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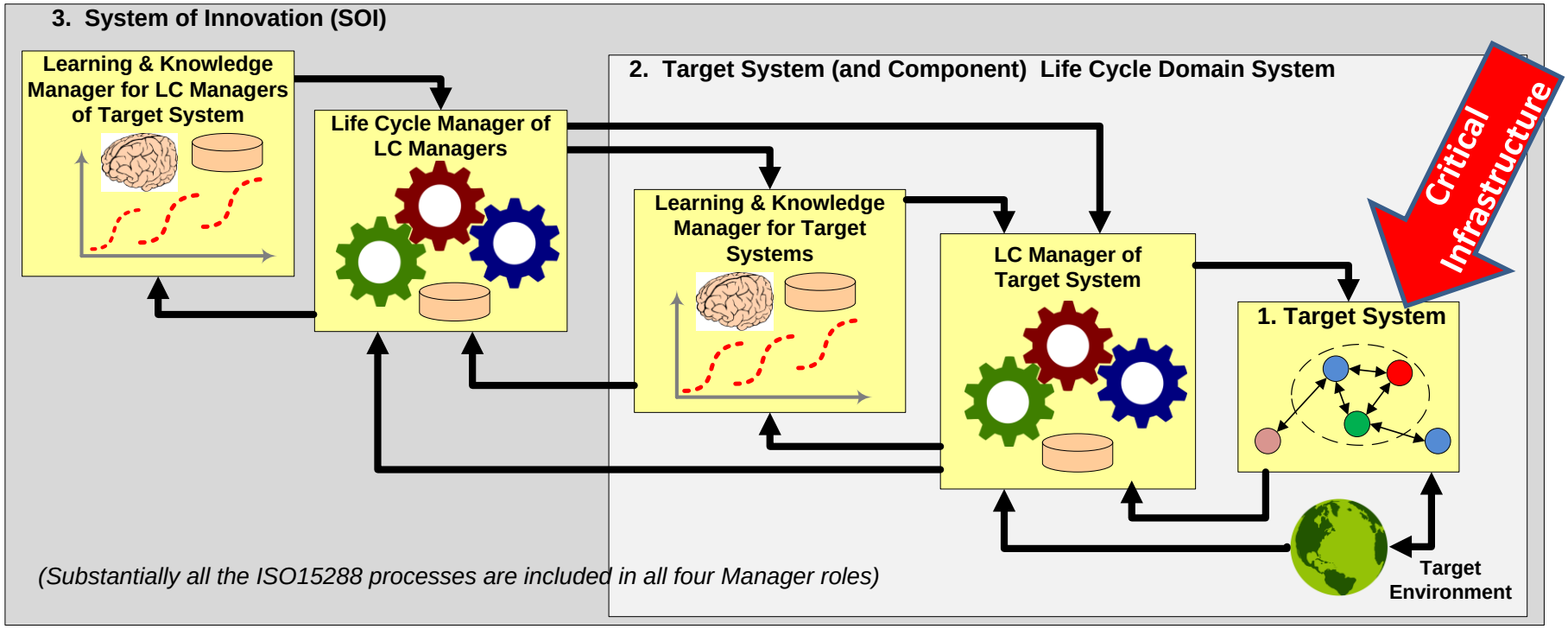
V1.2.3

The CIPR Pattern Project: A Quick Introduction



A joint project of:
- INCOSE CIPR Working Group
- INCOSE MBSE Patterns Working Group

Applying results from: INCOSE Agile Systems Working Group

Contents

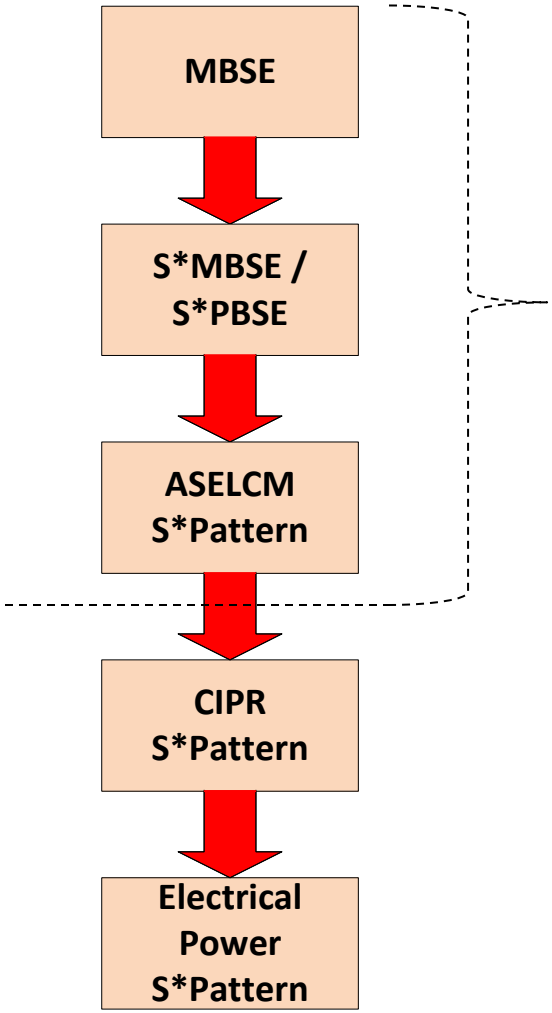
- The CIPR Pattern Project
- Background: S*Models, S*Patterns, ASELCM Pattern
- Specialized Case: Electrical Power Domain--System 1, 2, 3
- General Case: Critical Infrastructure Domain--System 1
- Current project status and activity
- Discussion

