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Philosophy of Engineering: Initial Explorations

NDIA 19th Annual Systems Engineering Conference

Paper 18979

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SYSTEMS ENGINEERING
ESTABLISHED 2002

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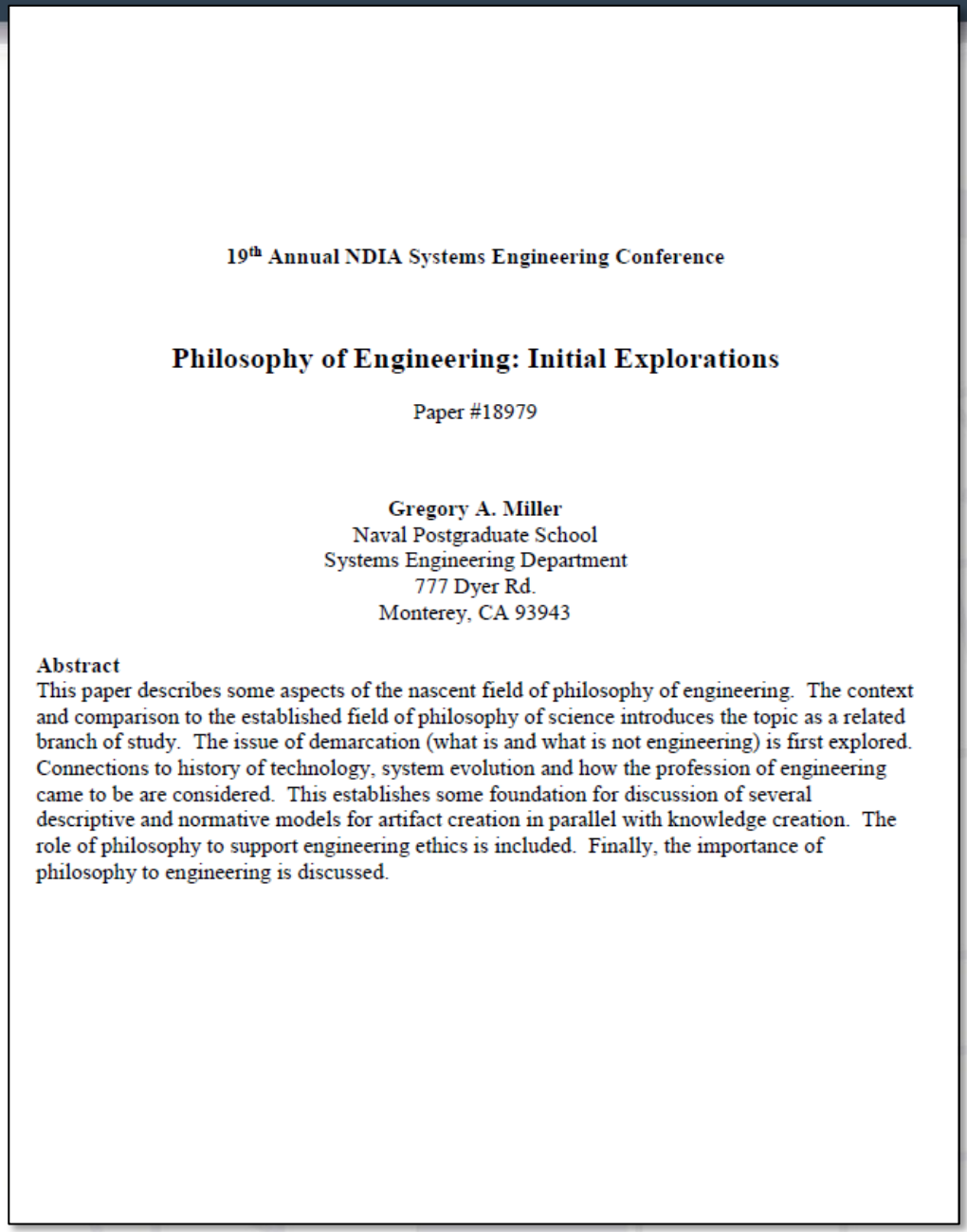
Introduction & Background

Read my paper!

