

Ontolog Summit 2018

Track #?

Benefits of Harmonizing
Diverse Conceptualizations in
Multi-context Systems Engineering

Proposed by

Janet Singer, Facilitator

Jack Ring, Panelist

Ontolog Summit 2018 Planning Session

1/17/18

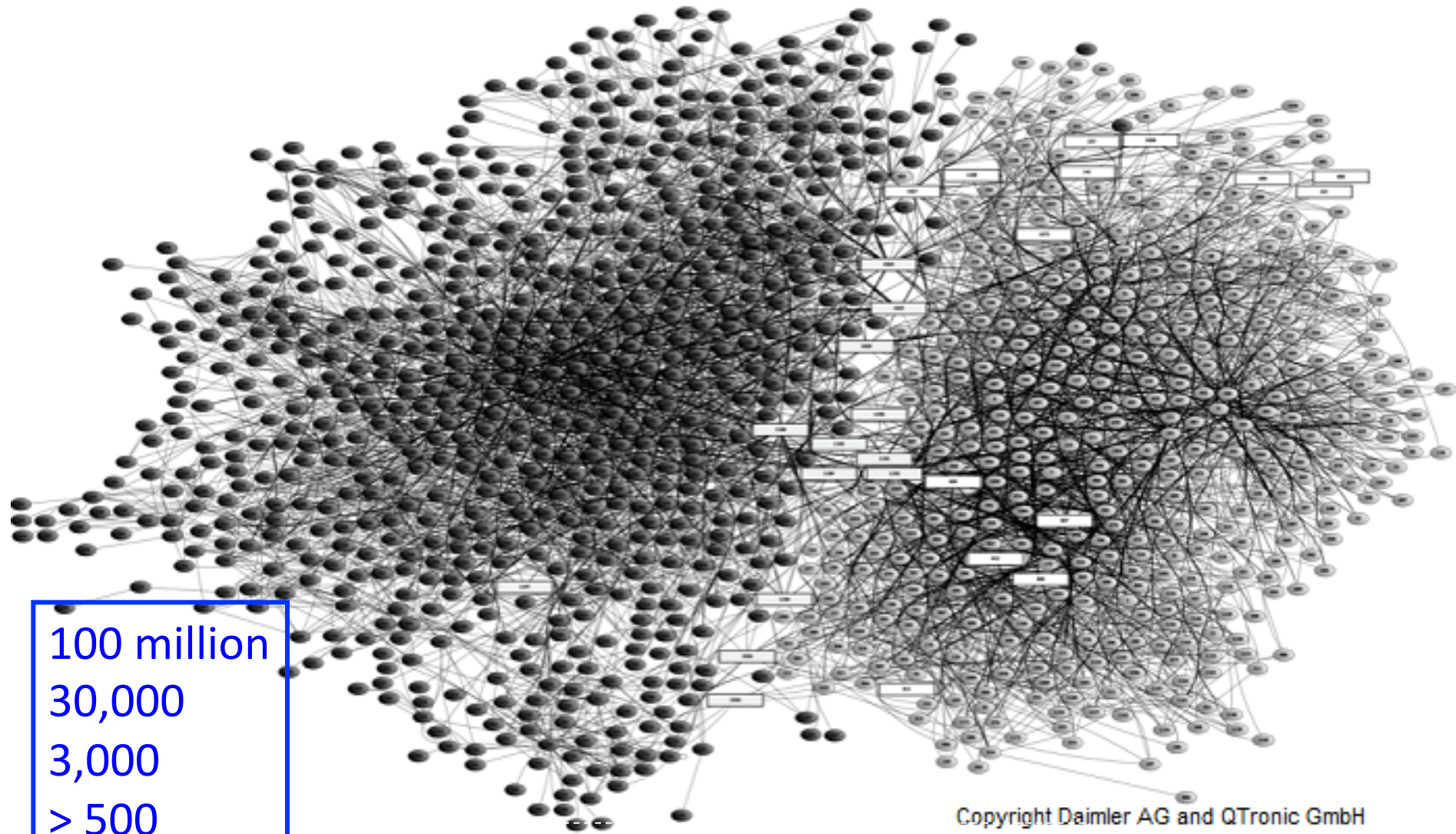
Our Context: The Autonomous Systems Era

We must ensure that each autonomous system is
Fit For Purpose:

- A. Quality:
 - 1. Accomplish intended Effects on Context,
 - 2. When and While needed,
 - 3. Do No Harm,
- B. Parsimony: No less Cost of Ownership alternative.
- C. Synergy: a) User trustworthy, b) SoS interoperability, and c) Just Enough Agility.

