

Clarifying the Relationships among Ontologies, Context and System Realization and Efficacy

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Ontolog Summit 2018 Planning Session

10/11/2017

Agenda

Dialog prompts seeking solace for struggling systemists.

Greatly appreciate Ontolog, NIST NCOR, NCBO, IAOA, NC_ NITRD. And other authors of prior Summits. Also Barry Smith's presentation in the 2017 Summit symposium and presentations by John Sowa and others in this 2018 thread.

This session will explore a different perspective. At the risk of hurting any participant's feelings, let's consider whether we are addressing a problem we know how to solve instead the one that is causing the trillion dollar losses --- inaccurate, inadequate, insecure and intransigent systems.

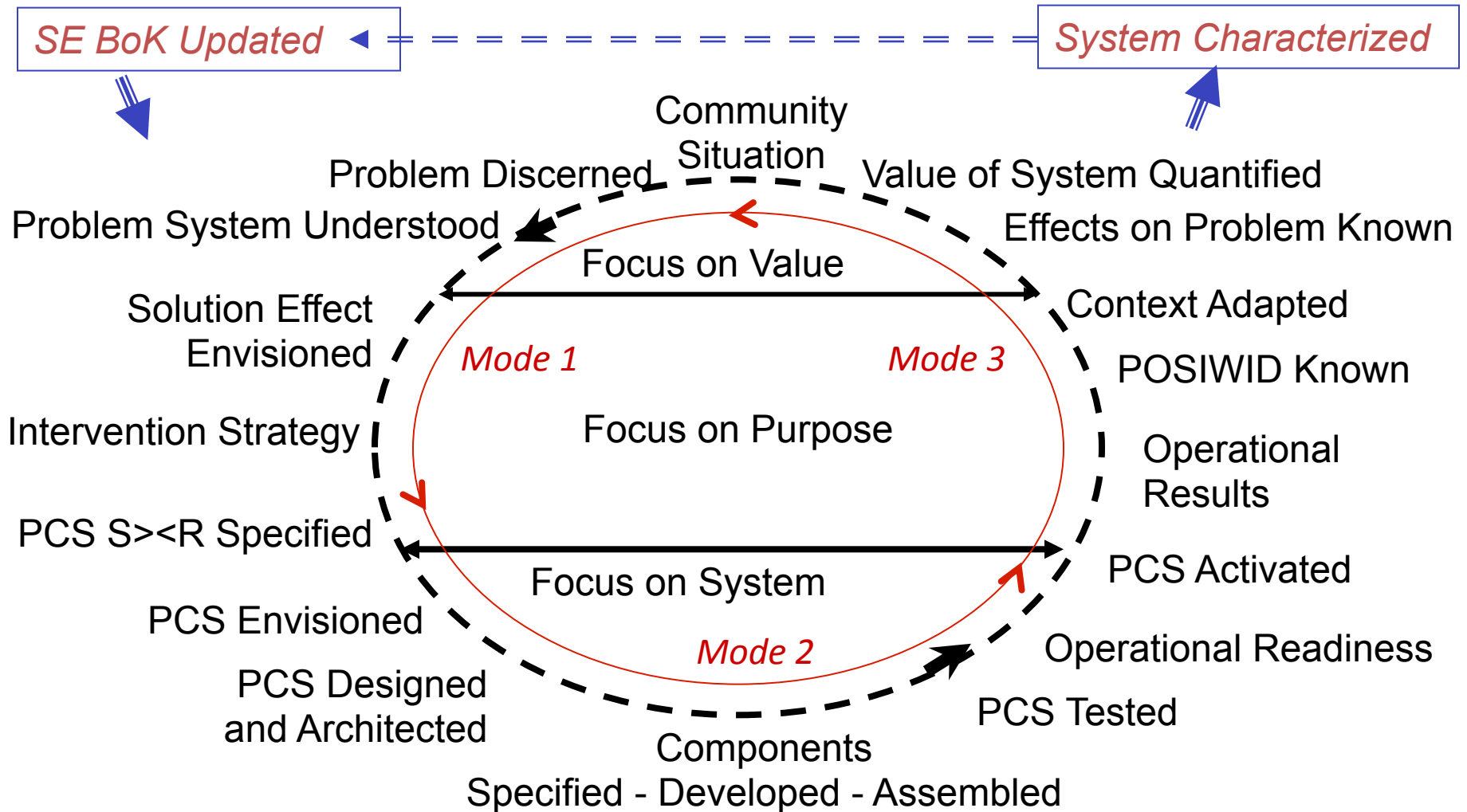
Let's consider ontology as a way to synergize multiple stakeholders having diverse, conflicting views and viewpoints.