As engineers, we communicate via information-dense media. The poor communication style of endless bullet-list Neanderthal grunts leads to a poor cognitive style counter to critical thinking and engineering reasoning.



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Paper #18979

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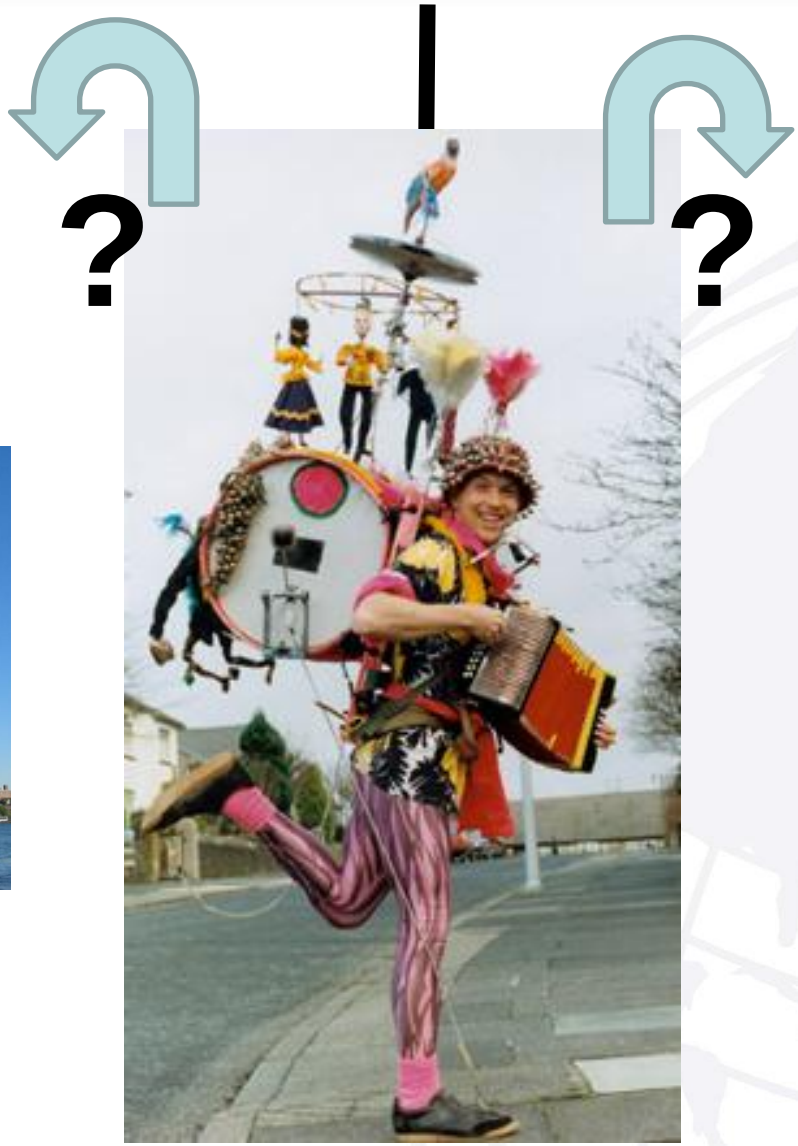
Abstract
This paper describes some aspects of the nascent field of philosophy of engineering. The context and comparison to the established field of philosophy of science introduces the topic as a related branch of study. The issue of demarcation (what is and what is not engineering) is first explored. Connections to history of technology, system evolution and how the profession of engineering came to be are considered. This establishes some foundation for discussion of several descriptive and normative models for artifact creation in parallel with knowledge creation. The role of philosophy to support engineering ethics is included. Finally, the importance of philosophy to engineering is discussed.