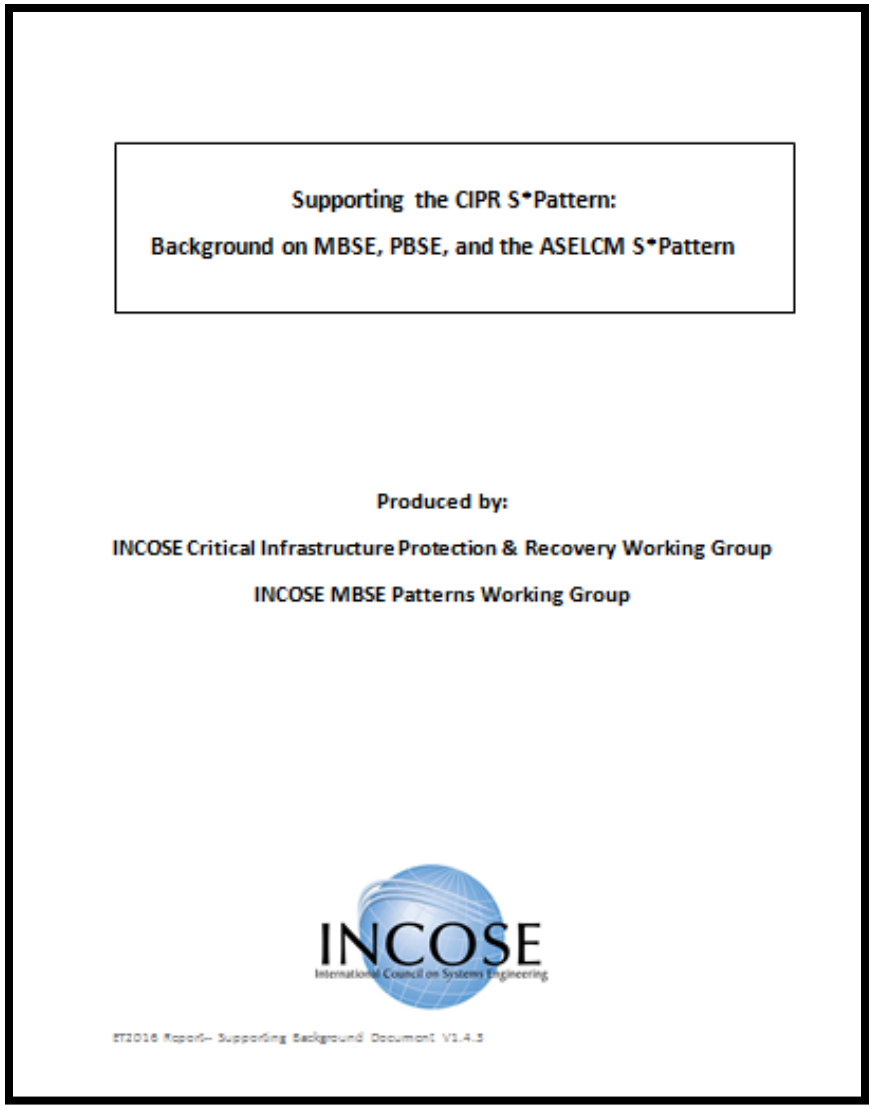
- References

The CIPR Pattern Project

- Creation of an Model-Based Systems Engineering (MBSE) Pattern:
  - A configurable, re-usable MBSE reference model (an S*Pattern) . . .
- Of Critical Infrastructure Protection and Recovery (CIPR) Domain:
  - Including an illustrative specialization to the Electrical Power Domain.
- A joint project of the INCOSE CIPR Working Group and the INCOSE MBSE Patterns Working Group:
  - Domain expertise from CIPR Working Group
  - S*Pattern construction by Patterns Working Group
  - Using results from the INCOSE Agile Systems Working Group
- Began in 2016:
  - In preparation for the Energy Tech 2016 Conference, applying Model-Based Facilitation to capture Conference Track 1 discussion results.
  - Initial 2016 construction limited to Logical Architecture subset of overall pattern, for both Electrical Power and General CIPR cases.
  - In 2017, we are building out other elements of this pattern (states, features, couplings, interactions, etc.) in preparation for ET2017.

Background Reference Document: S*Models, S*Patterns, ASELCM Pattern





Supporting the CIPR S*Pattern:

Background on MBSE, PBSE, and the ASELCM S*Pattern

Produced by:

INCOSE Critical Infrastructure Protection & Recovery Working Group

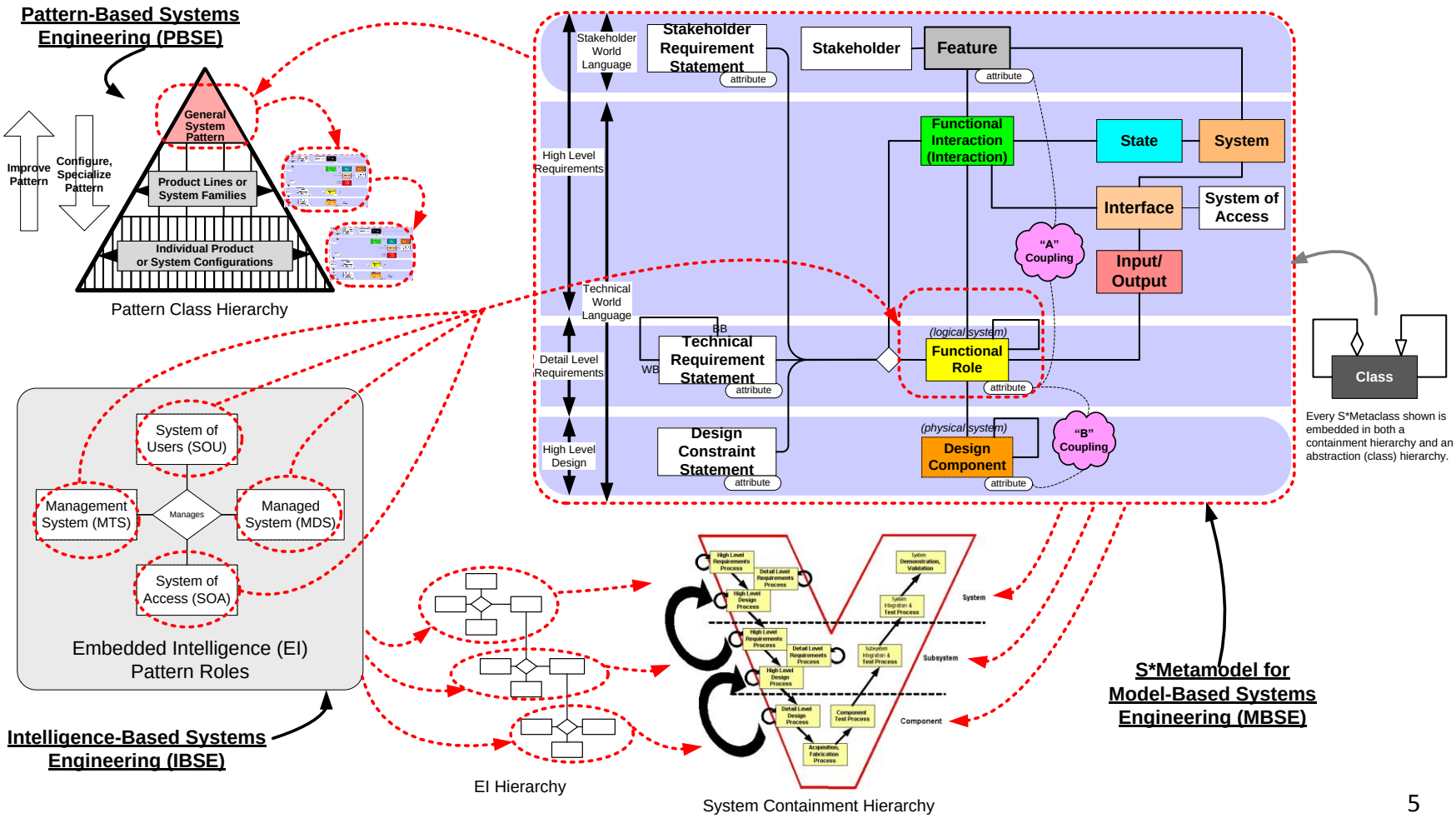
INCOSE MBSE Patterns Working Group

INCOSE
International Council on Systems Engineering

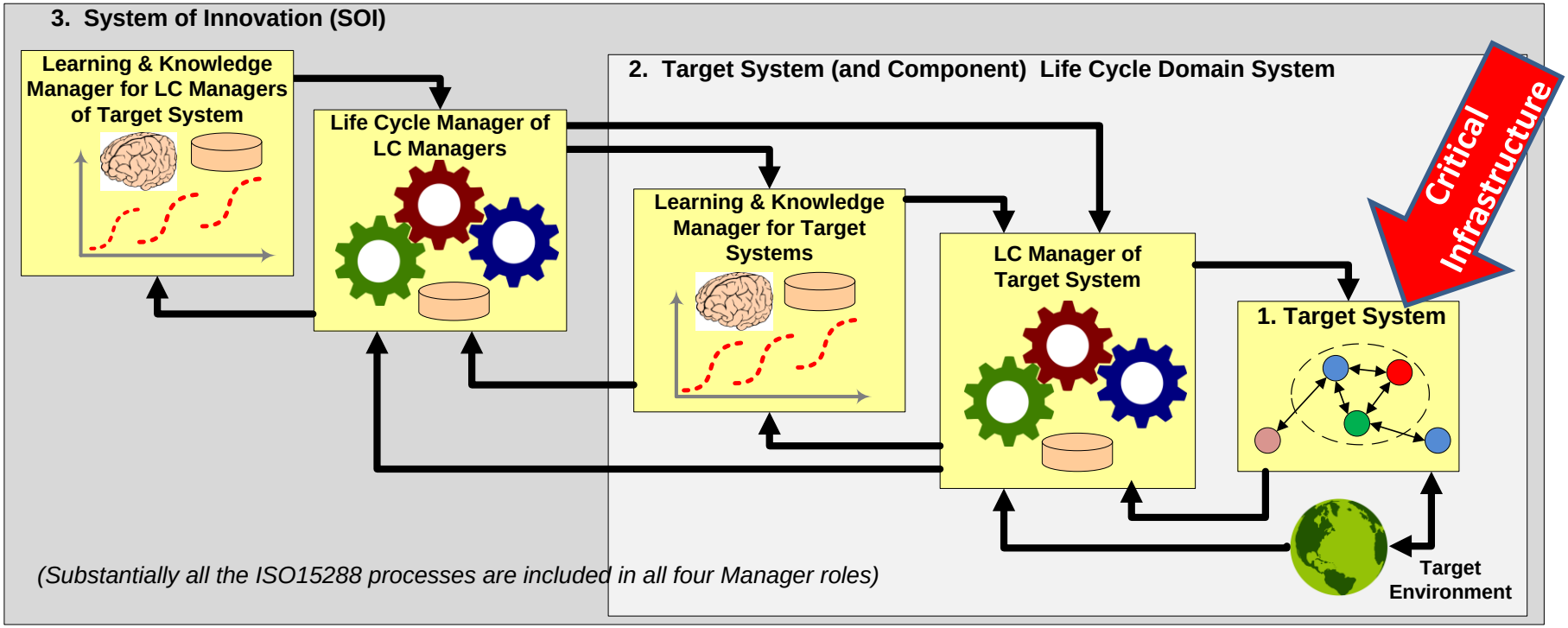
ET2016 Report– Supporting Background Document V1.4.3

S*Models, S*Patterns

- S*Metamodel: Smallest model to cover purposes of engineering and science, modeling language and tools independent (portably maps to them)
- S*Models: are models that conform the S*Metamodel
- S*Patterns: are generalized, configurable, re-usable S*Models



ASELCM S*Pattern: A product of the INCOSE Agile Systems Engineering Life Cycle Discovery Project

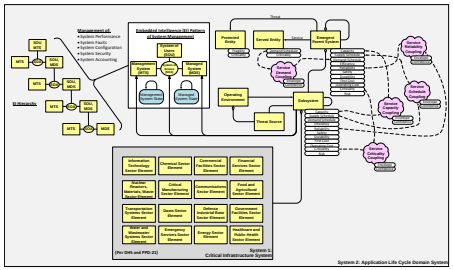


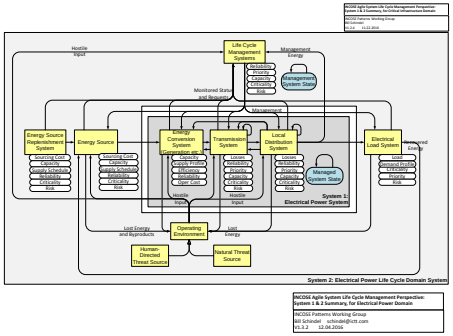
- **System 1:** Target system of interest, to be engineered or improved.
- **System 2:** The environment of (interacting with) S1, including all the life cycle management systems of S1, including learning about S1.
- **System 3:** The life cycle management systems for S2, including learning about S2.

