

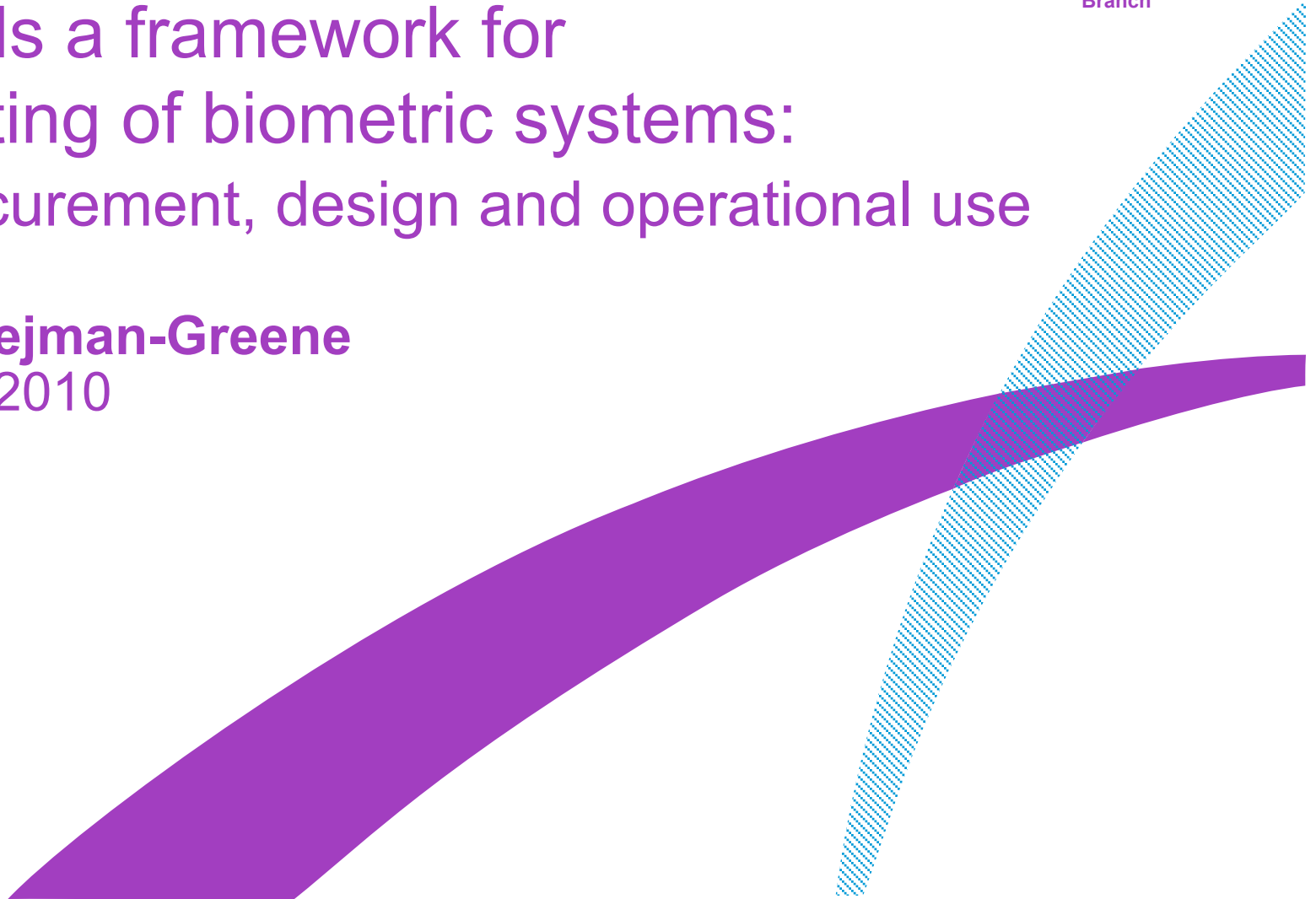


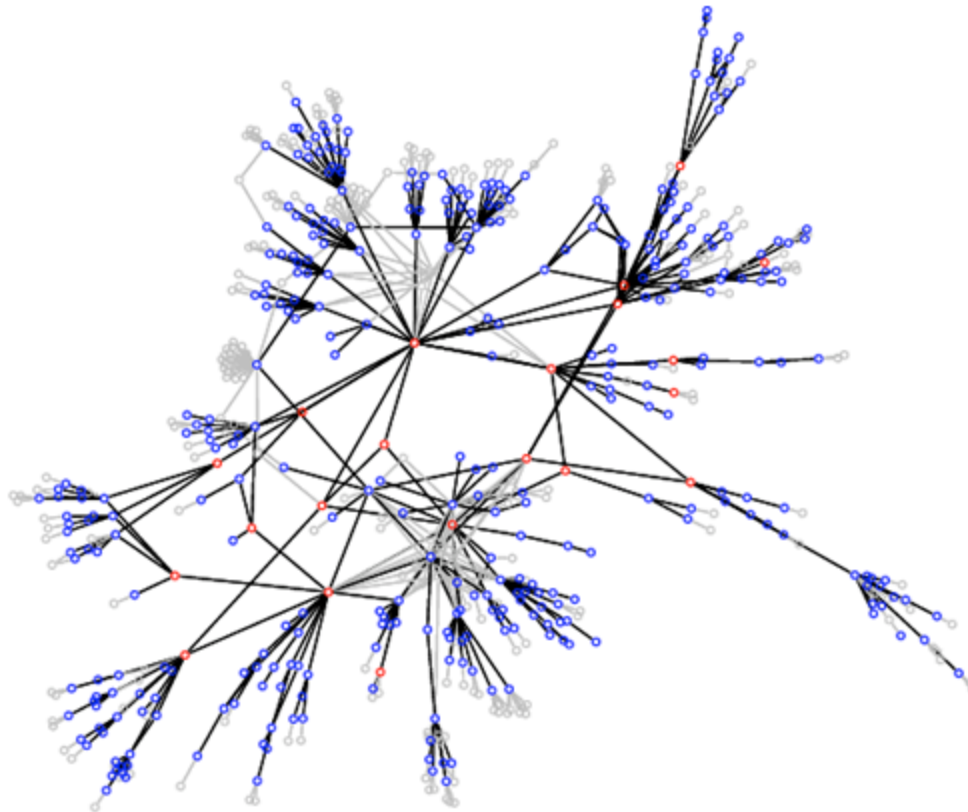
Home Office

Scientific Development
Branch

Towards a framework for the testing of biometric systems: - in procurement, design and operational use

Marek Rejman-Greene
2 March 2010





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SPEAKER **Marek Rejman-Greene**



Testing through an SE lens

- Systems Engineering approach to Testing
 - reduce distraction of novel technology and ‘apparent’ benefits
 - clear focus on stakeholder objectives
 - business benefits, user concerns, audit procedures, ...
 - potential cost reduction
 - testing what’s needed, and when it’s needed
 - input into modelling and simulation activities
 - reuse datasets through lifecycle?

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Systems Engineering

- *‘An interdisciplinary approach and means to enable the realisation of successful systems...’*
- *‘it focuses on defining customer needs and required functionality early in the development lifecycle, documenting requirements, then proceeding with design synthesis and system validation while considering the whole problem...’*
- *‘Systems Engineering integrates all the disciplines and speciality groups into a team effort forming a structured development process that proceeds from concept to production to operation ...’*
- *‘Systems Engineering considers both the business and technical needs of all customers with the goal of providing quality products that meet user needs’*
- (International Council on Systems Engineering, INCOSE, 2006)