Clues: Ashby: Requisite Variety,
Boyd: OODA,
Cabrera: DSRP
Ontolog Summit Communiques

Example: Autonomous Automobile Code, 2015



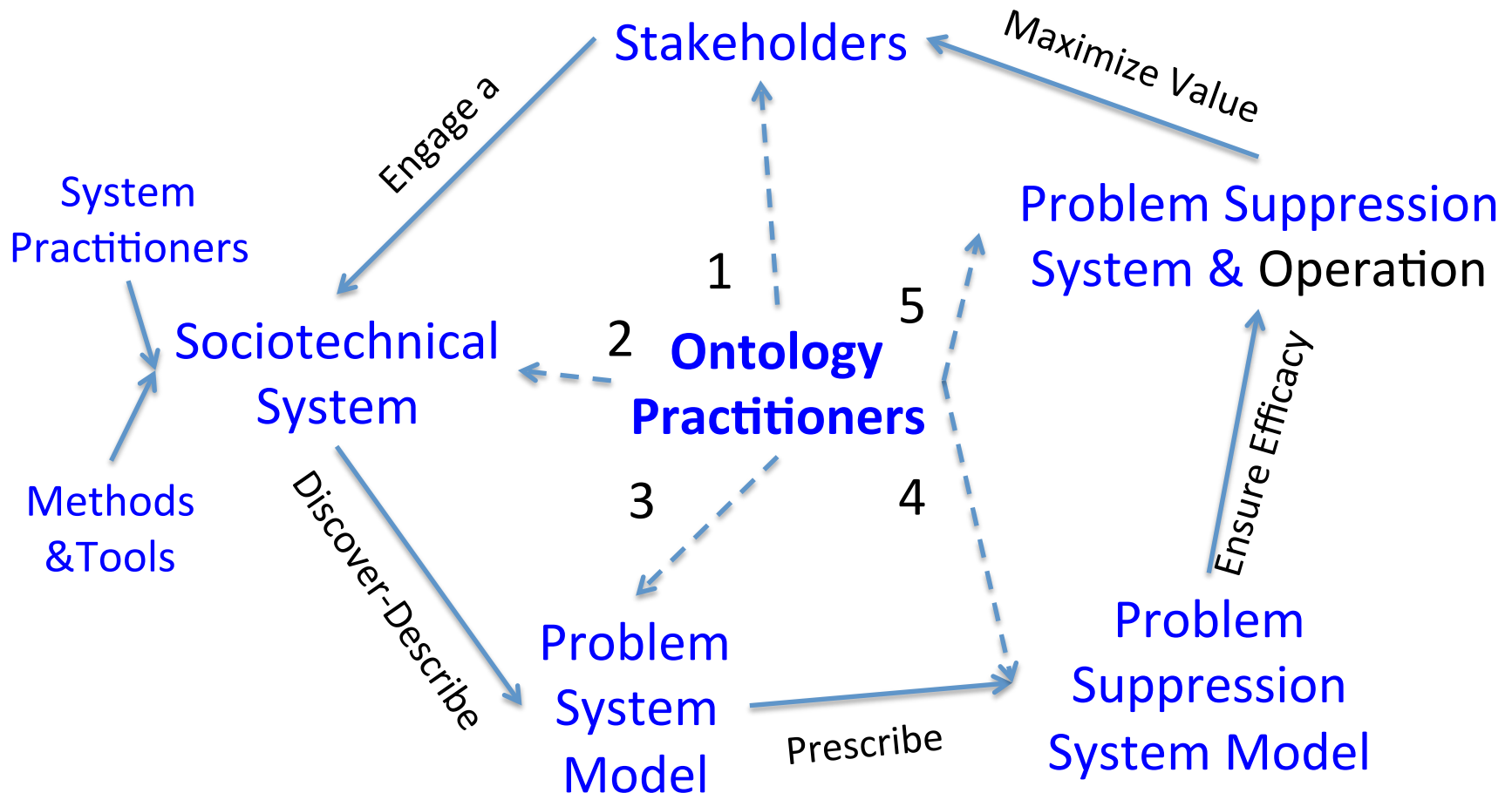
Copyright Daimler AG and QTronic GmbH

Expect 5X larger by 2020.