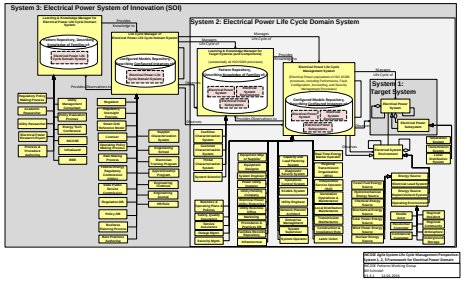
CIPR and Electrical Domains: Systems 1, 2, and 3

- MBSE
- S*MBSE / S*PBSE
- ASELCM S*Pattern
- CIPR S*Pattern
- Electrical Power S*Pattern

In 2016: Initial S1-S2-S3 logical architecture subset of the general CIPR Domain Pattern and the specialized Electrical Power Domain Pattern

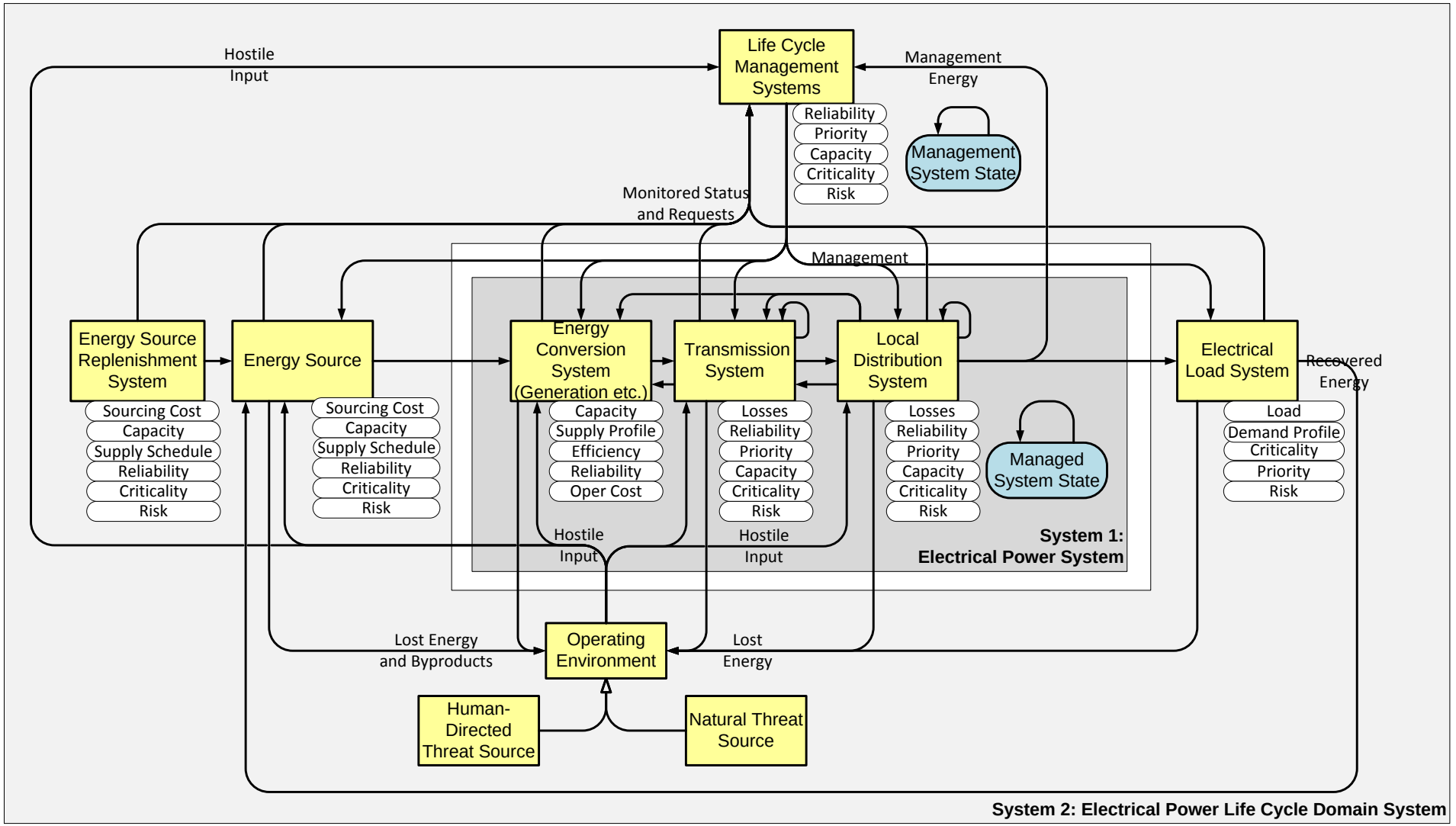






(following slides)

Electrical Power Domain : System 1, System 2



INCOSE Agile System Life Cycle Management Perspective: System 1 & 2 Summary, for Electrical Power Domain