Caveat Emptor

Jack Ring

60+ years as system practitioner. Instrumental in enabling more than 50 advanced systems. Majority were successful. Bachelor in Physics, Emporia State College. Declined AEC Fellowship in radiation biophysics. Fellow, International Council on Systems Engineering, www.incose.org

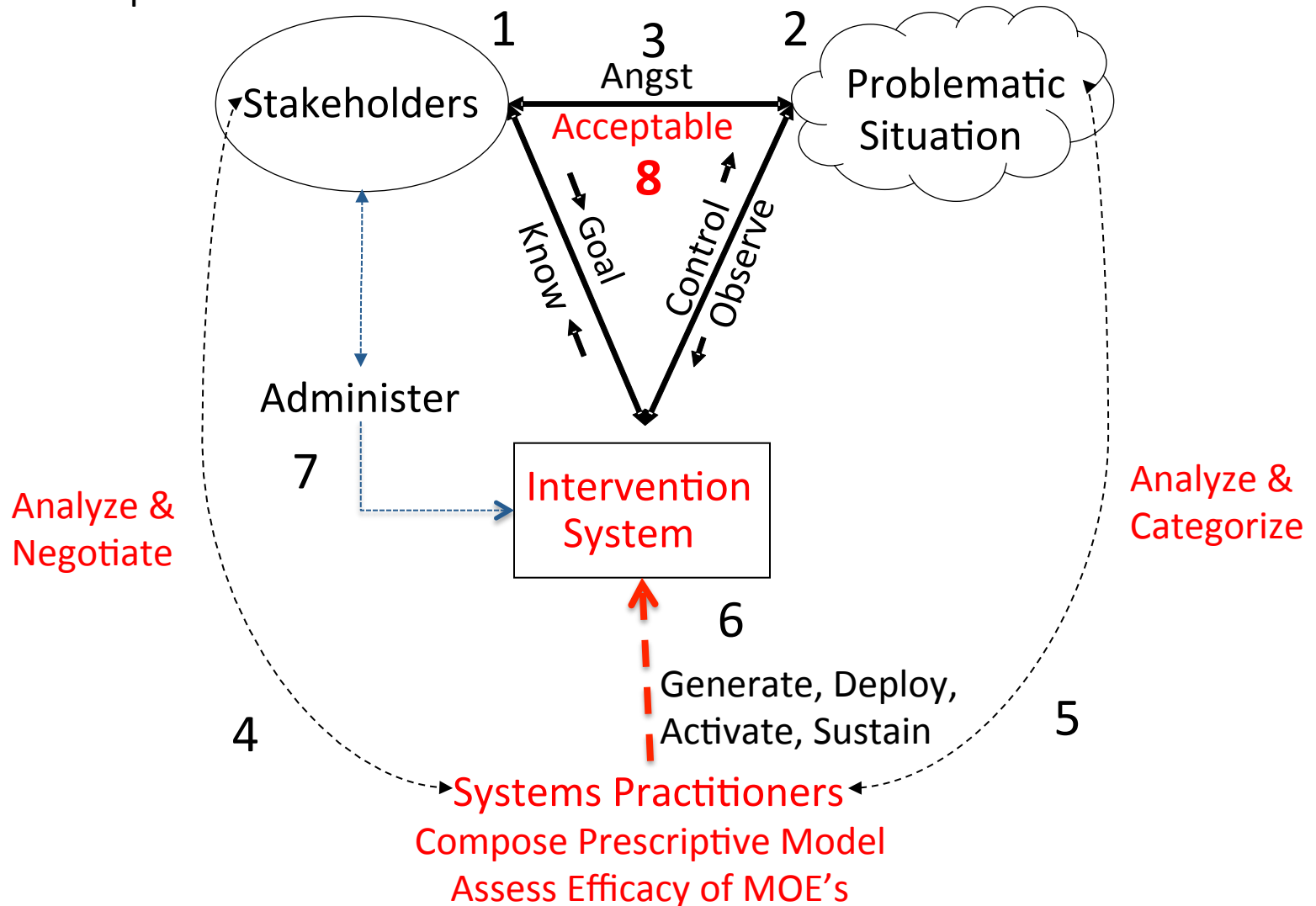
Enabling the System Value Cycle



Context of Ontology

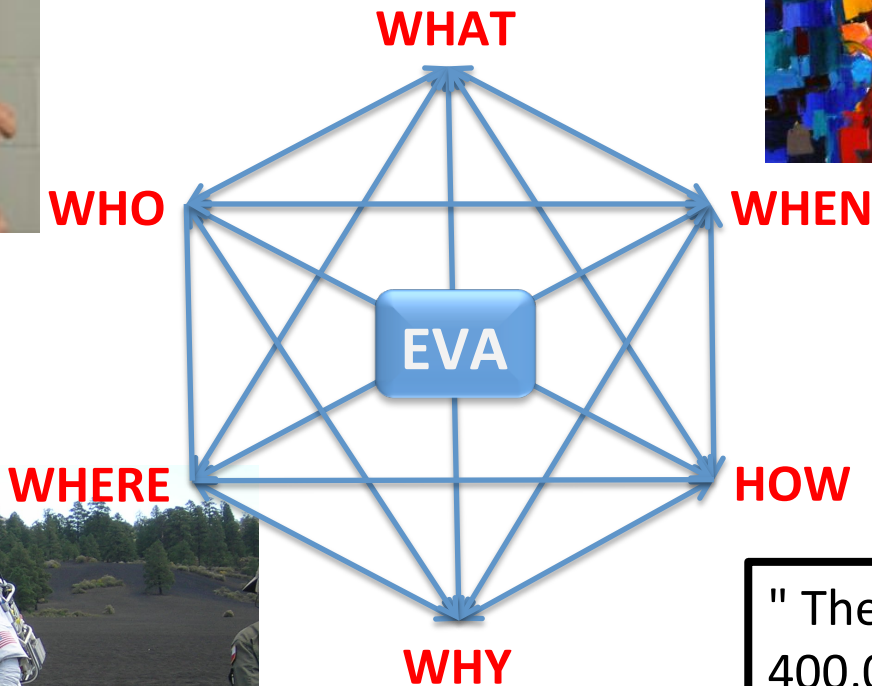
Cognitive Overload

Underconceptualization





Scope



" The FAA predicts
400,000 to 2.3M licensed
Part 107 remote pilots by
2020"

- FAA Air Traffic Organization
Policy: Order JO 7200.23

SE Constructs a Theory



Questions for Ontologists

What's the problem? Stakeholders, our intended beneficiaries, are overwhelmed with the Extent, Variety (semantic and temporal), and Ambiguity of their respective fields of discourse each of which is becoming increasingly non-deterministic.

Because they lack a mutually coherent understanding of what 'system' signifies they do not understand 'The Problem' as a system let alone conceive and leverage Problem Suppression as a system.

Who cares? Who are these stakeholders and what makes them our intended beneficiaries? What value proposition will they respond to and how meaningful is it to them? Do we need an ontology of the intended beneficiaries?