Demarcation

Demarcation

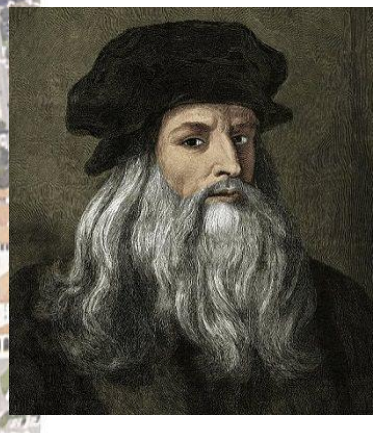


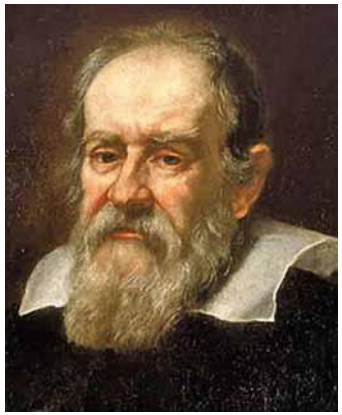
Demarcation

ABET

Role of History

Technology Growth and Change





Role of History

Technology Growth and Change

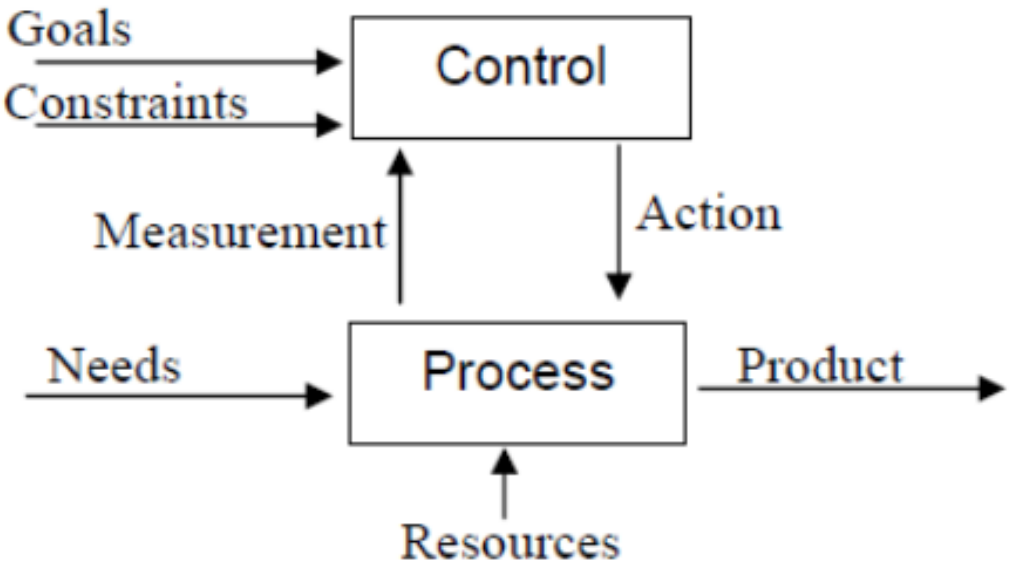
1800	1900	2000
Natural Philosophy	Civil Engineering	Civil Engineering
		Wind Engineering
		Seismic Engineering
		Mining Engineering
		Cost/Value Engineering
		Safety Engineering
		Environmental Engineering
	Mechanical Engineering	Mechanical Engineering
		Industrial Engineering
		Manufacturing Engineering
		Materials Engineering
		Metallurgy
		Maintainability Engineering
		Aeronautical Engineering
		Astronautical Engineering
		Human Engineering
		Test Engineering
	Chemical Engineering	Chemical Engineering
		Petroleum Engineering
		Combustion Engineering
		Nuclear Engineering
	Electrical Engineering	Electrical Engineering
		Power Engineering
		Communications Engineering
		Computer Engineering
		Software Engineering
		Electronics Engineering
		Control System Engineering
		Biomedical Engineering
		Systems Engineering
		Reliability Engineering
		Logistics Engineering
		Optical Engineering
	Naval Architecture	Naval Architecture
		Ocean Engineering
		Naval Engineering

