

Putting the *System* Back Into Systems Engineering

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Putting the *System* Back Into Systems Engineering



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Introduction - Systems Engineering Situation

What is a system?

What is systems engineering?

Systems Engineering of Systems of Systems?



What guidance does INCOSE give/offer? "INCOSE cannot even come up with reasonable technical SE criteria for certifying SEs. INCOSE was designed fundamentally so that almost anyone can publish almost anything, no matter how wrong it is."



Introduction - Answers form the Qualified



Systems Engineering, according to **INCOSE** (p.7: **one of three possible definitions**), is an interdisciplinary approach and means to enable the realization of successful systems. It focuses on

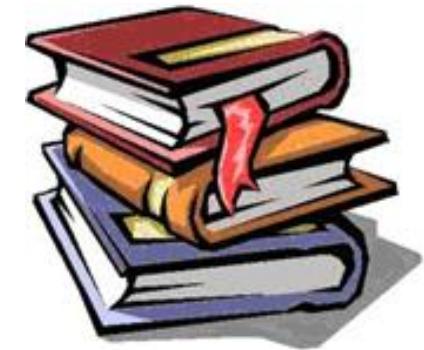
Systems Engineering, according to **Blanchard and Fabrycky** (p.31: **one of five possible definitions**), is the structured evolution of man-made systems from

Introduction - Nagging Questions no Answers

So, who is going to provide answers
to all these probing questions?

Do we ourselves understand what we
are busy doing?

Who is qualified to answer if not we
the fraternity



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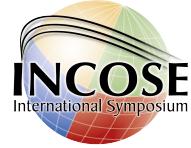
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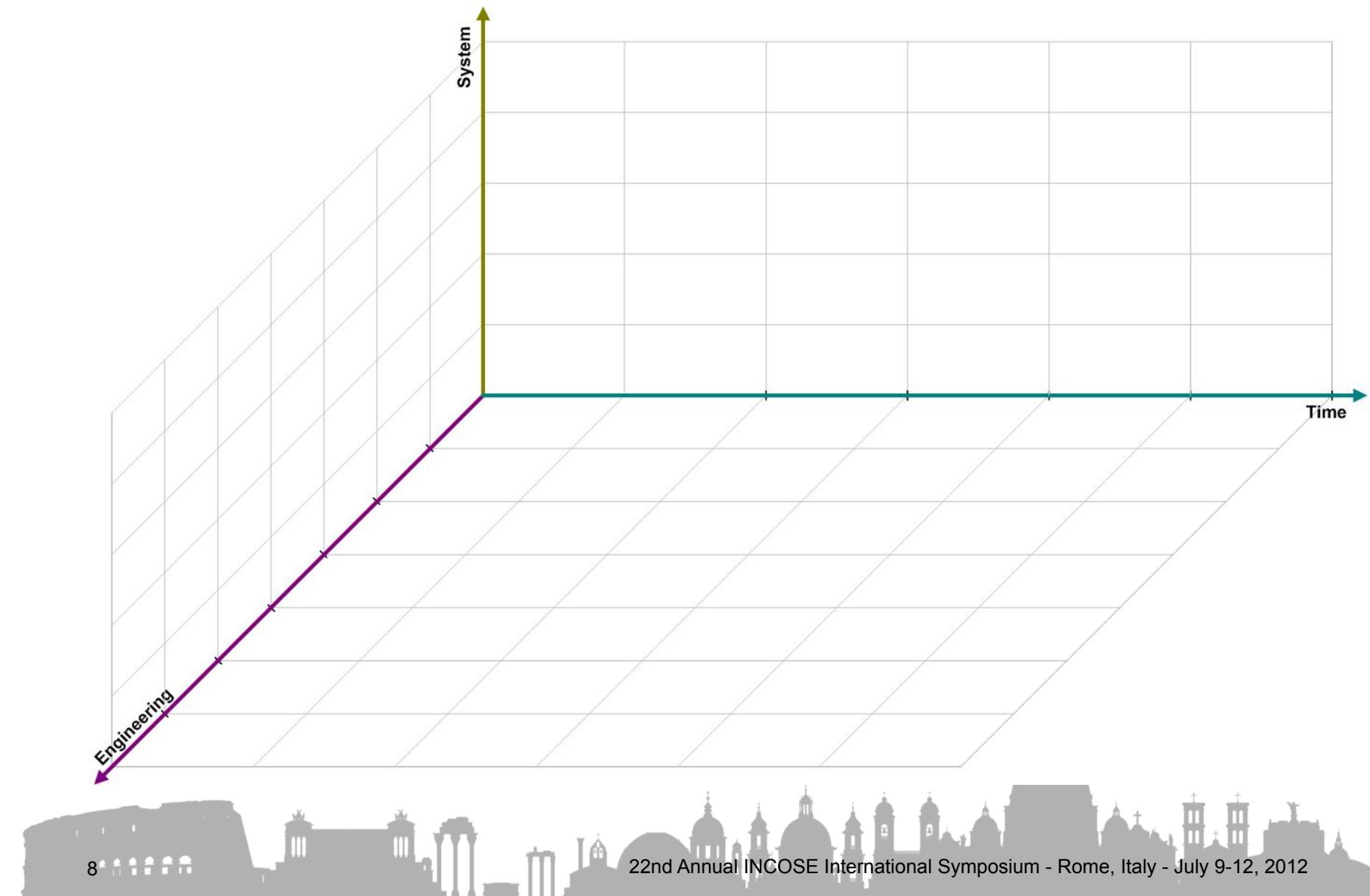
Underlying Principles - Outlining our Journey



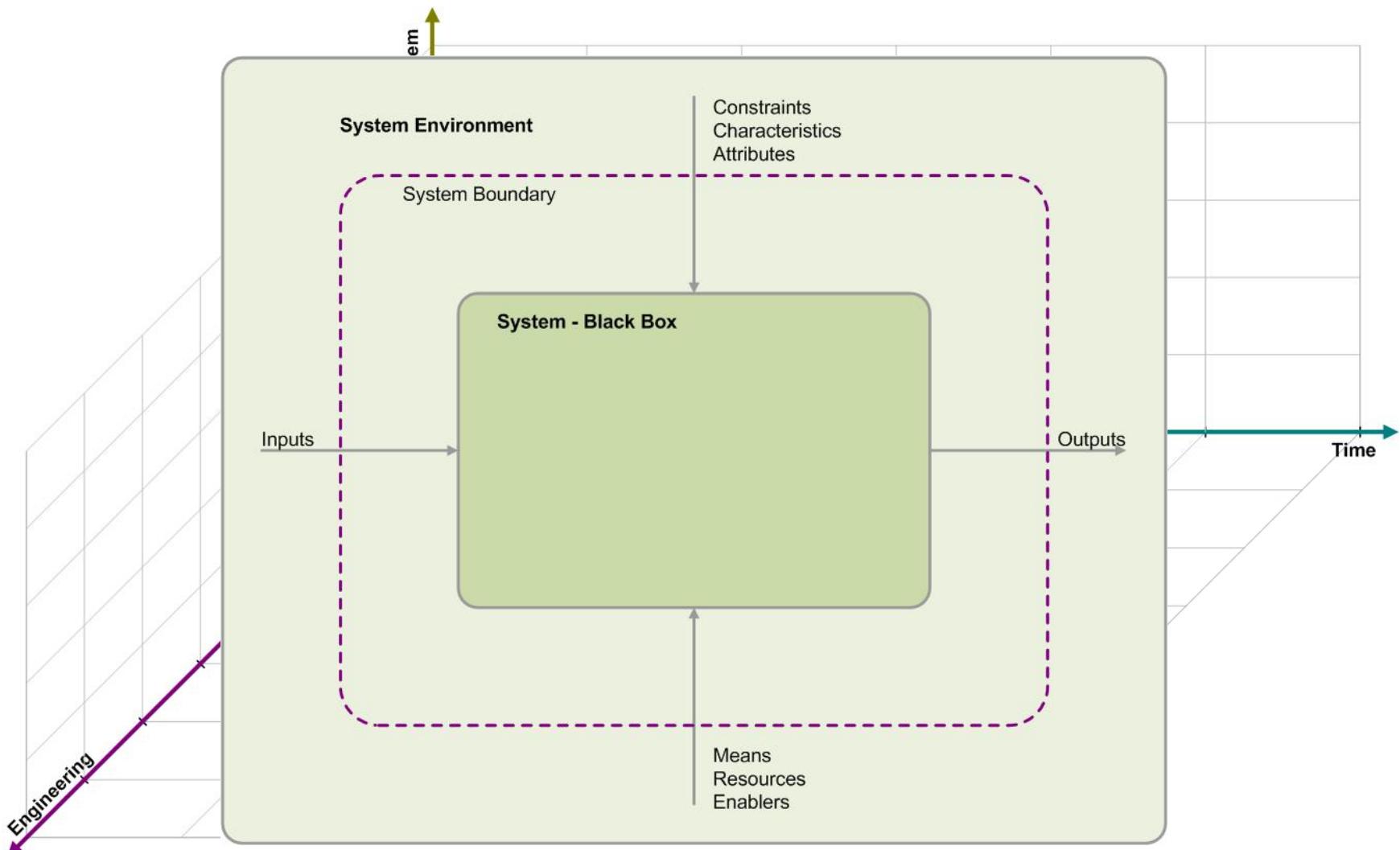
I would like to share my experience gained over many years of practicing what I believe to be the essentials of systems engineering:

- A Generic Systems Engineering (G-SE)
- Where the “System” is the subject
- A “back to the roots” expedition

