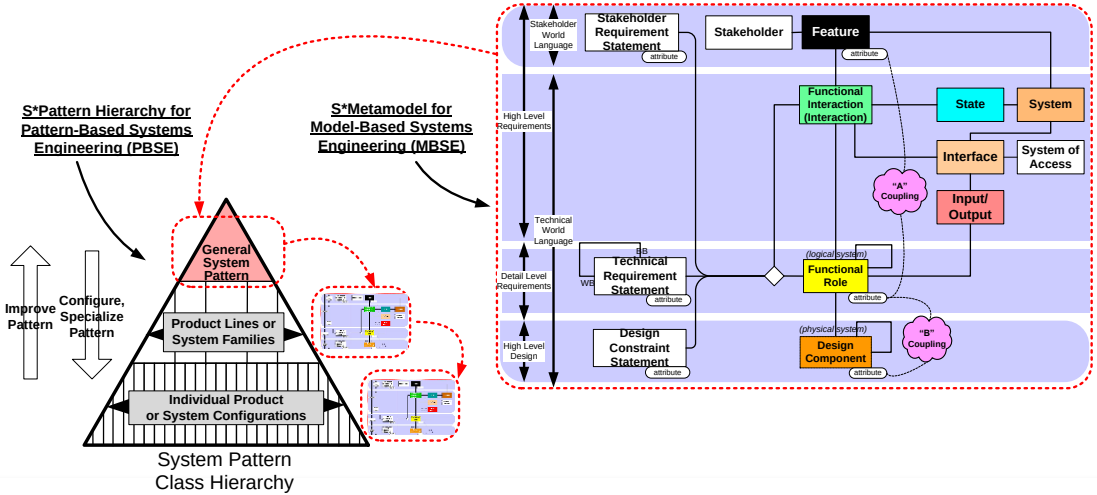




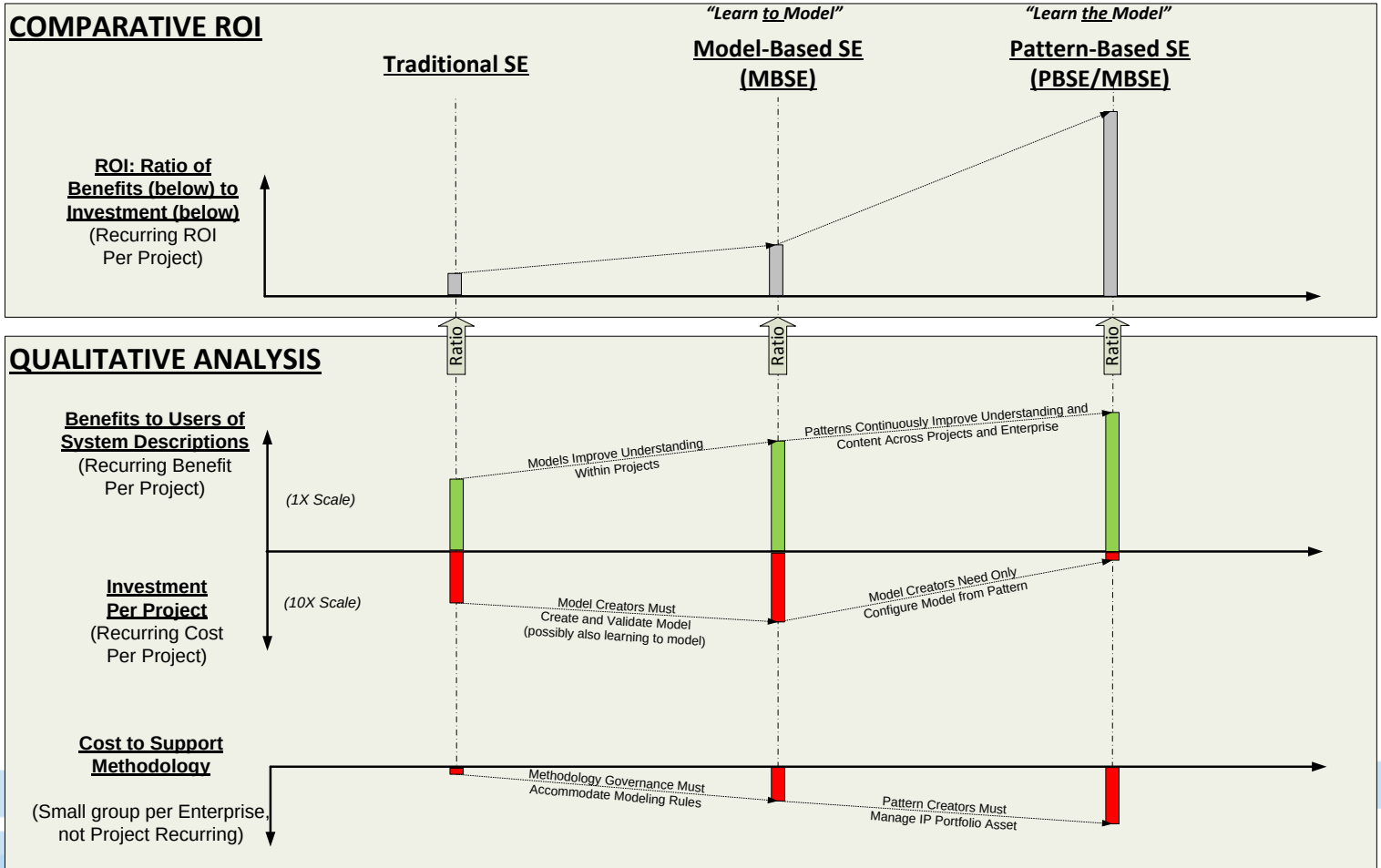
- And, patterns lie at the very heart of the history of the physical sciences
- We refer to the use of MBSE Patterns as PBSE.