Role of History

Professional Societies

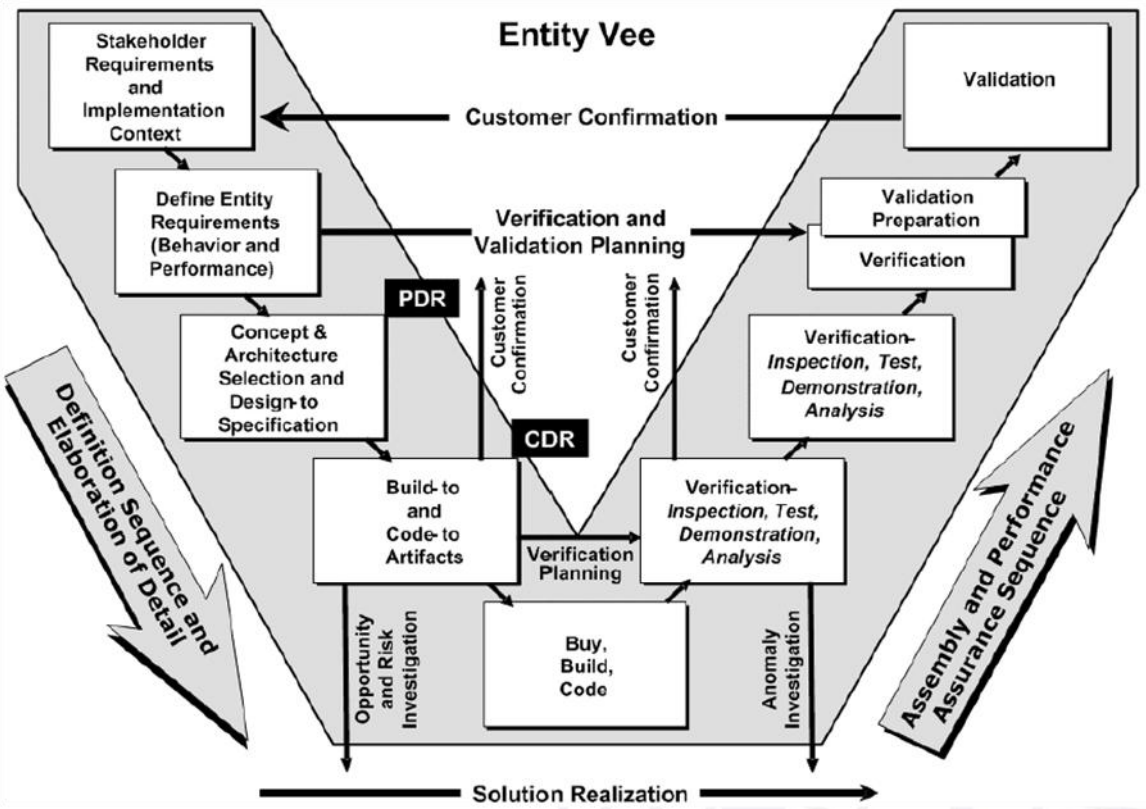
Education

Models for Engineering Design



[Moore 2006, 5]