INCOSE Patterns Working Group
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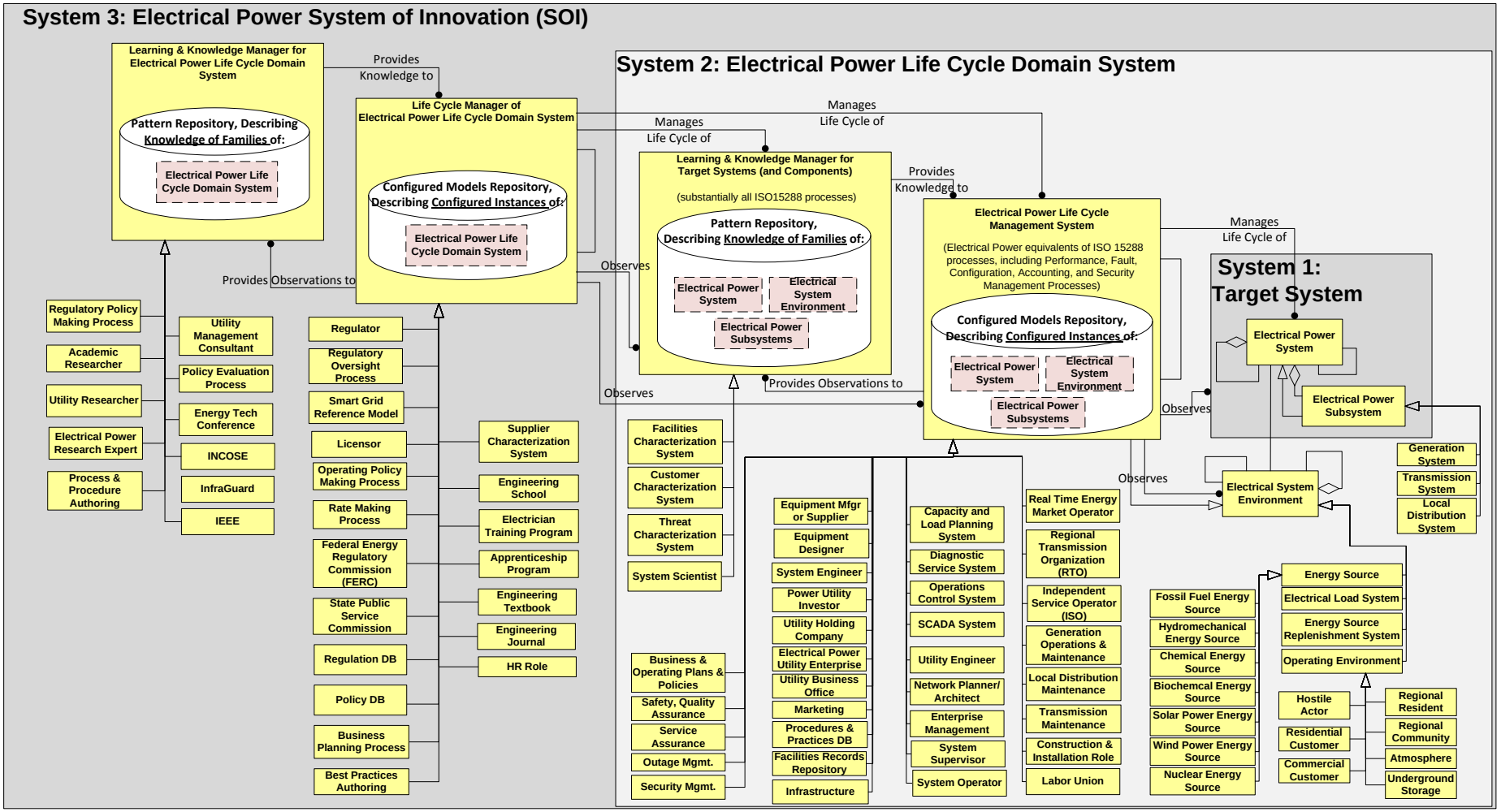
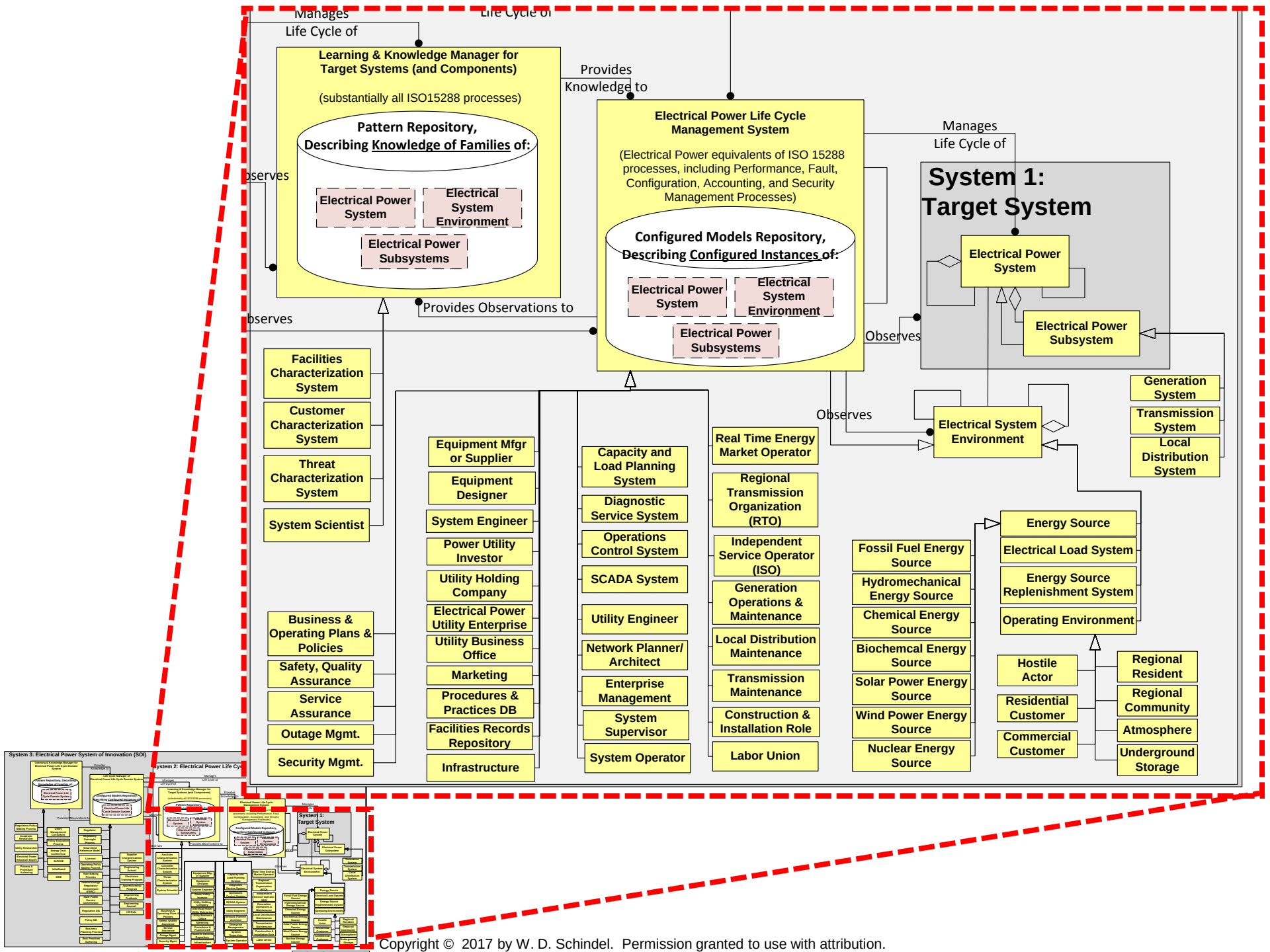
V1.3.2 12.04.2016