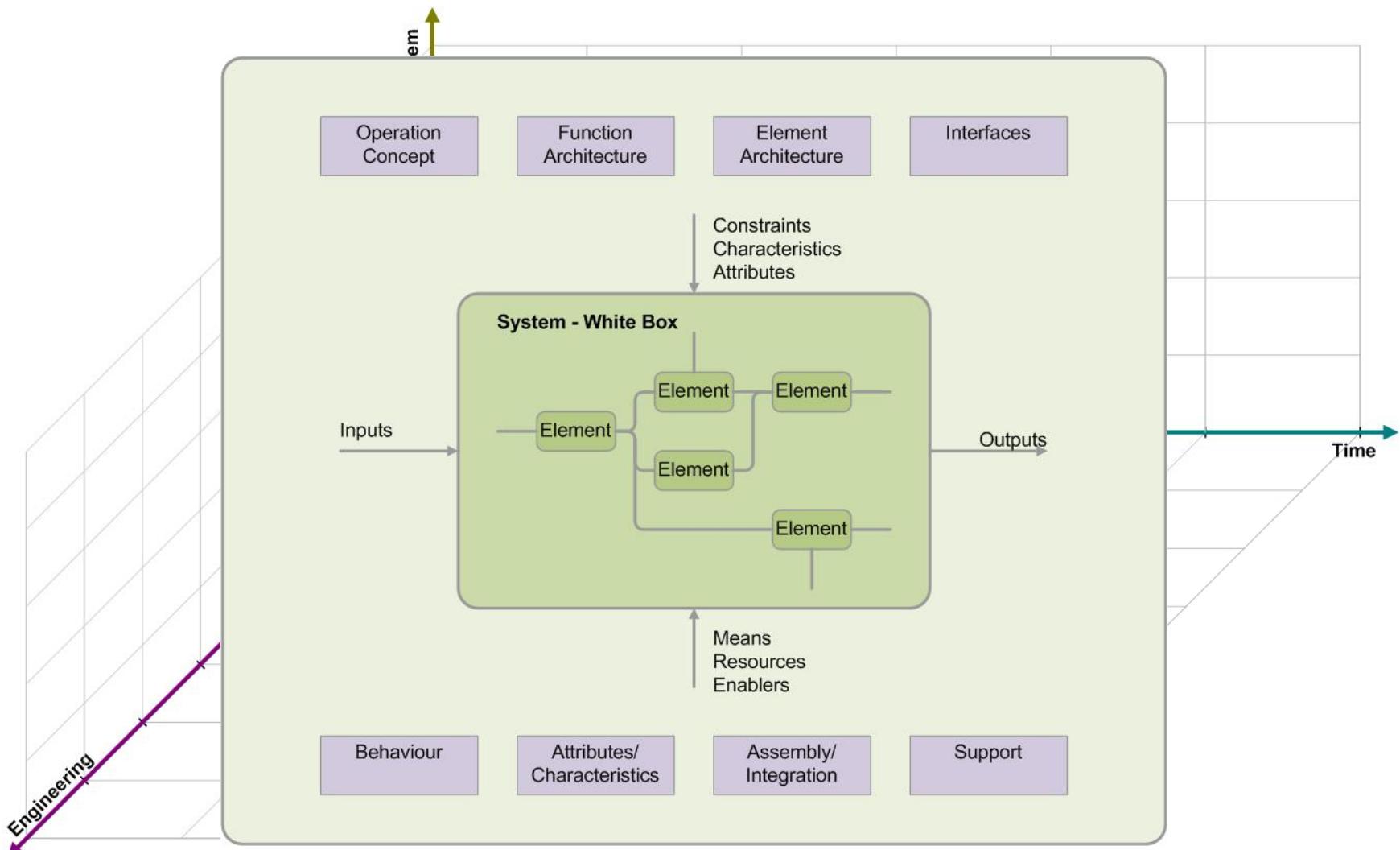
Underlying Principles - SE Space



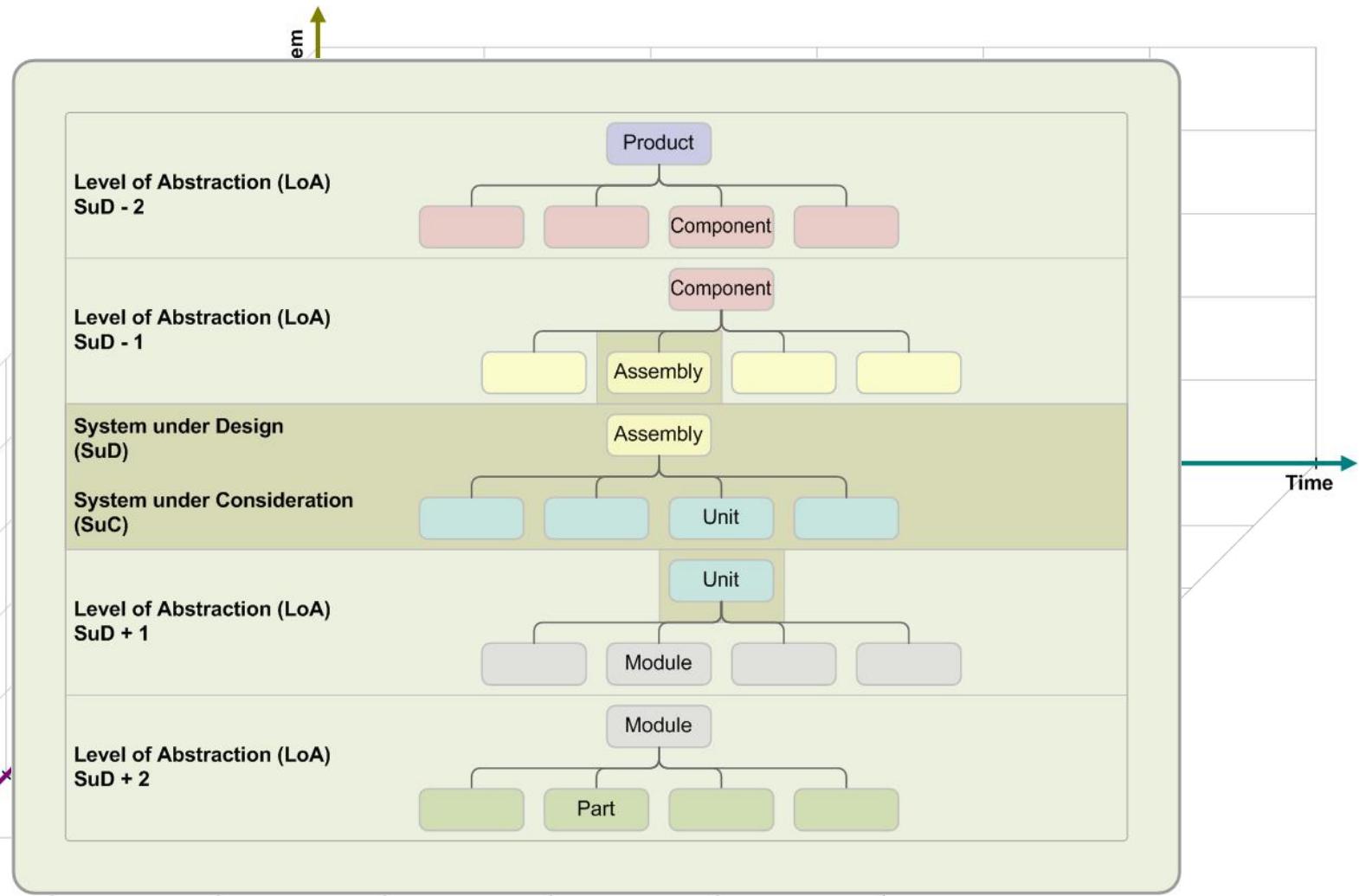
Underlying Principles - System Black Box



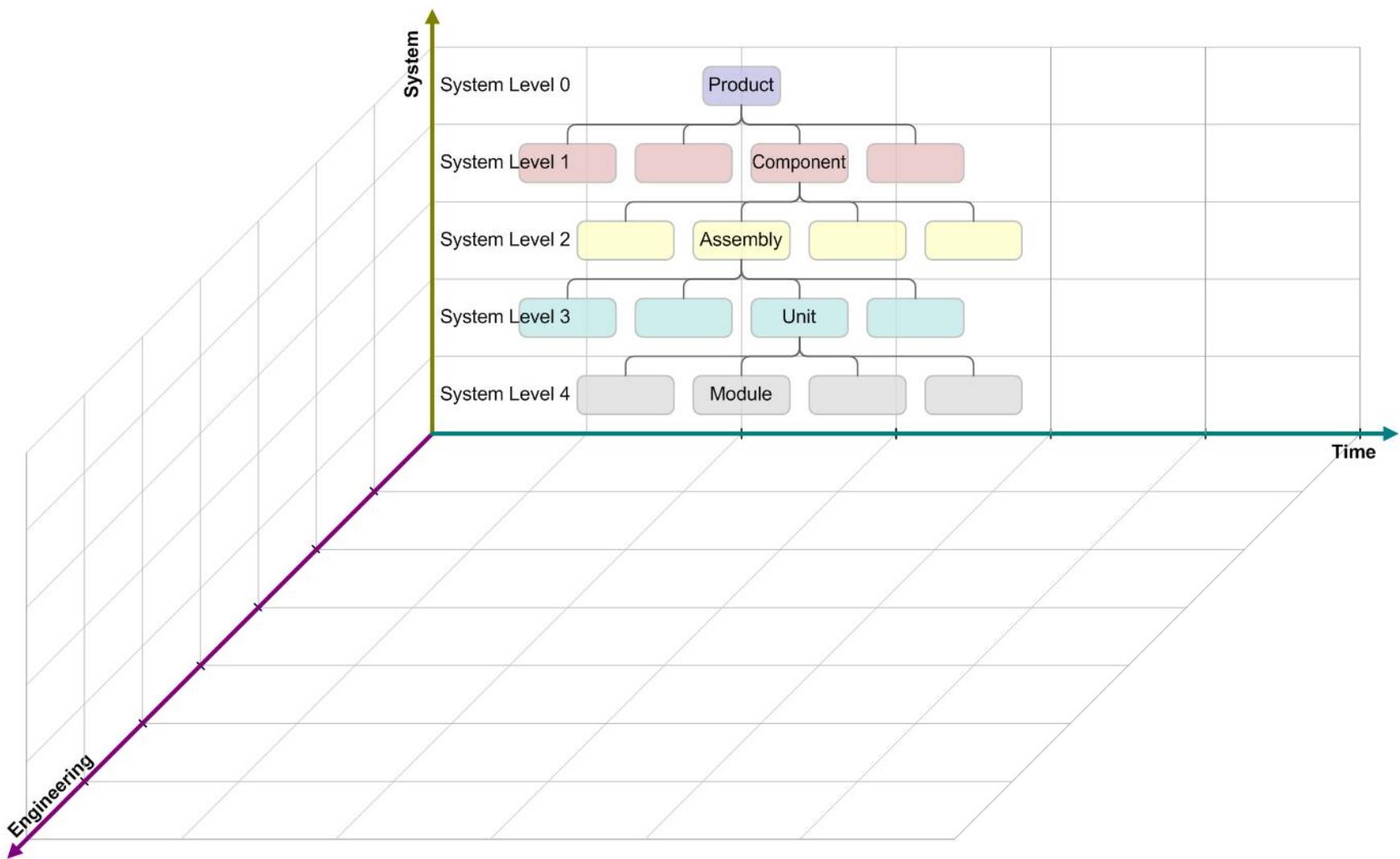
Underlying Principles - System White Box



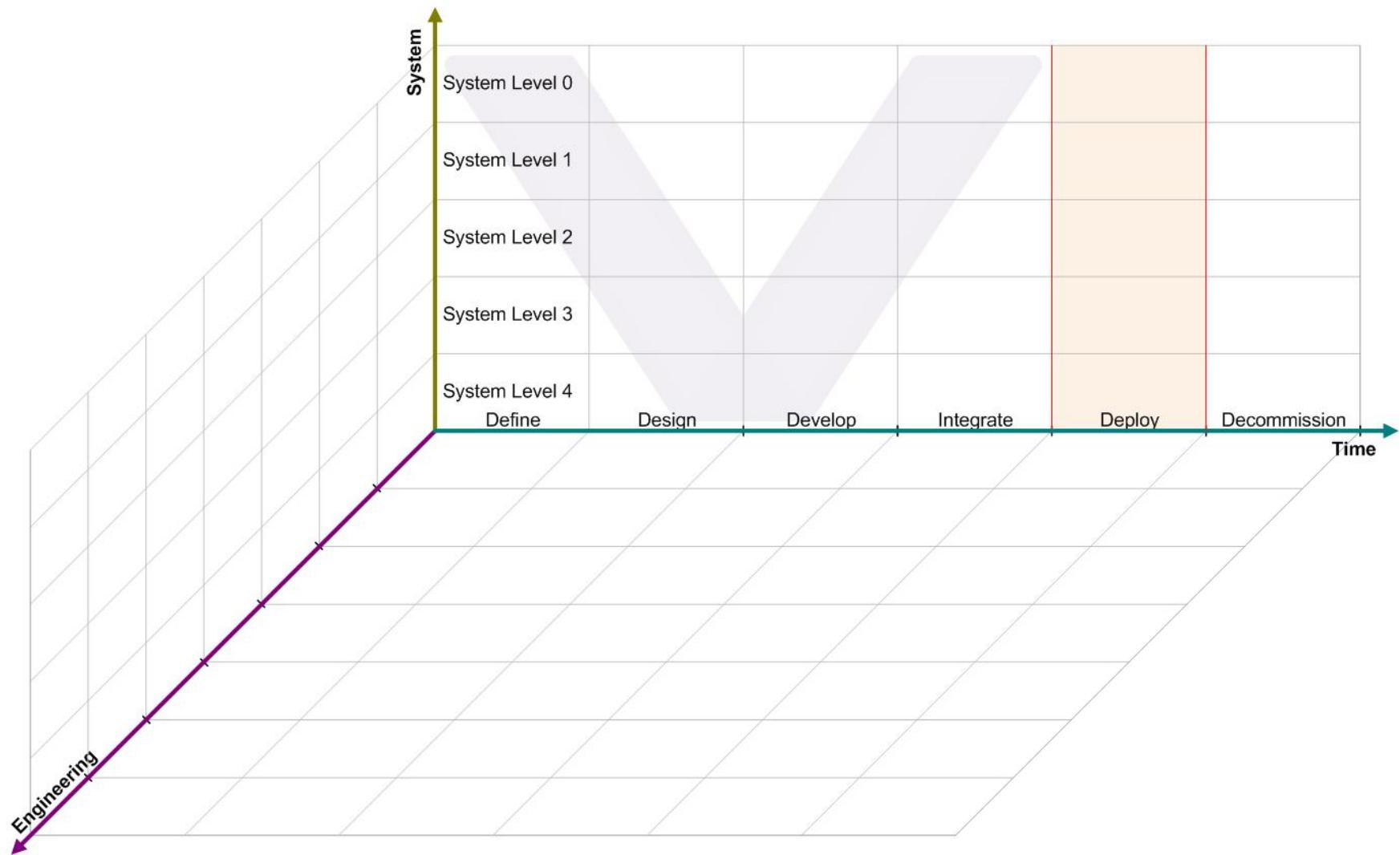
Underlying Principles - System Hierarchical Context