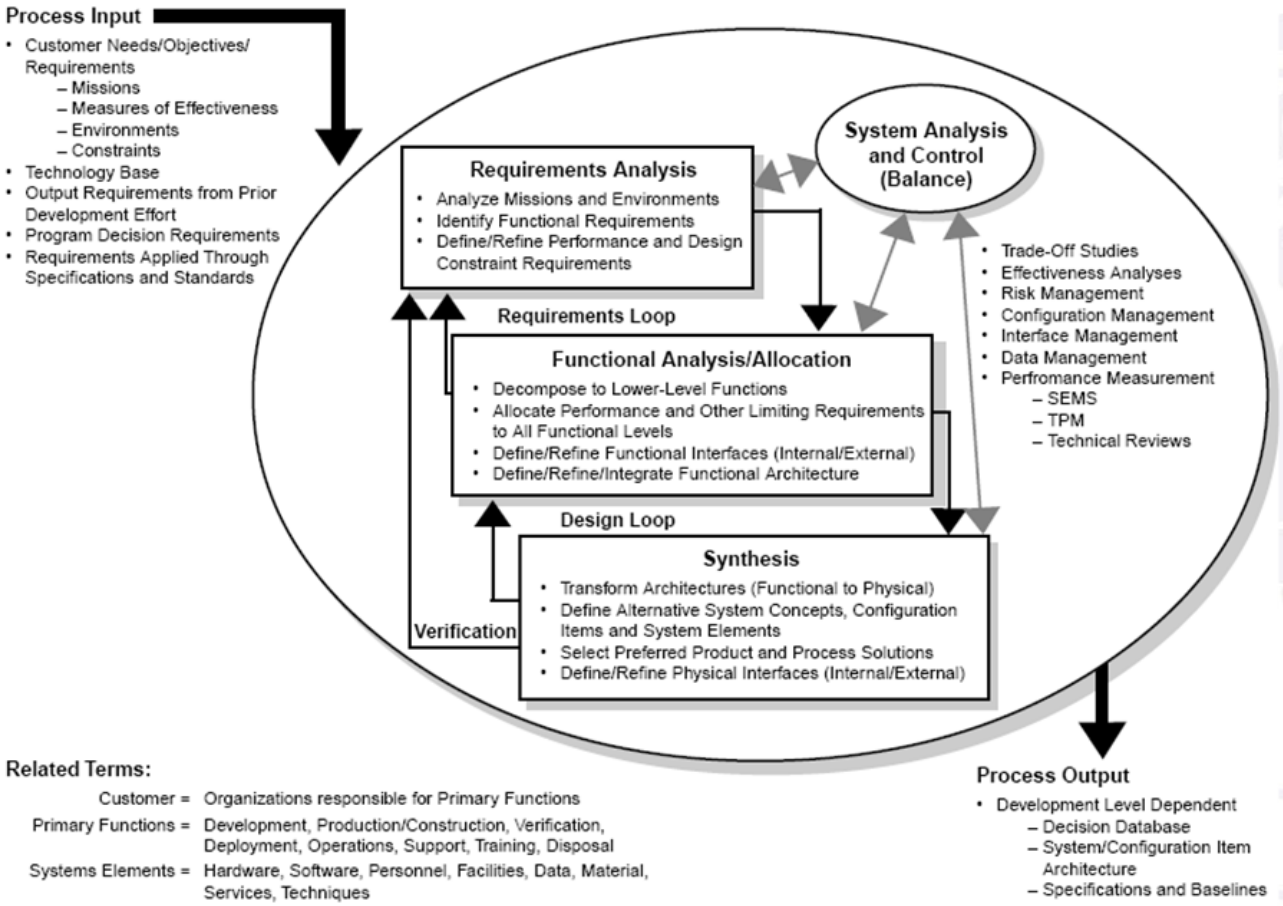
Models for Engineering Design



[from Mooz & Forsberg 2006, 6]