Electrical Power Domain : System 2, System 3



INCOSE Agile System Life Cycle Management Perspective: System 1, 2, 3 Framework for Electrical Power Domain
INCOSE Patterns Working Group Bill Schindel V1.3.1 12.04.2016



System 3: Electrical Power System of Innovation (SOI)

Learning & Knowledge Manager for Electrical Power Life Cycle Domain System

Pattern Repository, Describing Knowledge of Families of:

Electrical Power Life Cycle Domain System

Provides Knowledge to

Life Cycle Manager of Electrical Power Life Cycle Domain System

Configured Models Repository, Describing Configured Instances of:

Electrical Power Life Cycle Domain System

Provides Observations to

Regulatory Policy Making Process

Academic Researcher

Utility Researcher

Electrical Power Research Expert

Process & Procedure Authoring

Utility Management Consultant

Policy Evaluation Process

Energy Tech Conference

INCOSE

InfraGuard

IEEE

Regulator

Regulatory Oversight Process

Smart Grid Reference Model

Licensor

Operating Policy Making Process

Rate Making Process

Federal Energy Regulatory Commission (FERC)

State Public Service Commission

Regulation DB

Policy DB

Business Planning Process

Best Practices Authoring

Supplier Characterization System

Engineering School

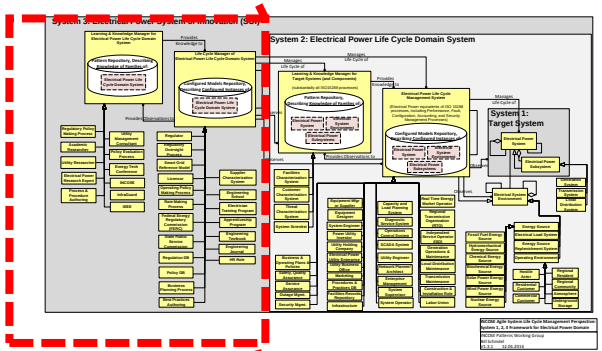
Electrician Training Program

Apprenticeship Program

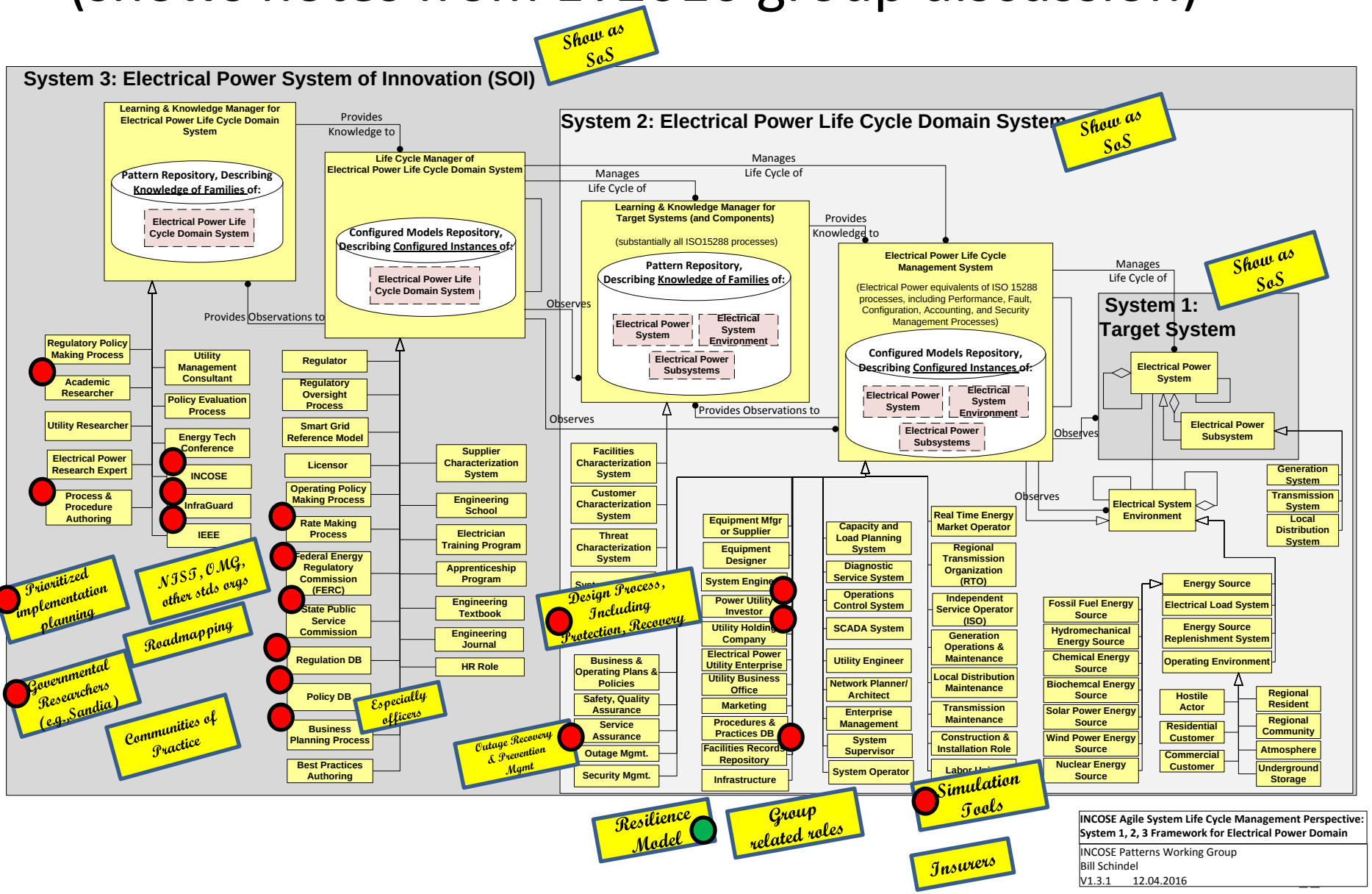
Engineering Textbook

Engineering Journal

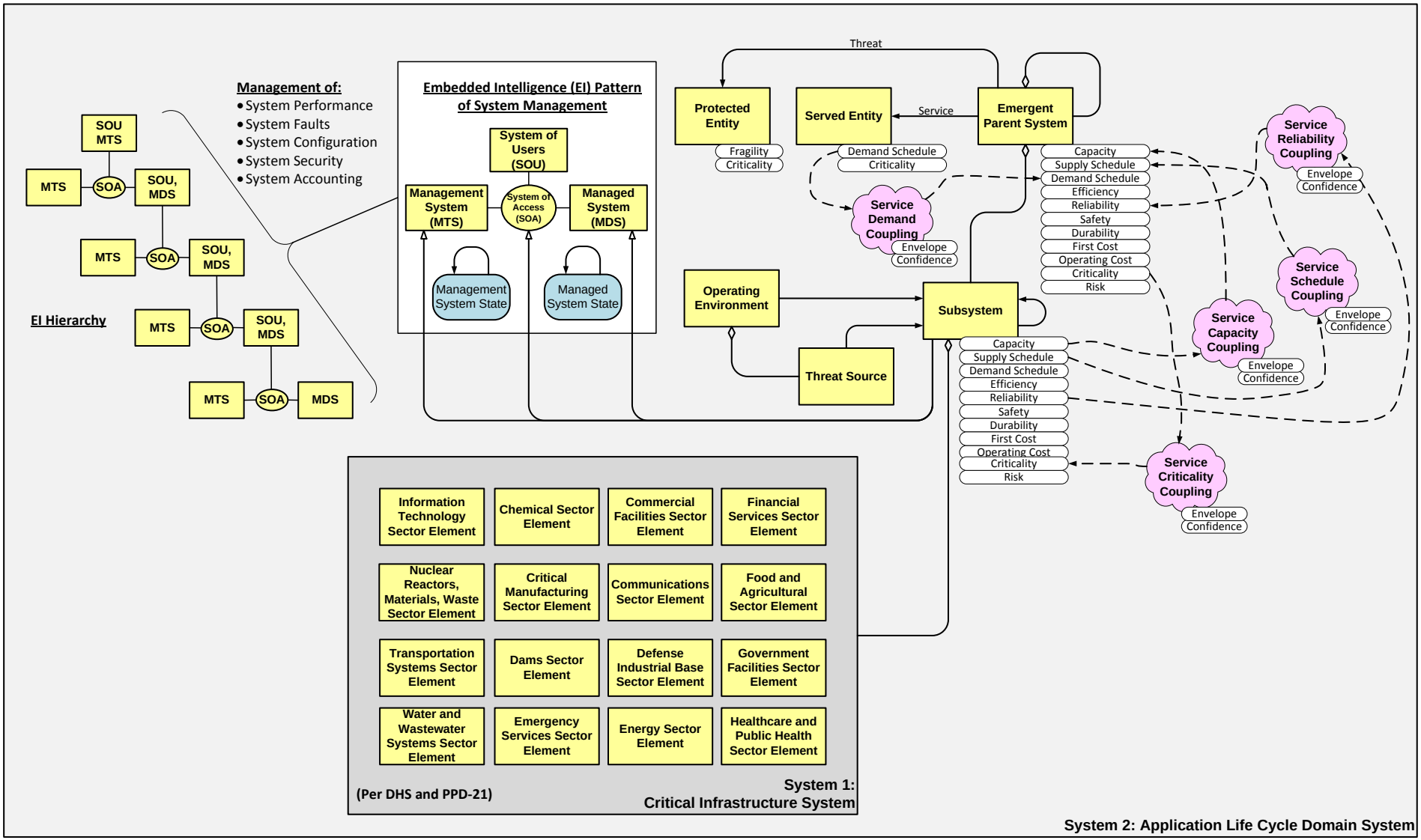
HR Role



Electrical Power Domain : System 2, System 3 (shows notes from ET2016 group discussion)



Generalized CIPR Systems Domain: System 1, System 2



INCOSE Agile System Life Cycle Management Perspective: System 1 & 2 Summary, for Critical Infrastructure Domain