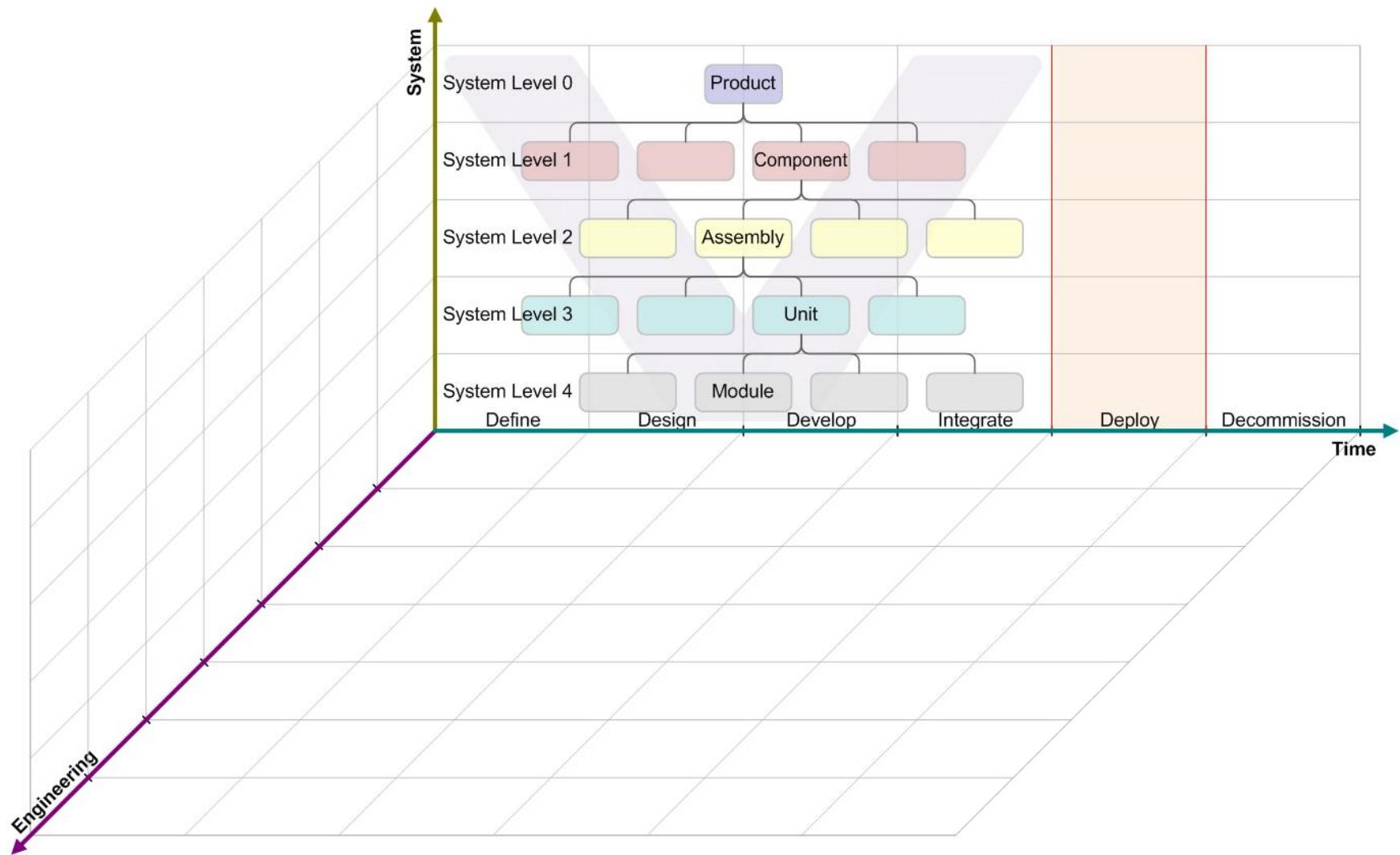
Underlying Principles - System Dimension



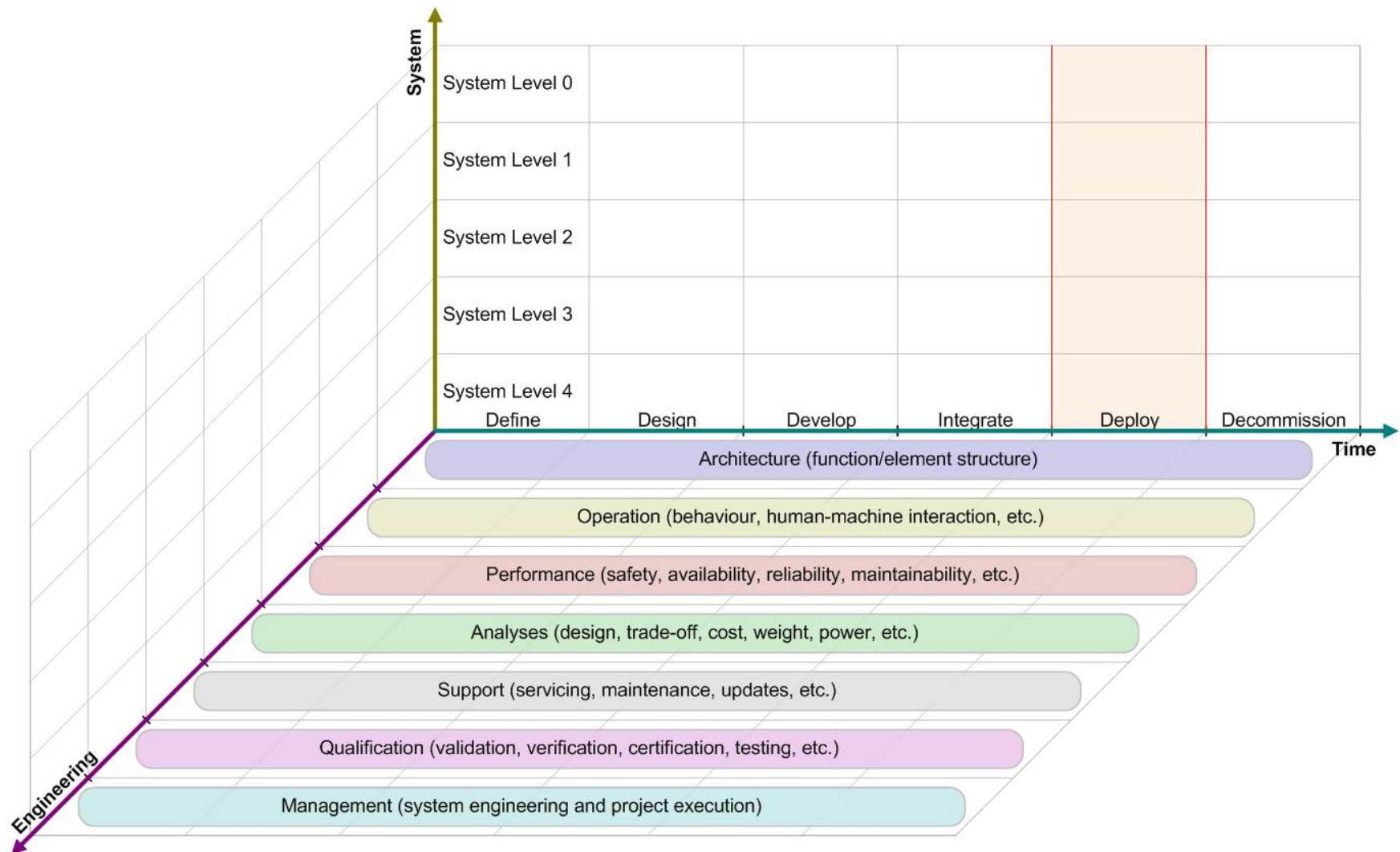
Underlying Principles - Time Dimension



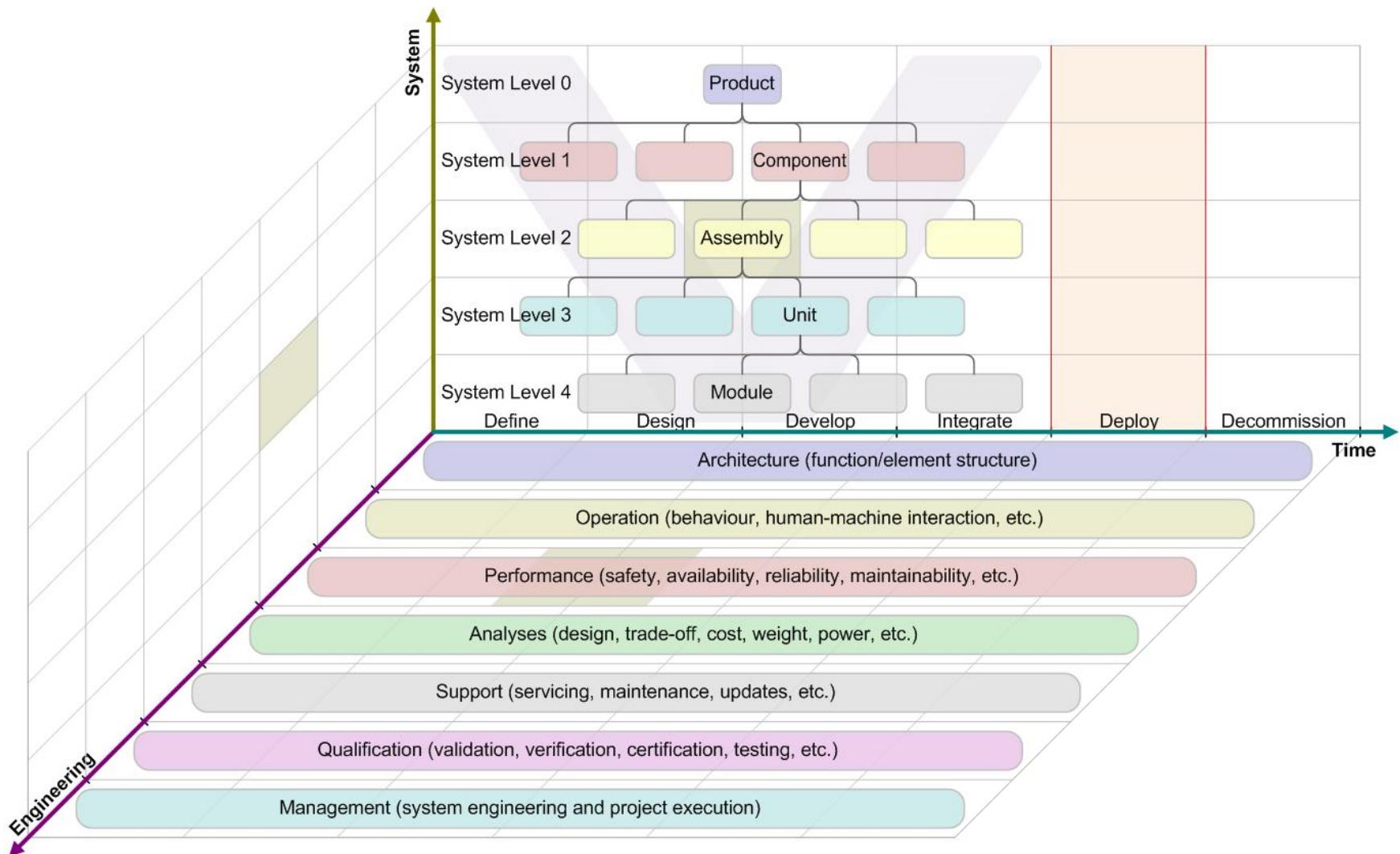
Underlying Principles - System and Time Dimension