100 million
30,000
3,000
> 500
? 10,000 ?

Example of Five Multi-Contexts

In Coping with Extent, Variety, & Ambiguity



Ontology Value Proposition?

Ontology Practitioners

Can enable >10X Productivity, Innovation, and Liquidity among
Systems Practitioners

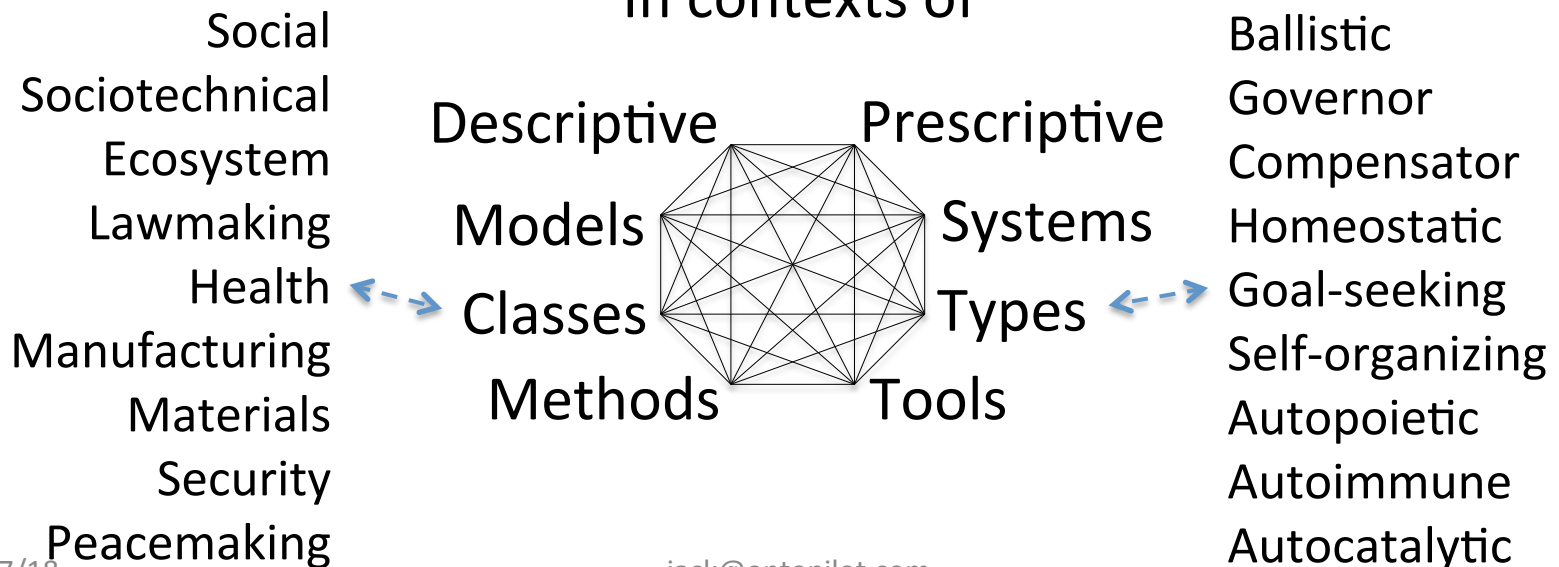
≈ 1 million world-wide → 1 billion

In projects of 2-200-20,000 participants having

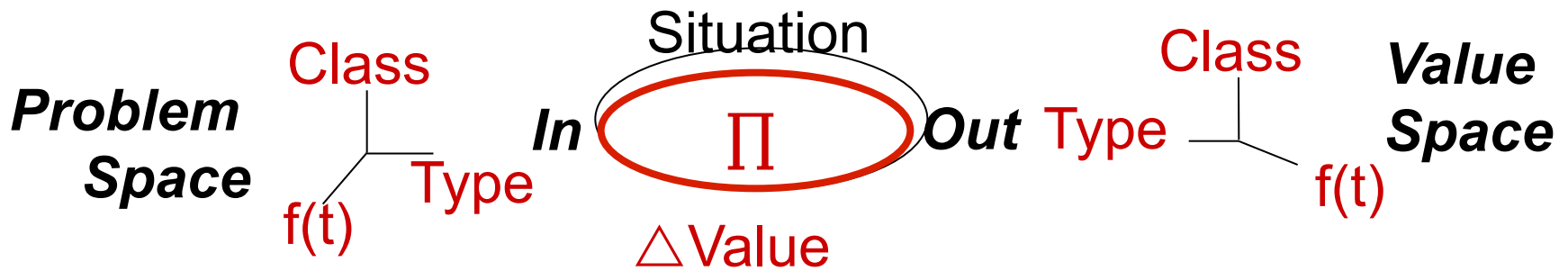
novice $\longleftrightarrow$ ≈ 30 Performance Improvement Potentials ≈ 1 $\longleftrightarrow$ expert

By evolving their Thinking → Feeling → Making → Doing → Being

In contexts of



Example Types of Systems



$\Pi 1 = f(k) = \text{ballistic}$

$\Pi 2 = f(O) = \text{governor}$

$\Pi 3 = f(I) = \text{anticipatory}$

$\Pi 4 = f(\text{Sit}, O) = \text{homeostatic}$

$\Pi 5 = f(\text{Sit1}, O) = \text{homeorhetic}^1$

$\Pi 6 = f(\text{Val}) = \text{goal-seeking}^1$

$\Pi 7 = f(\text{Pr}) = \text{self-organizing}^1$

$\Pi 8 = f(\text{Pr}, \text{Val}) = \text{value-seeking}^1$

$\Pi 9 = f(\text{all}) = \text{autocatalytic}^1$

Pr = Problem Space

Val = Value Space

S = Stimulus

R = Response

Sit = Situation

Π = System Transfer Function¹

1) Must contain a simulation of Π

Tentative Panelists 1

Janet Singer: Track Facilitator. Leads joint efforts by the International Society for the Systems Sciences (ISSS) and the International Council on Systems Engineering (INCOSE) to 'co-mature' systems science and systems engineering as disciplines. Her background spans philosophy, statistical data analysis, AI, engineering economics, and law. She is an editor of the Systems Engineering Body of Knowledge (SEBoK), former ISSS liaison to INCOSE and former ISSS Vice President for Research and Publications..

Hillary Sillitto. Author of *Architecting Systems – Concepts Principles and Practice (2014)*. Leader, INCOSE Fellows Initiative to modernize definition of system. A UK Chartered Engineer. Fellow of the Institute of Physics (FInstP). Fellow of the International Council On Systems Engineering (INCOSE). Visiting Professor at the Universities of Bristol (Systems Centre) and Strathclyde. Member of the Omega Alpha Association. Served as Thales UK's Systems Engineering Director at the time of his retirement from tenured employment in 2013.