What will help them? Will providing them with cogent ontologies be sufficient and efficient? Will they adopt and successfully apply such artifacts? Or will they need to experience formulating useful ontologies? Or what?

Questions for Ontologists, con't.

How can we be sure that our recommendations will or did help them?

Systems are composed of automaton, automaton containing faults and humans as operators and administrators.

Are we too focused on procedural models (Data Base and Data Processing) **vs. Goal-seeking Objects** ala Smalltalk, and Objective C? Note: Object-oriented is not Object Technology.

Do Requirements establish Ontology? Should we estimate the efficacy of a set of requirements?

Example Ontological faults:

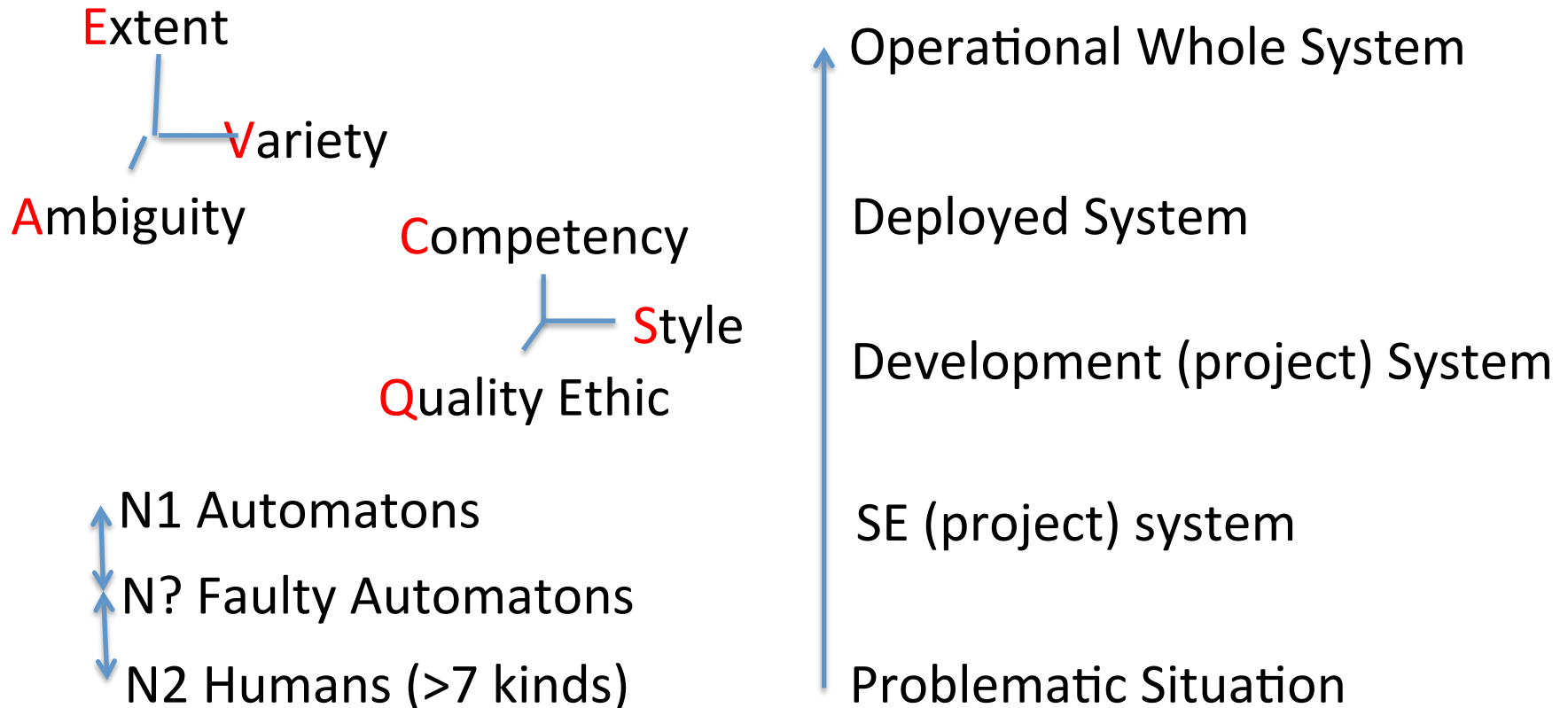
Aircraft on ground → wheels turning

One year = 365 days

Metric vs. English units

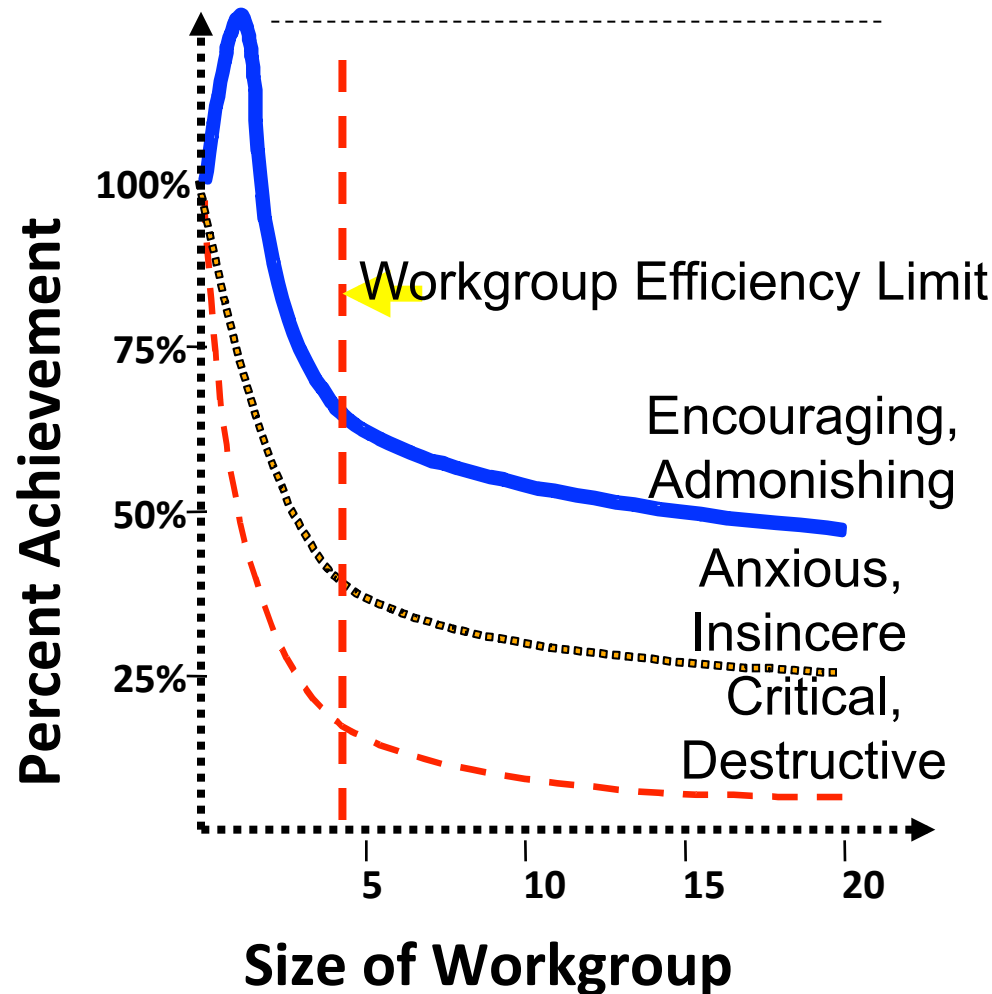
Your P(faults)

$$P(\text{fault}) = f(\text{EVA}, \text{CQS}, \# \text{ Assertions}, \# \text{ languages})$$



Objective vs. Team Player?