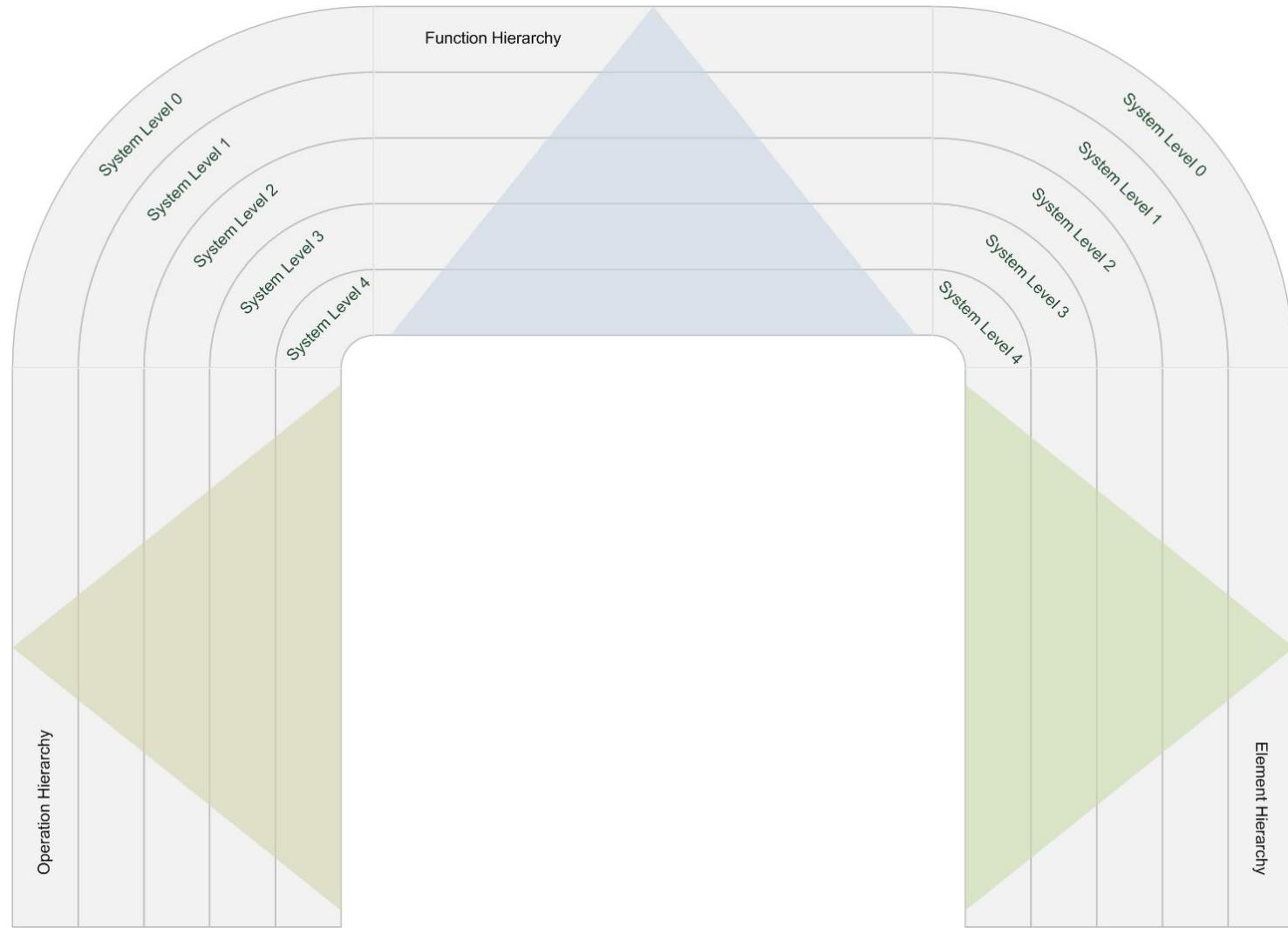
Underlying Principles - Time and Engineering Dimension



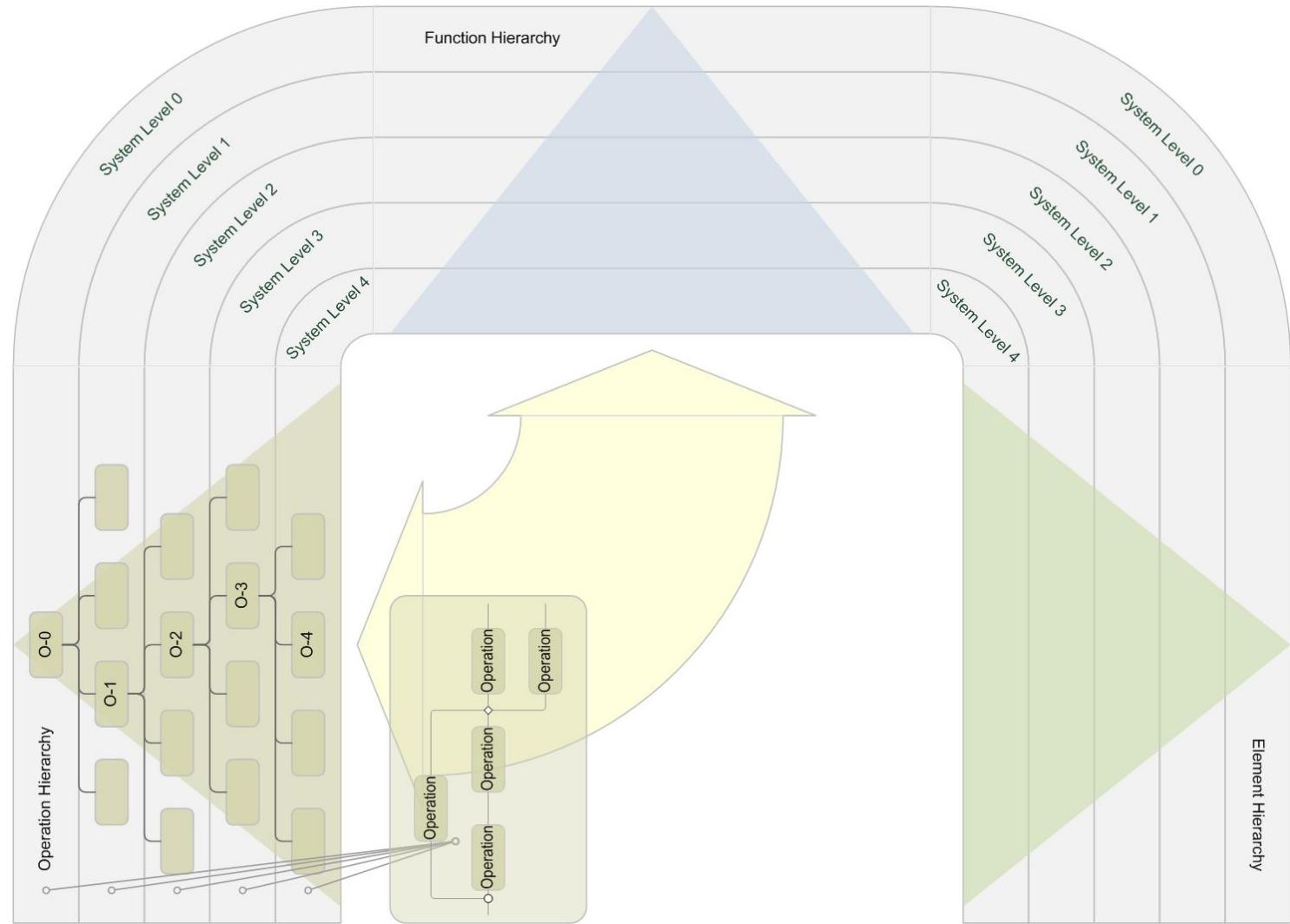
Underlying Principles - Three Dimensional SE-Space



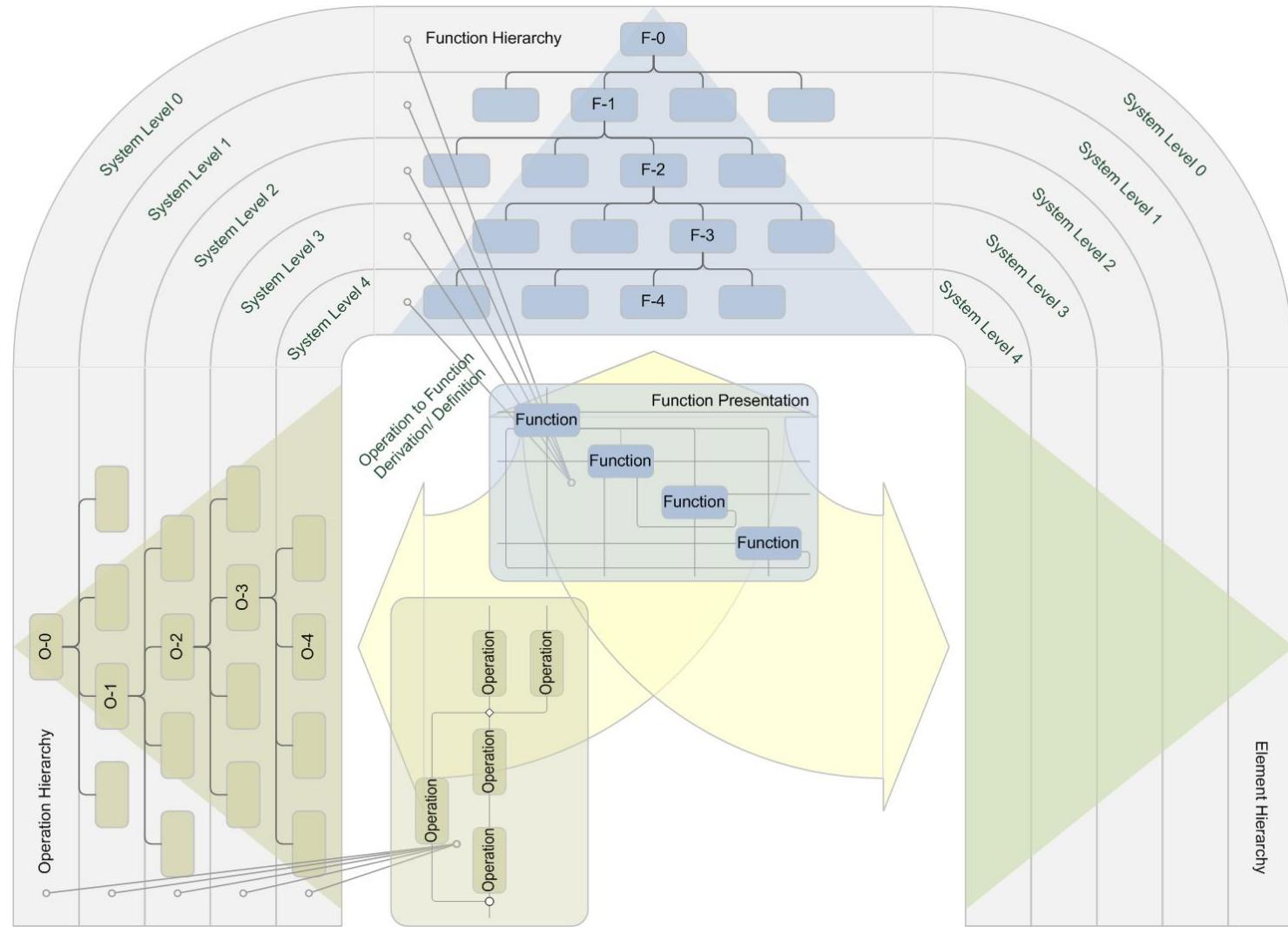
Illustrating Concepts - Operation/ Function/ Element Mapping