Tentative Panelists 2

Prof. Dov Dori is Head of Enterprise System Modeling Laboratory at Technion, Israel. He is Fellow of IEEE, INCOSE, and IAPR, member of Omega Alpha Association, the International Honor Society for Systems Engineering, and Senior Member of ACM. Since 2000, he has been intermittently Visiting Professor at MIT, where he holds an adjunct position. In 1993, Dori invented Object-Process Methodology (OPM), now ISO 19450:2015. He has authored two books on OPM, over 300 publications and supervised over 50 graduate students in Israel and USA, of whom 12 are faculty members in three countries.

Jack Ring, U.S., architects and evolves sociotechnical systems that learn to initialize deployed systems. INCOSE Fellow and leader of various Working Groups. Co-author of patent for discovering conditional patterns in data. Colleague for preventing logic, arithmetic and semantic cyber-vulnerabilities throughout large, complex, ambiguous suites of computer code.

Perhaps a 'System' of Ontologies?

Is there an ontology/model for the world's smallest system and a scheme for evolving the different types and classes of systems with that 'seed holon?'

Ontology of a sociotechnical system that Discovers existing systems and Initializes future ones?

Ontologies of Classes and Types?

Ontology of System?

Ontology of Ontology?

General Systems Theory

General Semantics Theory

Questions for Ontologists

(Refine for March 2018 Sessions)

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 Stakeholders 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.

(Refine for March 2018 Sessions)

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

Systems are composed of automaton, automata 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?