Models Strong Enough for Effective Patterns

- The “smallest possible” constraints require us to use stronger models than are necessarily found in some contemporary MBSE:
  - Conforming to the S*Metamodel.
  - Conforming models are called S*Models.
  - And S*Patterns are S*Models that are re-usable, reconfigurable models of system families
  - In any modeling language—agnostic as to modeling tools and languages—used in any (SysML, others).



Comparative Benefits, Investments, ROI



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INCOSE/OMG MBSE Initiative

- The MBSE Patterns WG continues its participation in the INCOSE/OMG MBSE Initiative:
  - A number of other Challenge Teams and Activity Teams are also in that Initiative'
  - While we now also join the other INCOSE Working Groups as a partner in collaboration.

Joint WG-WG Projects: WG-WG and WG-External

- MBSE Patterns WG Joint Projects with:
  - Agile Systems WG
  - SoS WG
  - PLE WG
  - Health Care WG
  - MBSE Transformation Lead Team
- And with other entities outside INCOSE:
  - e.g., with ASME model validation & verification standards committees

Model-Based Transformation of SE Discipline

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- The MBSE Patterns WG assists the Transformation in multiple ways:
  - Shifting the emphasis from learning modeling to learning and using the models.
  - Increasing the audience for systems models
  - Reconnecting our engineering discipline to systems phenomenon-based science in the tradition of the other engineering disciplines.

Invitation to the CAB: Join Us in the Transformation

- It is a certainty that your enterprise is already strategically impacted by systems patterns…whether they are recognized and managed patterns, or are still “dark patterns”.
- We invite you to encourage your colleagues to join the MBSE Patterns WG, participate in the work, and gain the benefits.

http://www.omgwiki.org/MBSE/doku.php?id=mbse:patterns:patterns

- Patterns WG meeting at IS2016, July 17, 1500-1800
- Contacts: Bill Schindel schindel@ictt.com or Troy Peterson tpeterson@systemxi.com

Advice from the CAB, Questions, Discussion

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References

1. Patterns WG Web Site: Past meetings, PBSE examples, tutorial, INCOSE and other papers by multiple contributors:

   http://www.omgwiki.org/MBSE/doku.php?id=mbse:patterns:patterns

2. PBSE Methodology Summary from Patterns WG:

   Schindel, W., et al, "MBSE Methodology Summary: Pattern-Based Systems Engineering (PBSE), Based On S*MBSE Models", V1.5.5A, INCOSE Patterns Working Group, retrieved 2015 from: http://www.omgwiki.org/MBSE/doku.php?id=mbse:pbse