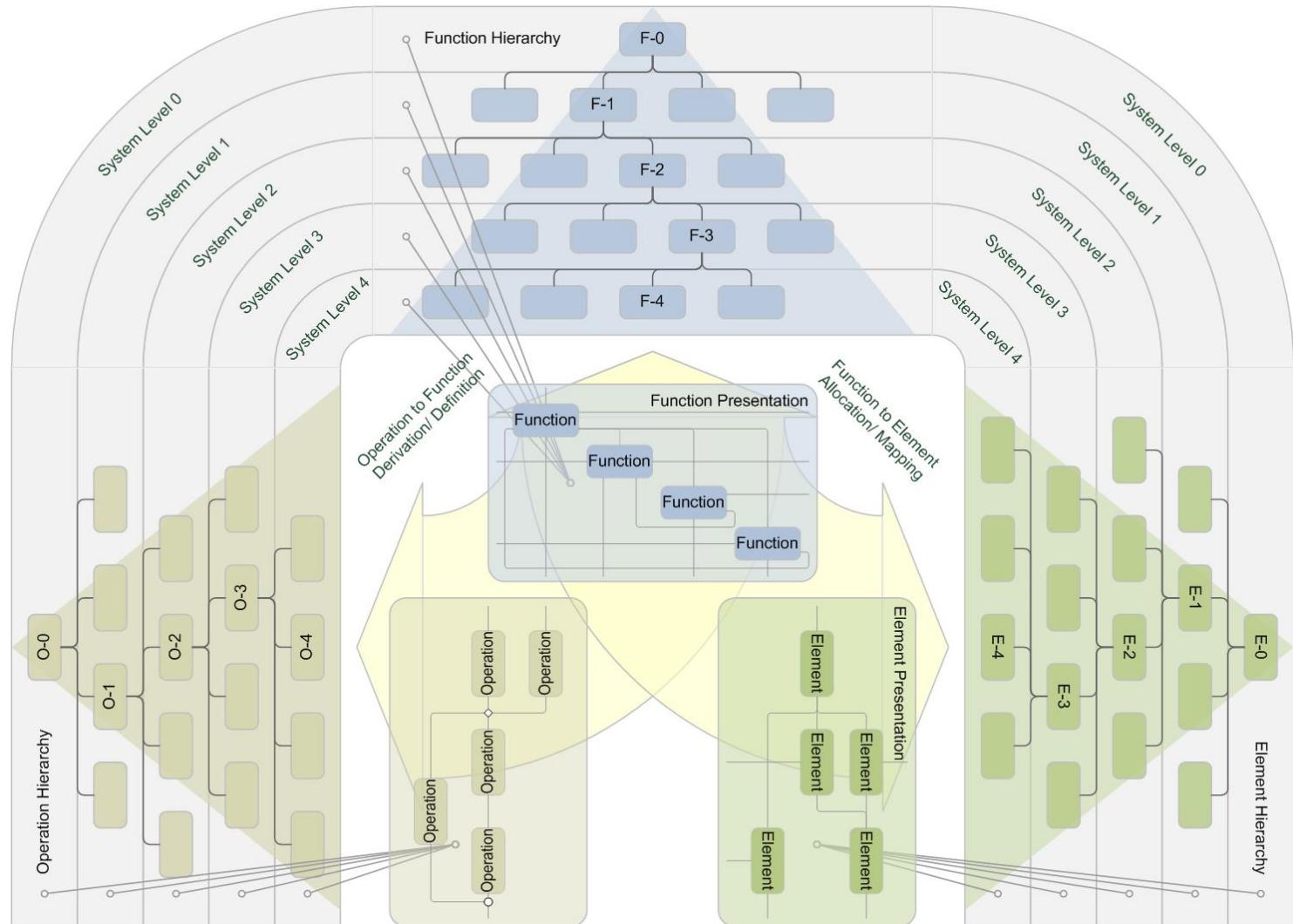
Illustrating Concepts - Operation/ Function/ Element Mapping



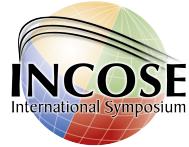
Illustrating Concepts - Operation/ Function/ Element Mapping



Illustrating Concepts - Operation/ Function/ Element Mapping



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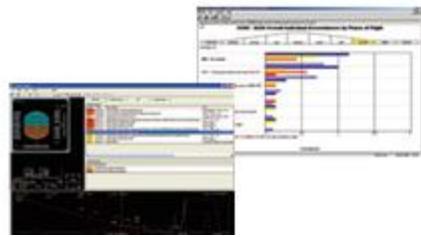
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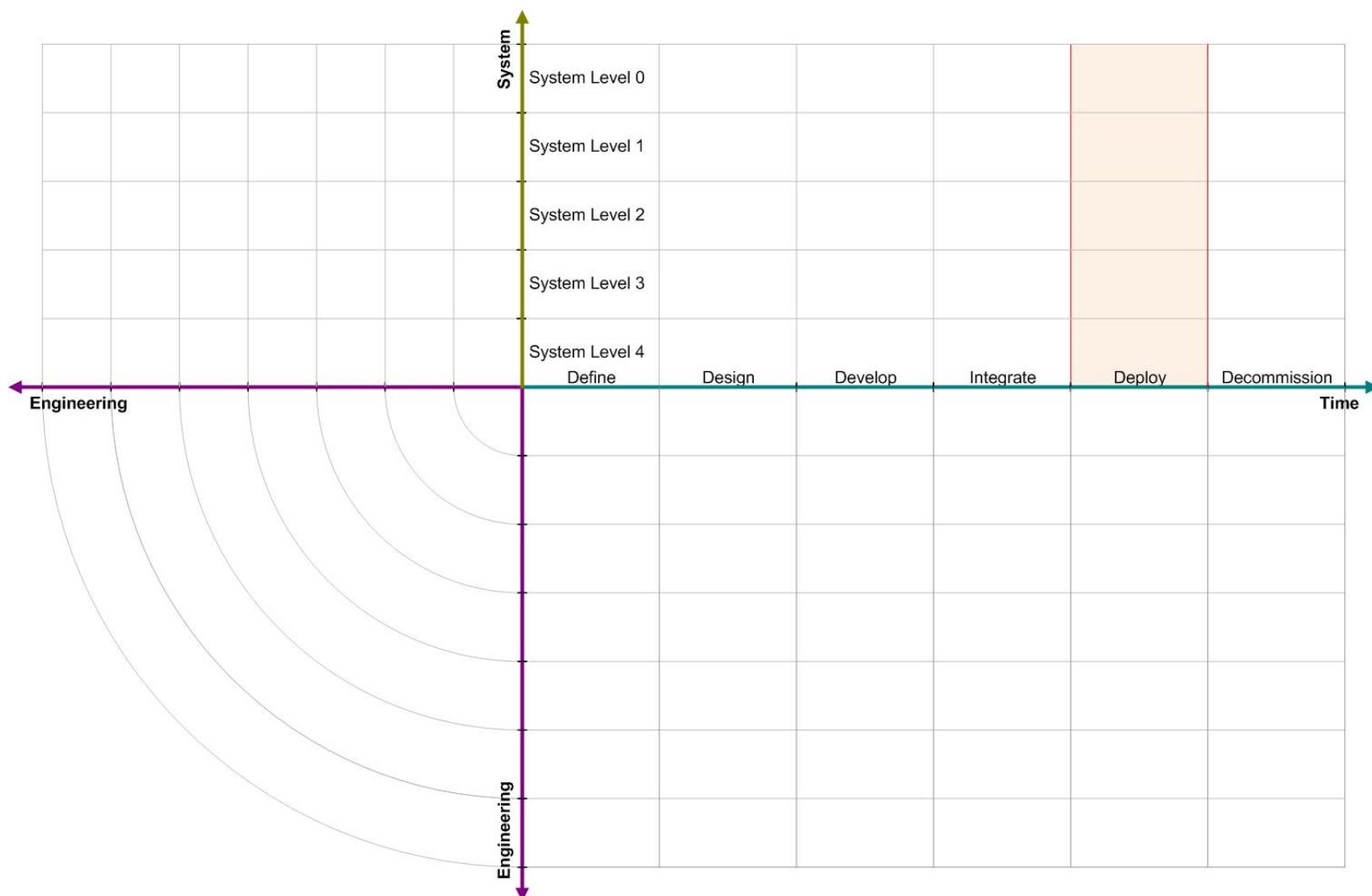
Illustrating Concepts

Appraisal

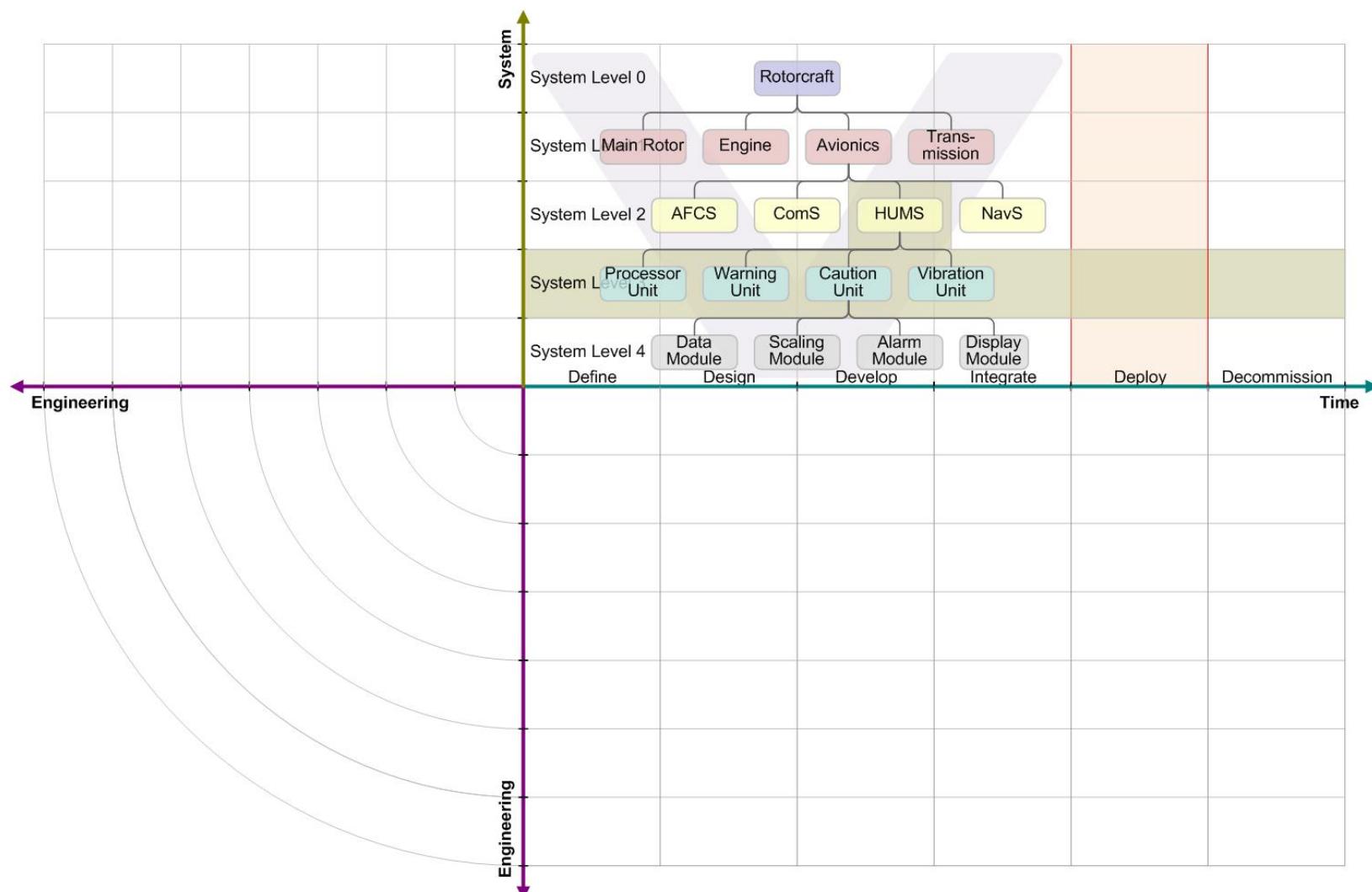
Illustrating Concepts - Health and Usage Monitoring



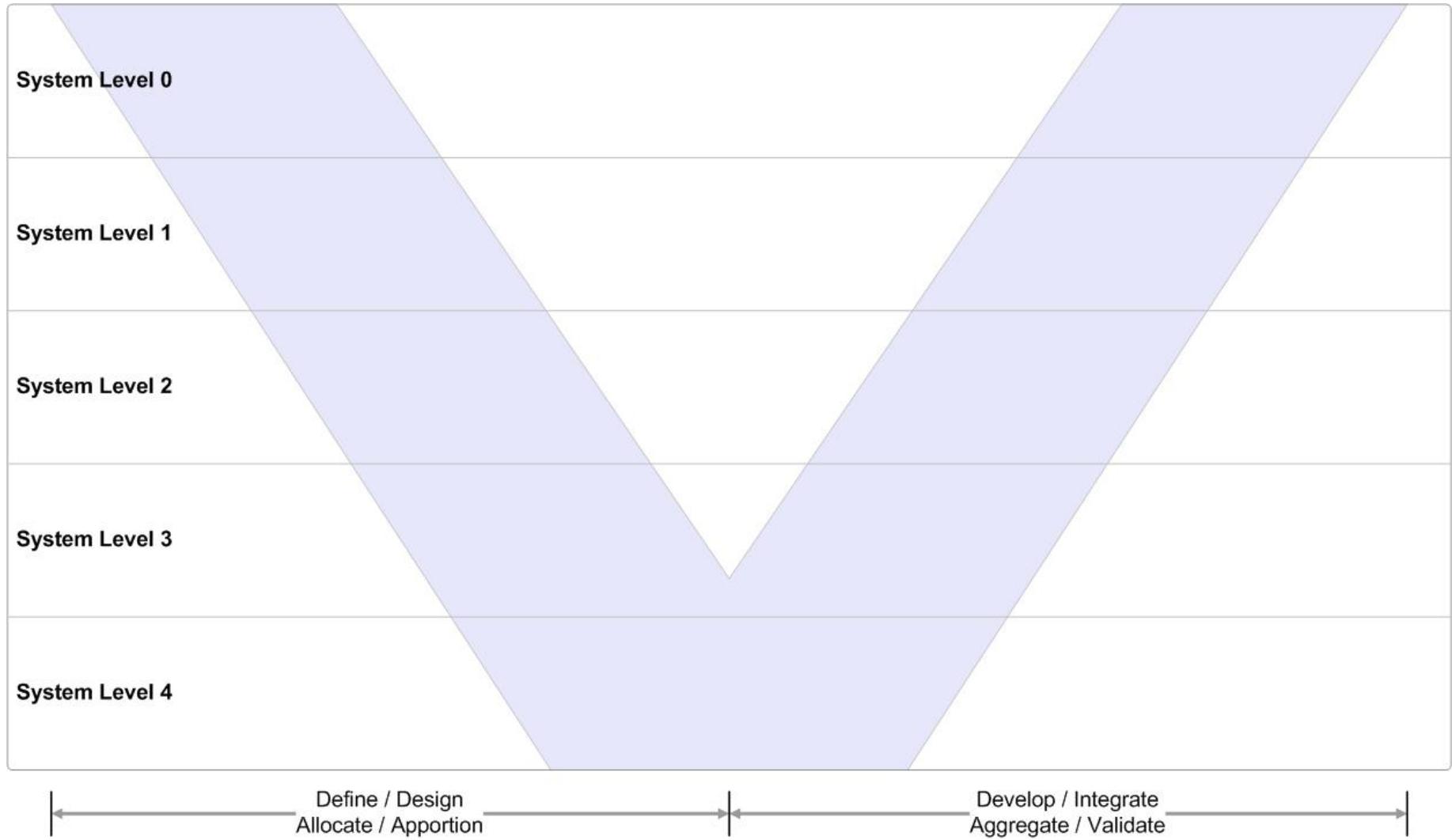
Illustrating Concepts - Health and Usage Monitoring