INCOSE Patterns Working Group
Bill Schindel
V1.2.4 11.22.2016

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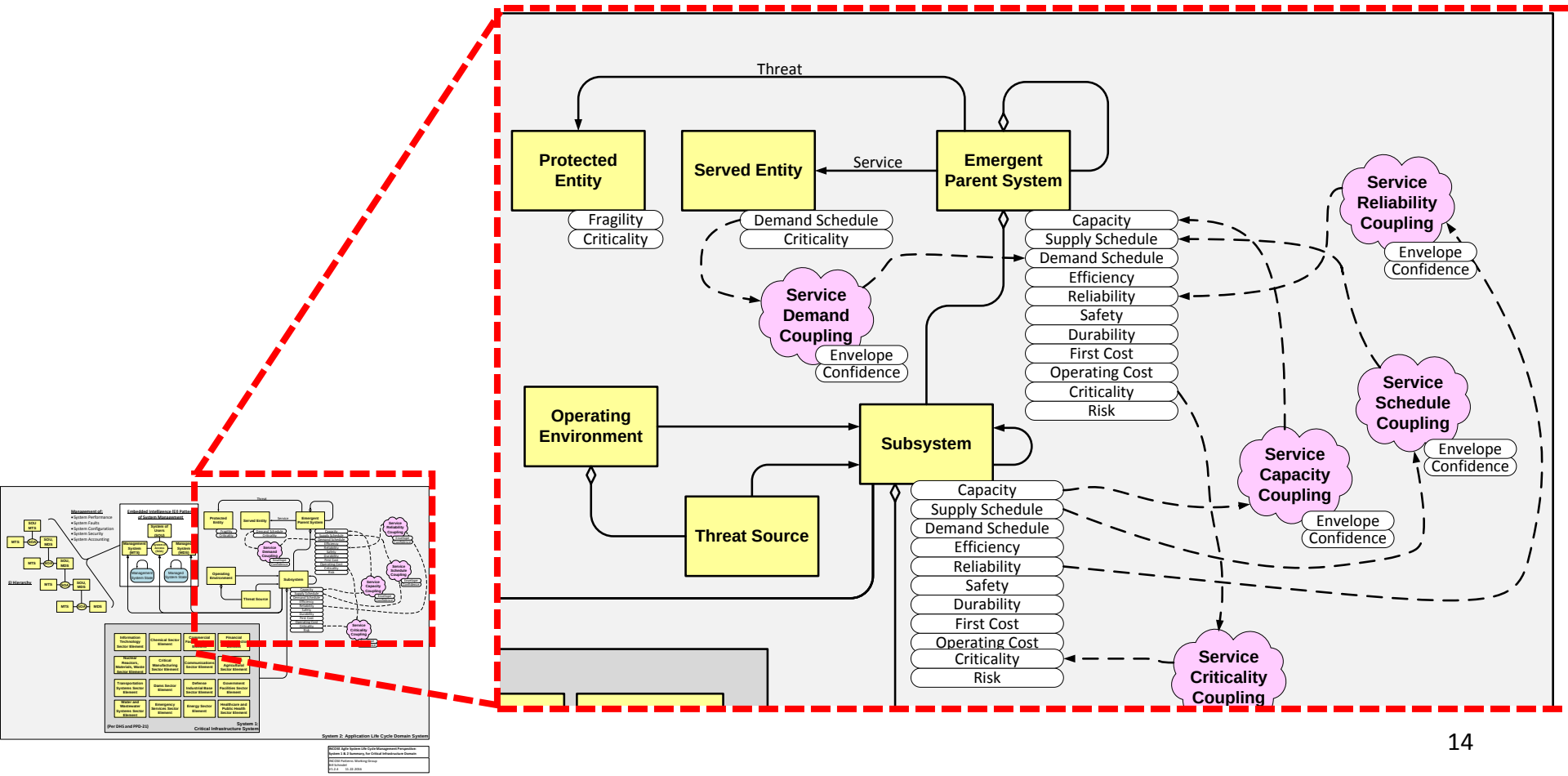
- Some “very interesting” areas concerning stakeholder feature-driven choices that will be encountered in widespread outage recovery or load shedding . . .



Current project status and activity

- Current and subsequent activities:
  - Build out Stakeholder Features: especially S1, S3
  - Build out State Model: especially S1, S2
  - Build out Attribute Couplings: especially S1
  - Other parts of S*Metamodel: as of interest
  - Pattern validation activities
  - Pattern application exploration
- Looking for interested participants in this work

Discussion

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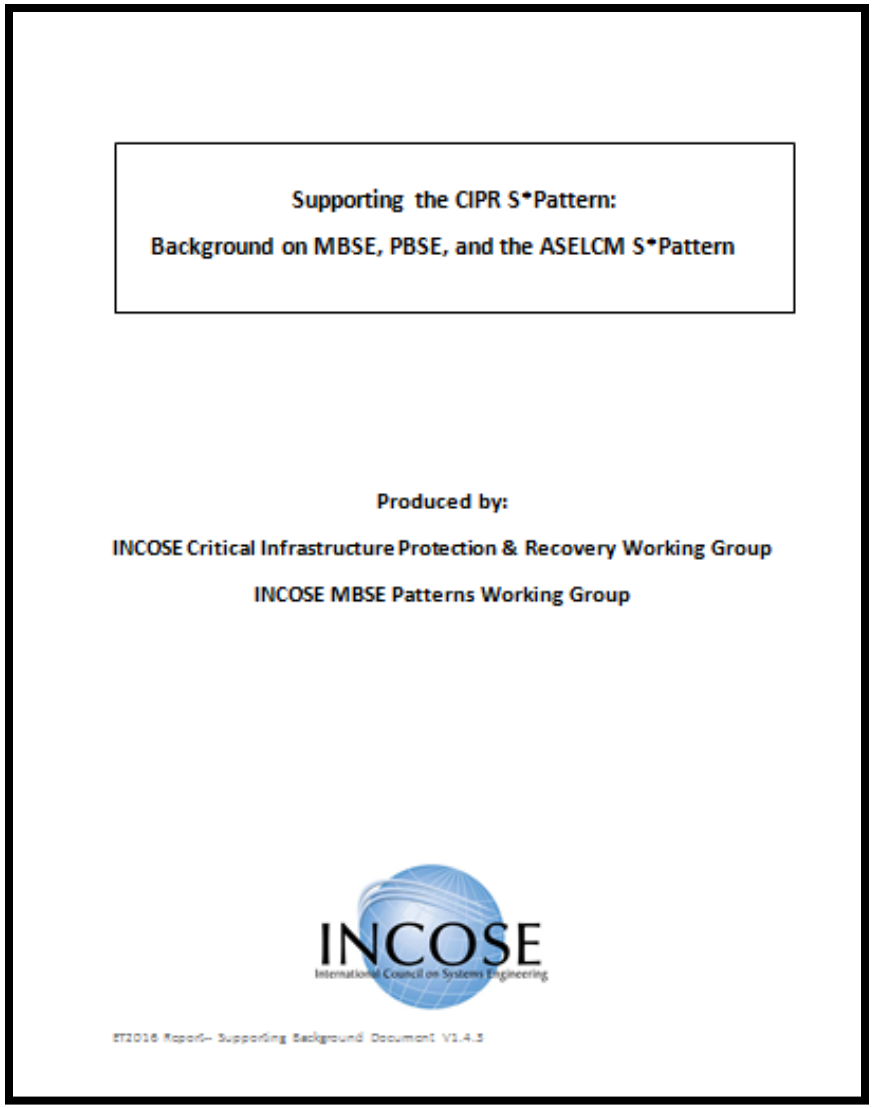
References



Click here to download—includes a references list as well as narrative.