(highly simplified)



Unexplored
Territory
of the
Intelligent
Enterprise

Interpersonal style is
dominant factor with
5X leverage on
achievement

Adapted from Amity and Enmity, R. Starkermann

10/9/17

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Humans Interaction Model

disturbances z_1

Conscious
Unconscious

“Amity and Enmity”
by R. Starkerman
info@editions.ch
ISBN 3-908730-29-5

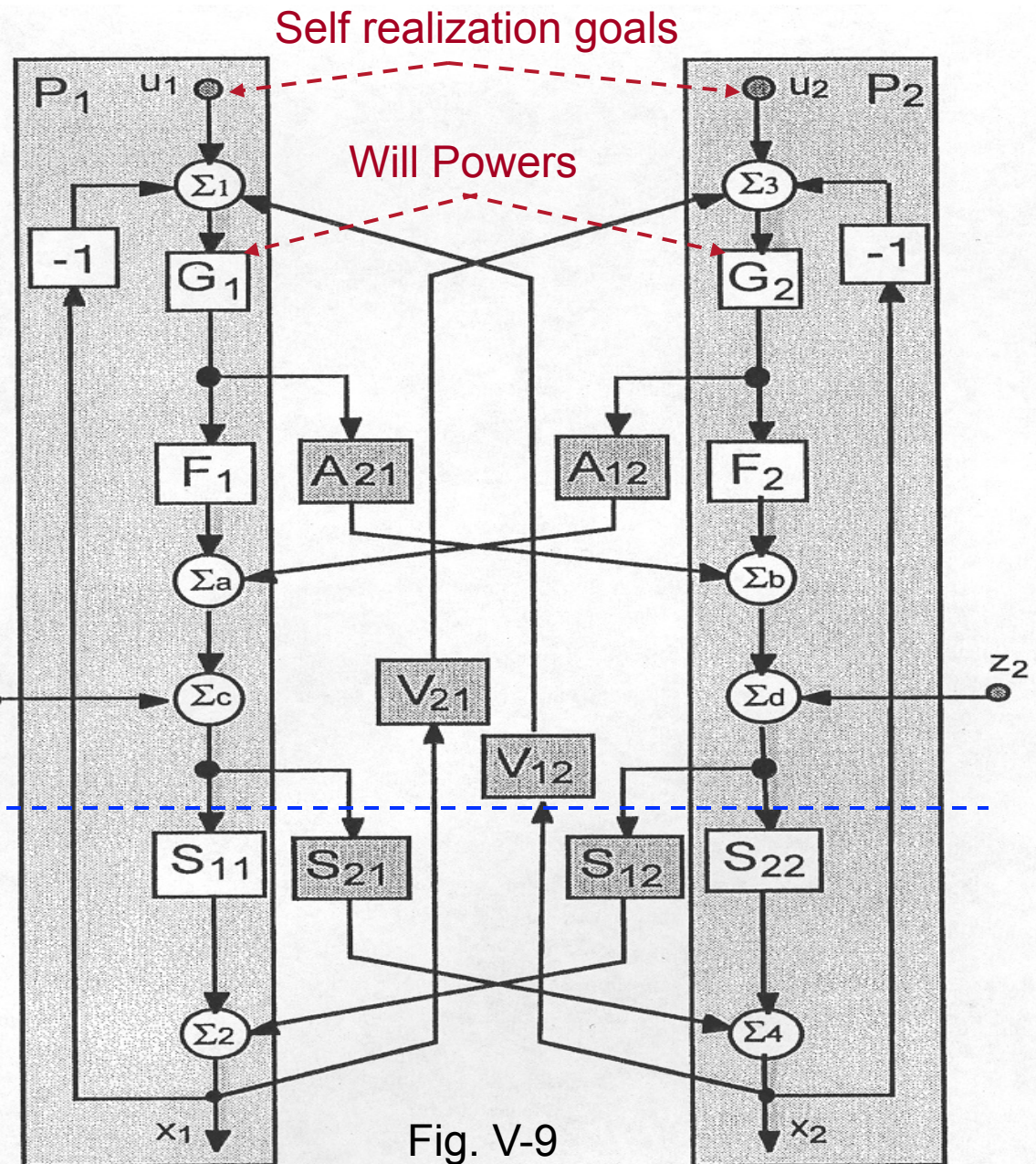


Fig. V-9

Limits of System Adaptation

System Evolution Options

Adjust: Gradients on relationships

Arrange: Pattern of relationships

Co-align: Content of system with context constraints.

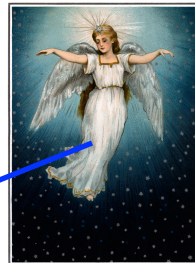
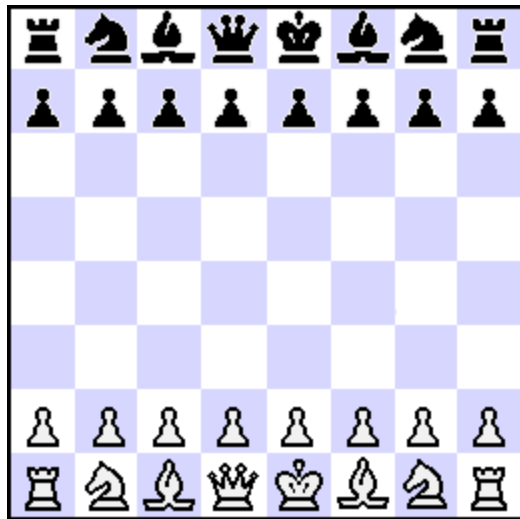
Within Conservation Laws

$$X, d(X)/dt, d^2(X)/dt^2$$

- **Thermodynamics:** mass, momentum and energy
- **Informatics:** data, information and knowledge?
- **Teleonomics:** skills, rate of learning, and rate of invention?
- **Human social dynamics:** trust, enthusiasm, co-evolution?
- **Economic:** Investment, ROI, Liquidity?
- **Ecology:** Waste, Fads, Unintended Consequences?

Angel(s) vs. Demons

- System behavior may be studied as a **game** between an **angel** and **demons** where the correct solution is the determination of the existence of a winning strategy for our champion: **the angel**.