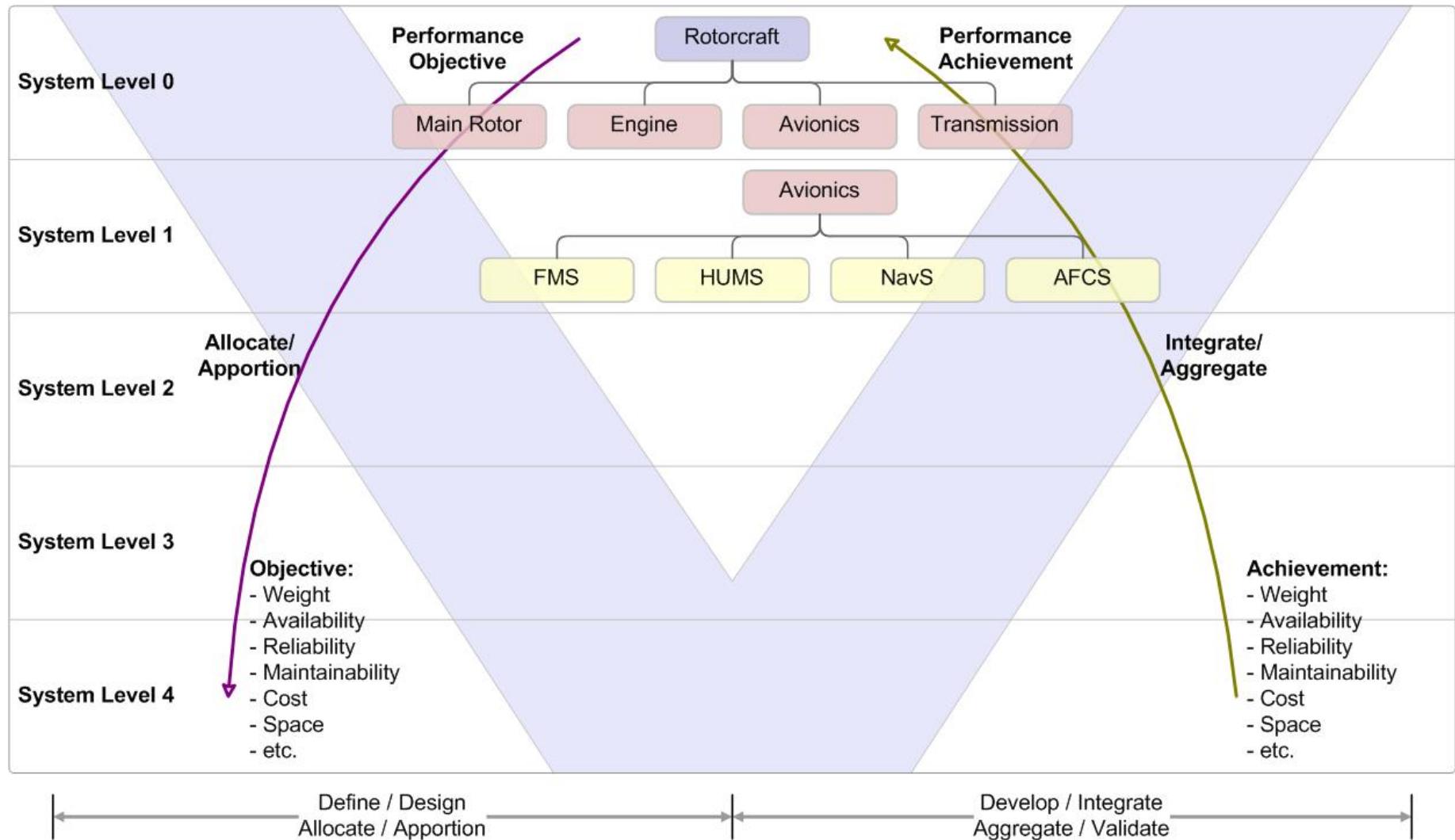
Illustrating Concepts - Health and Usage Monitoring



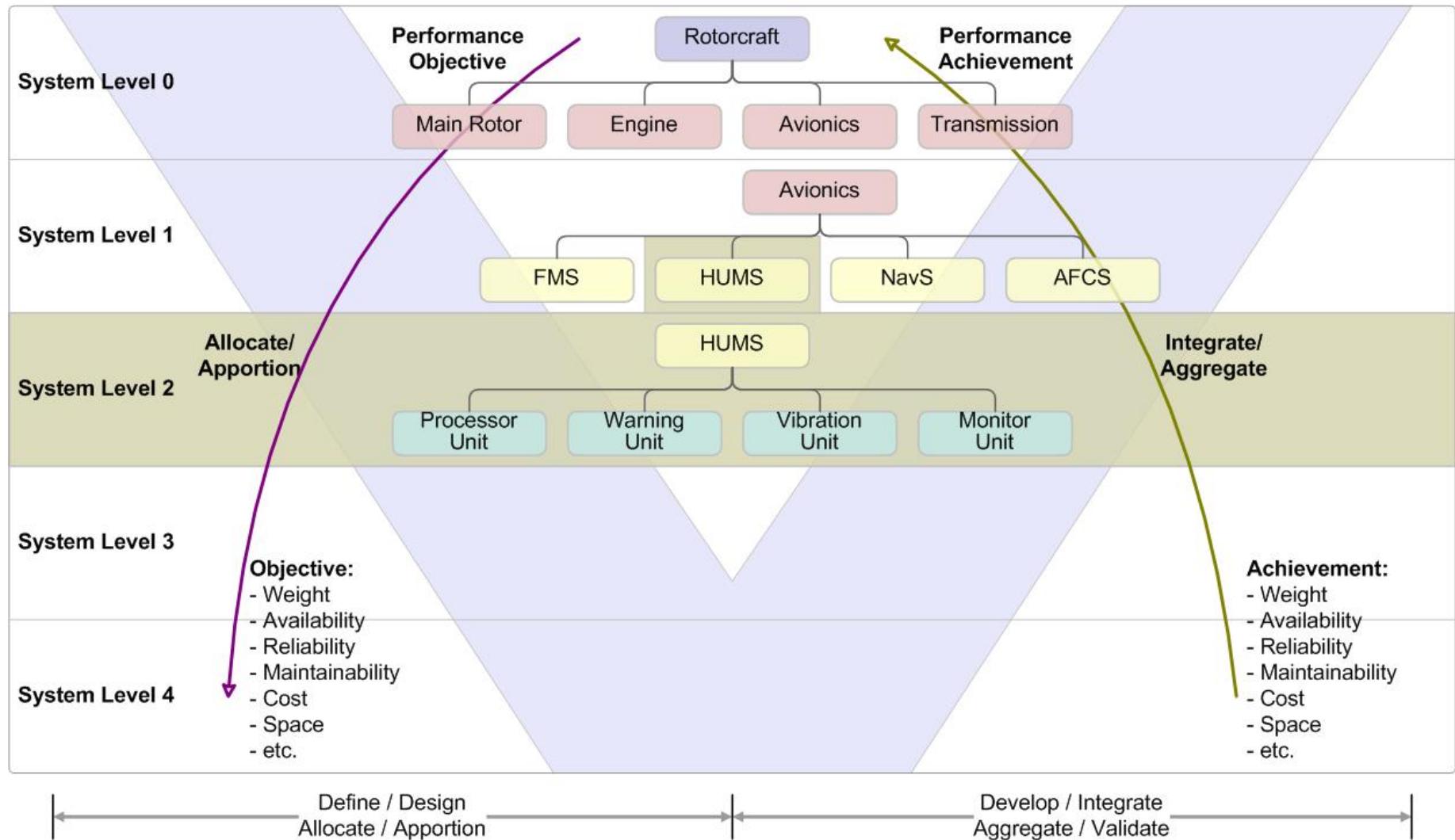
Illustrating Concepts - Hierarchical Context



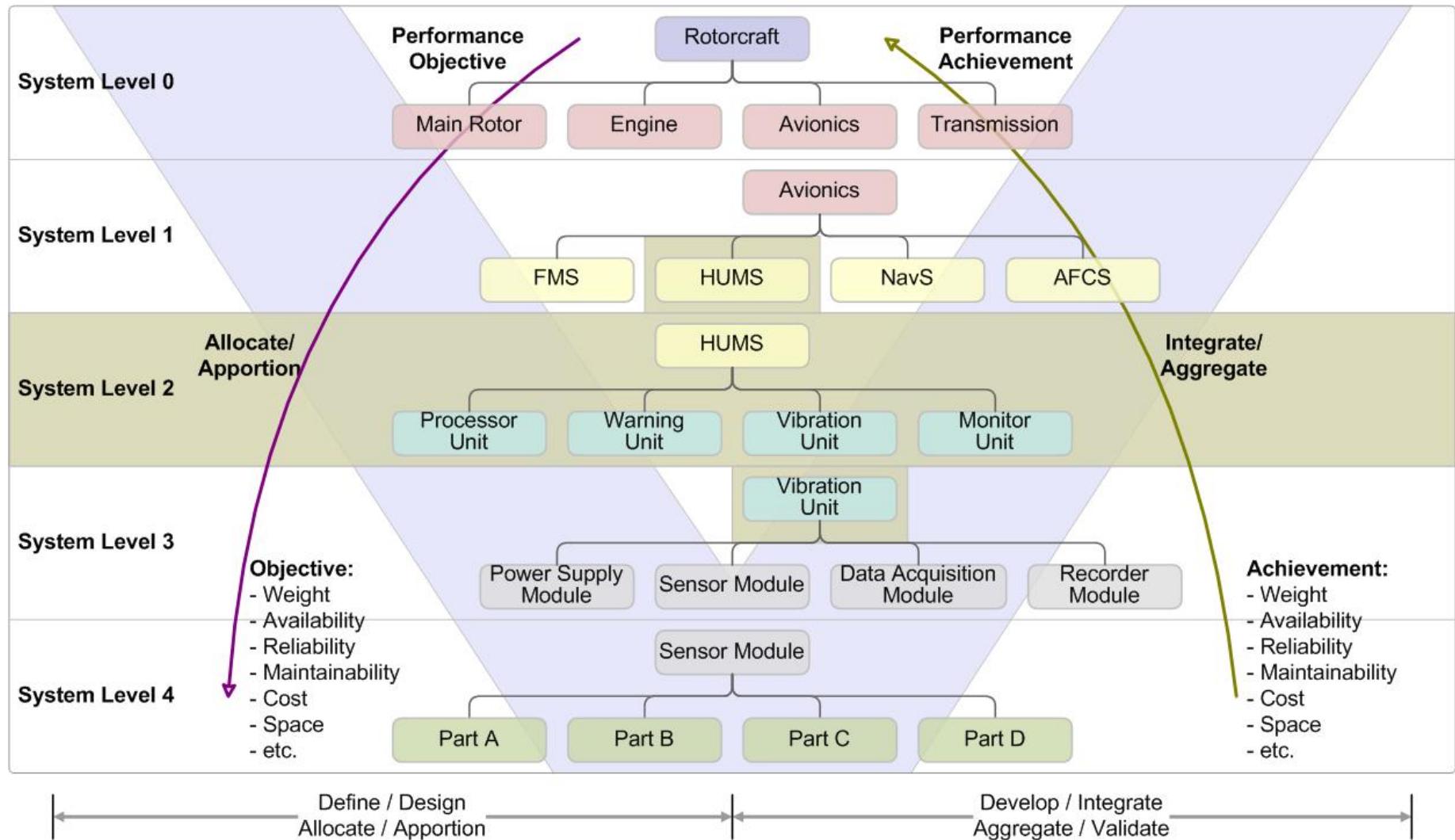
Illustrating Concepts - Hierarchical Context