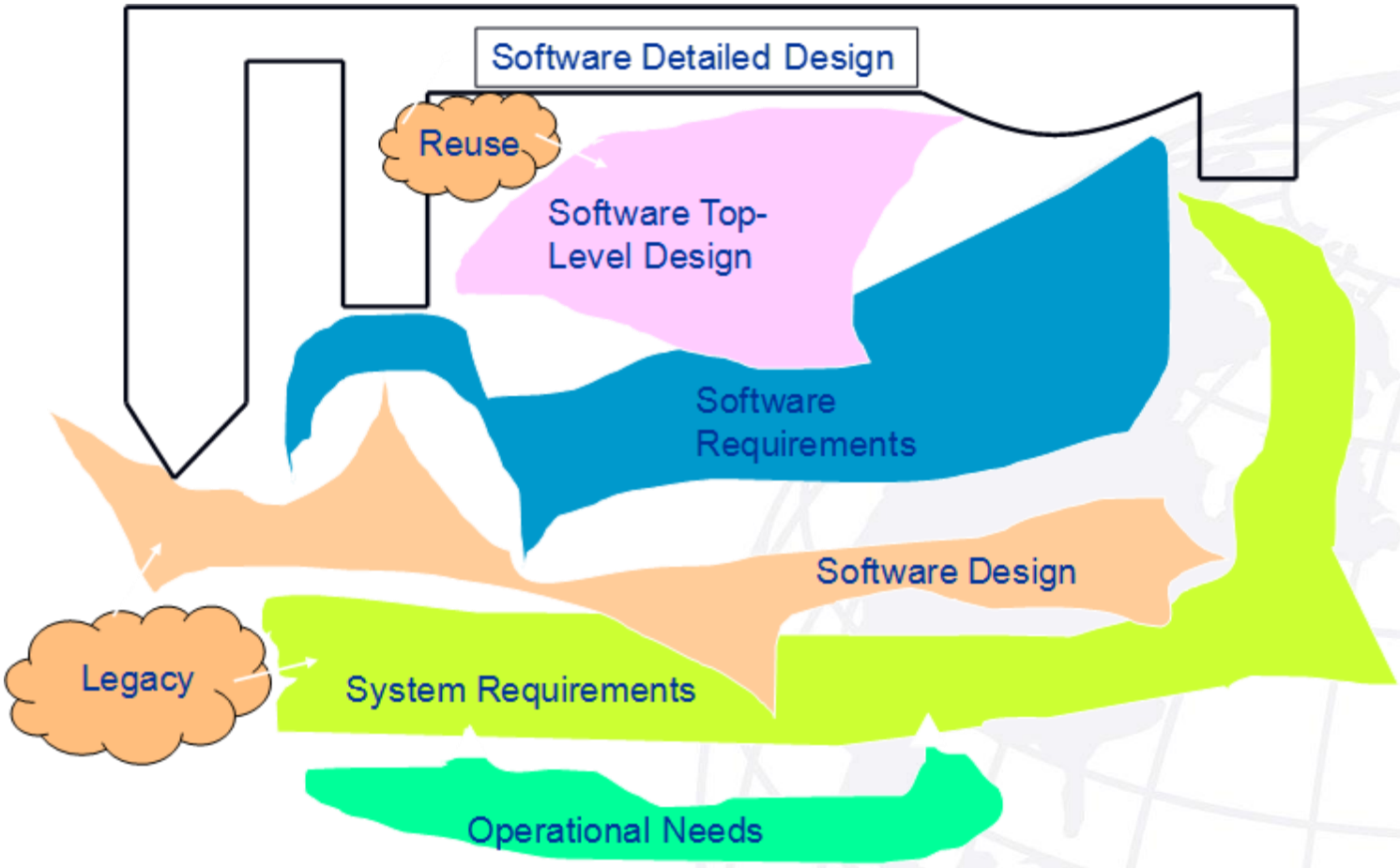
Models for Engineering Design

MIL-STD- 499B



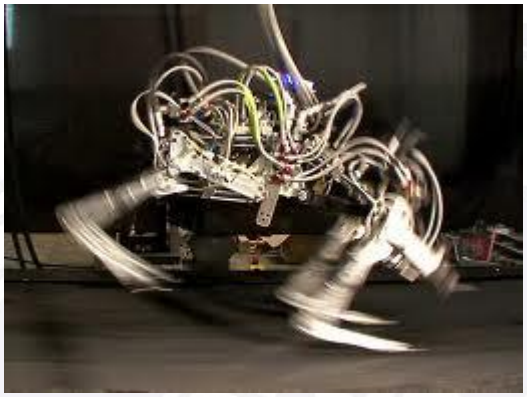
[DSMC 2000, 31]

Models for Engineering Design



[Schumate & Keller 1992, 15]

Ethics



Boston Dynamics

Recommendations & Way Ahead

Read my paper!

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