The **demon** may react to all the **angelic** moves attempting all possible tricks to defeat the **angel**. That means the **angel** must be able during the system lifetime to counter continuously any new **demonic** action: she must change her strategy in response to **demonic** actions

Design Intent vs. Efficacy Estimation

This will work!

Build a theory:

Problematic Situation

Desired Effects

Sufficient Capabilities

Input/Output

Performance

Technology

Cost

Tradeoff

Measures of Effect-iveness

Functions and Features

Architecture

Components Make/Buy

User Initialization

Production Utilization

Deployment Jigs and Fixtures



Will this work?

Find the limits:

Quality

Estimate Effects

Measure Effects

Determine Limits

Dynamic

Integrity

Parsimony

Simplify, Extend

Beauty

MOE of Efficacy Estimation and Measurement

Acuity, Accuracy, Cycle Time

Distance from the action

Four Known Fallacies

A. Simulation

Use simulation to verify that you understand the problem, never to justify a design.

– Prof. Jay Forrester

B. Proof of Correctness

“Beware of bugs in the above code; I have only proved it correct, not tried it”

Prof. Donald Knuth

C. Fidelity of Red Force

- ✓ Represents Reality
- ✓ KPP's and TPM's vs MOE's
- ✓ Designer as tester

D. Beware ReUse



Potential Participants

International Council on Systems Engineering

Object Management Group

IEEE-SMC

IEEE Systems

Systems Engineering Research Center; Stevens Inst. Tech.

Institute of Industrial and Systems Engineering

etc.