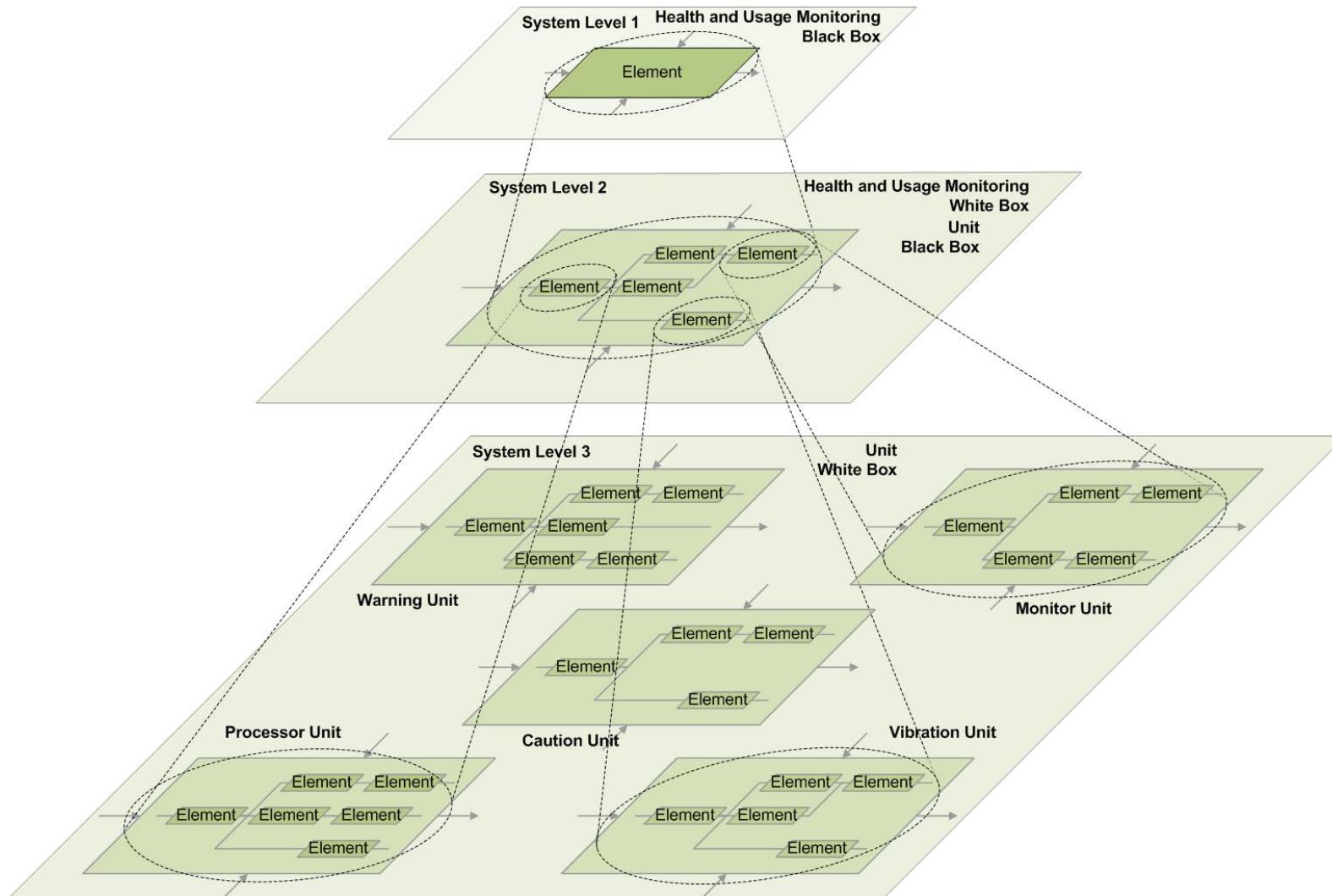
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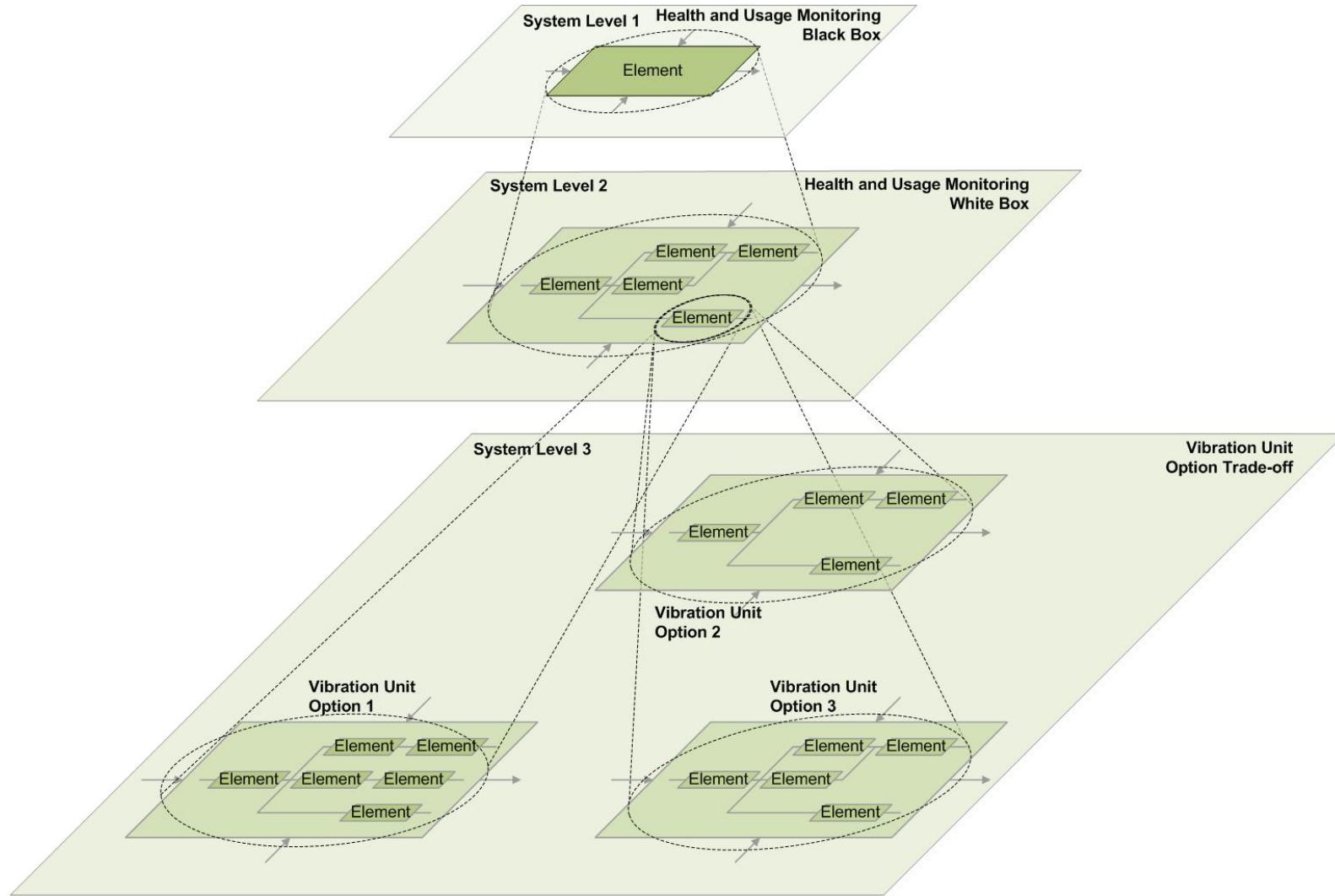
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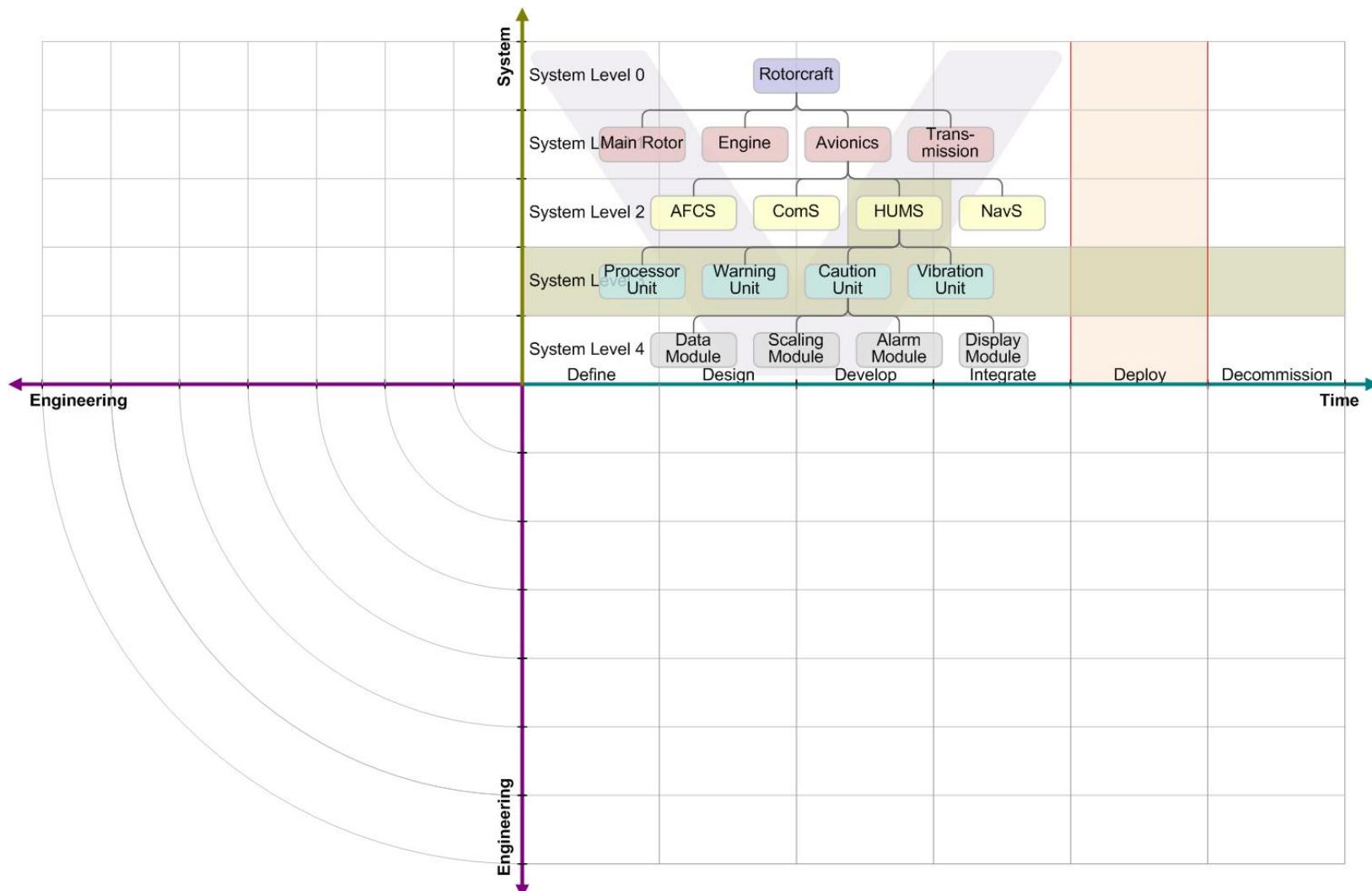
Illustrating Concepts - Hierarchical Mapping



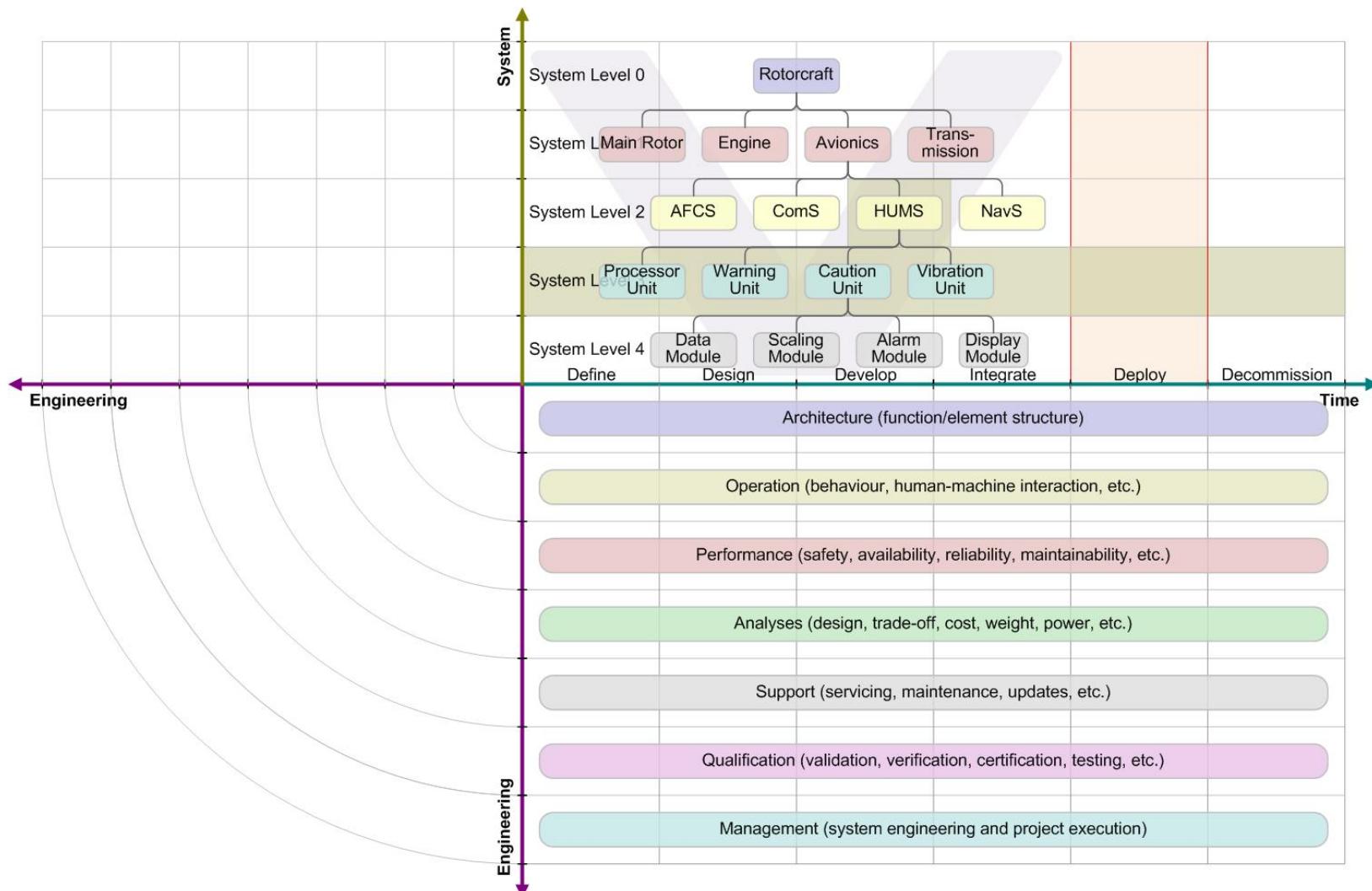
Illustrating Concepts - Design Option Trade-off



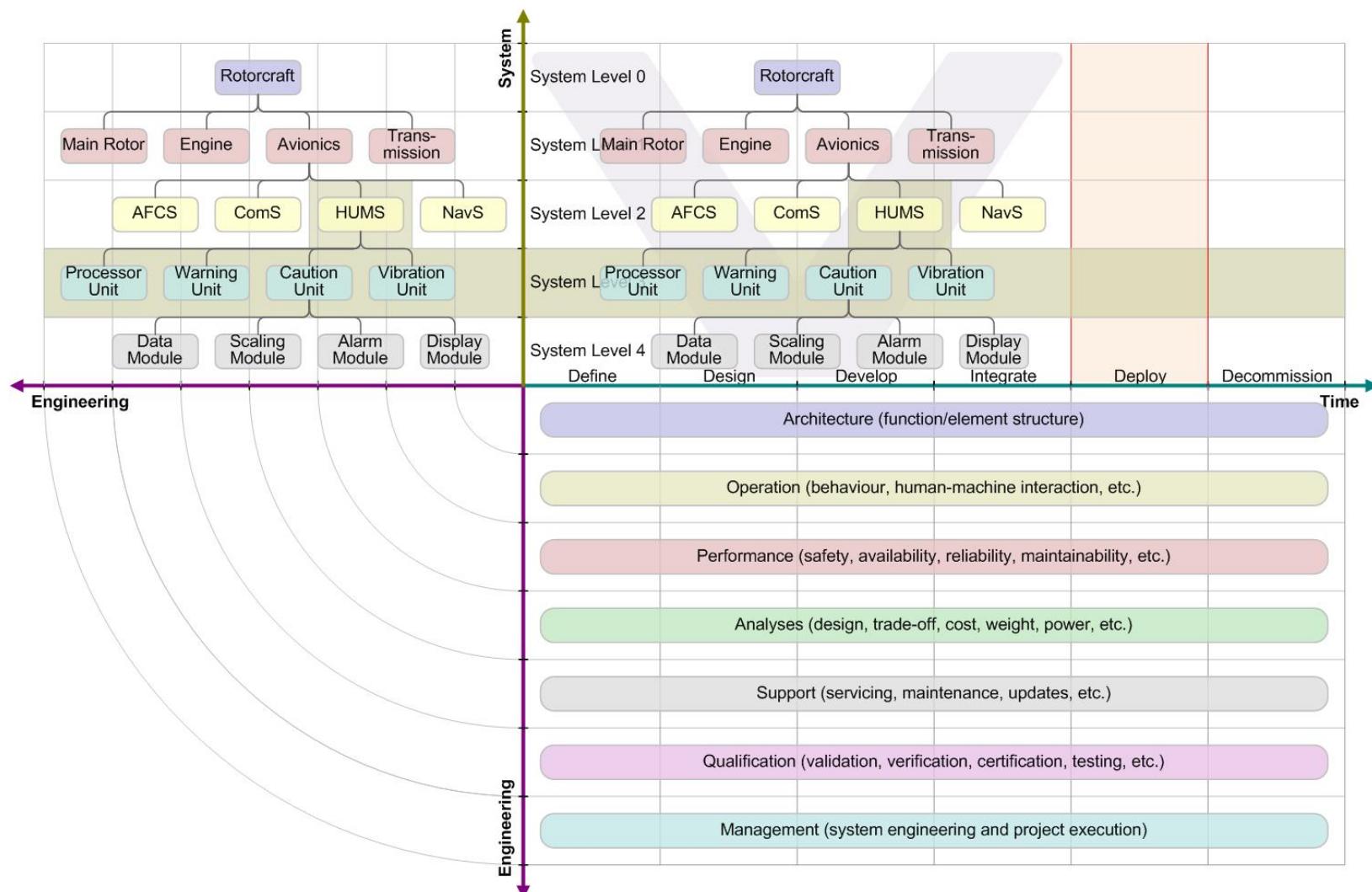
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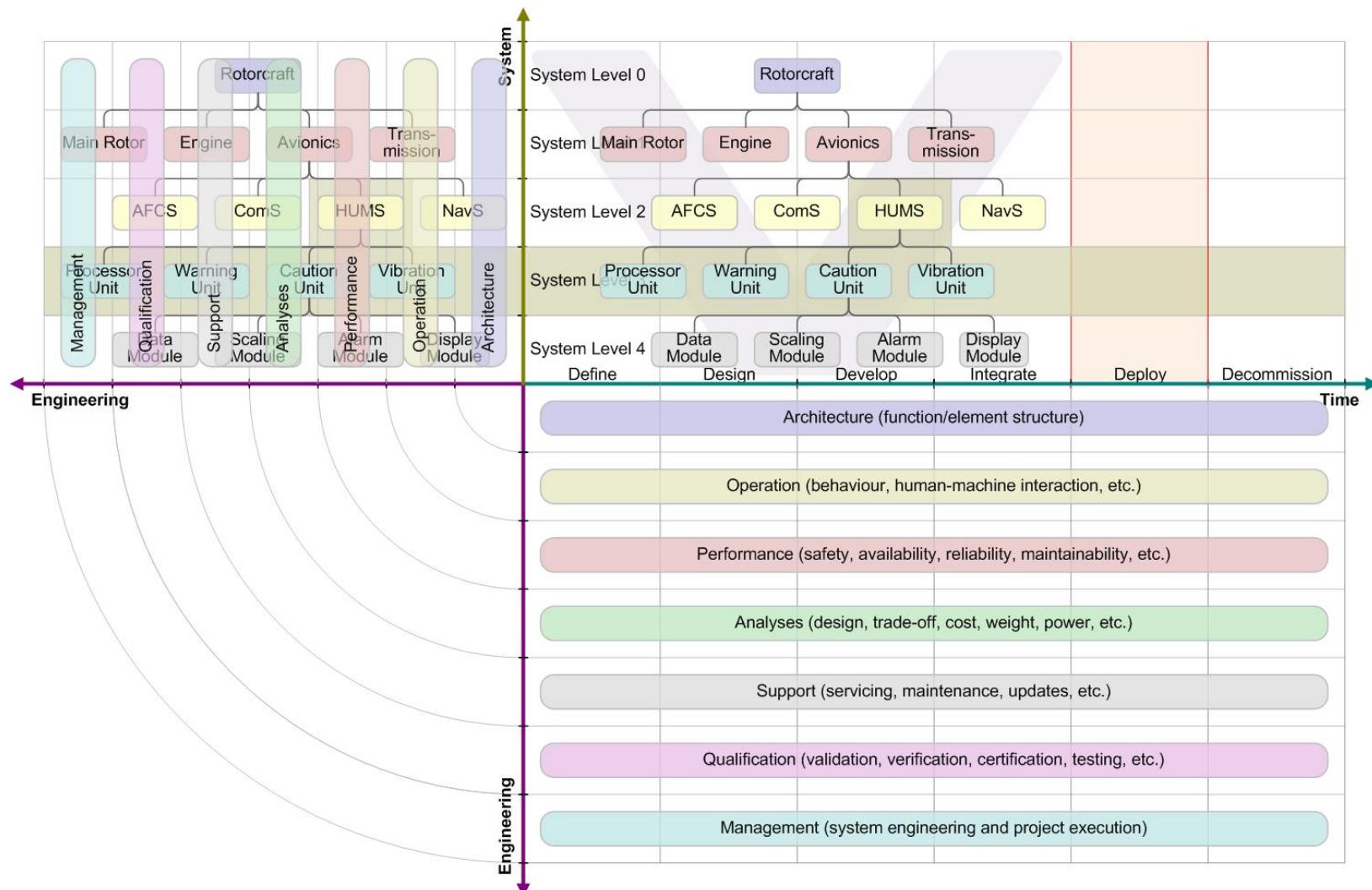
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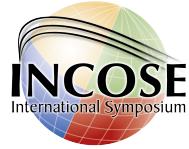
Illustrating Concepts

Appraisal

Appraisal - Mapping ISO 15288 vs. Generic-SE

	Architecture	Operation	Performance	Analyses	Support	Qualification	Management
Enterprise Management Process							
Investment Management Process							
System Life Cycle Management Process							
Resource Management Process							
Acquisition Process							
Supply Process							
Stakeholder Needs Definition Process							
Requirements Analysis Process							
Architectural Design Process							
Implementation Process							
Integration Process							
Verification Process							
Transition Process							
Validation Process							
Operation and Maintenance Process							
Disposal Process							
Planning Process							
Assessment Process							
Control Process							
Decision Making Process							
Risk Management Process							
Configuration Management Process							

Appraisal - A Fresh Look at Systems Engineering



Systems Engineering is the structured, concerted effort expended to provide an optimised, sustainable solution (man-made system) that satisfies an initial need, and it involves:

- System considerations
- Engineering considerations
- Time considerations



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Thank You