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Application

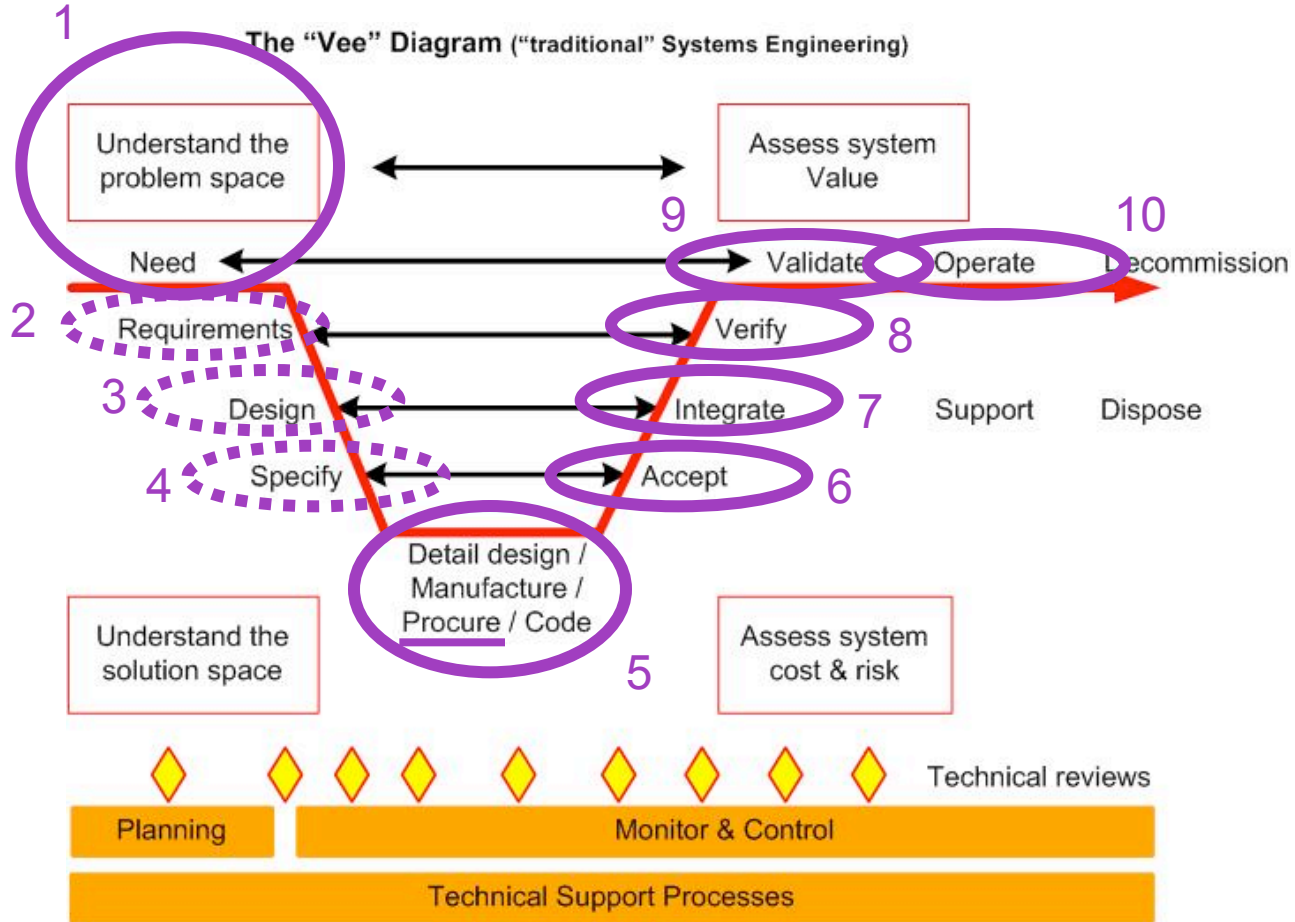
- For complex projects in military, non-military governmental applications, and commercial operations
- *Approach* could be used for smaller systems as well
- Aim to reduce integration and interoperability risks
as well as deliver applications that work first time at lowest cost
- Testing:
 - Verification – ‘building the service right’ – fulfilling requirements
 - Validation – ‘building the right service’ – fulfilling intended use

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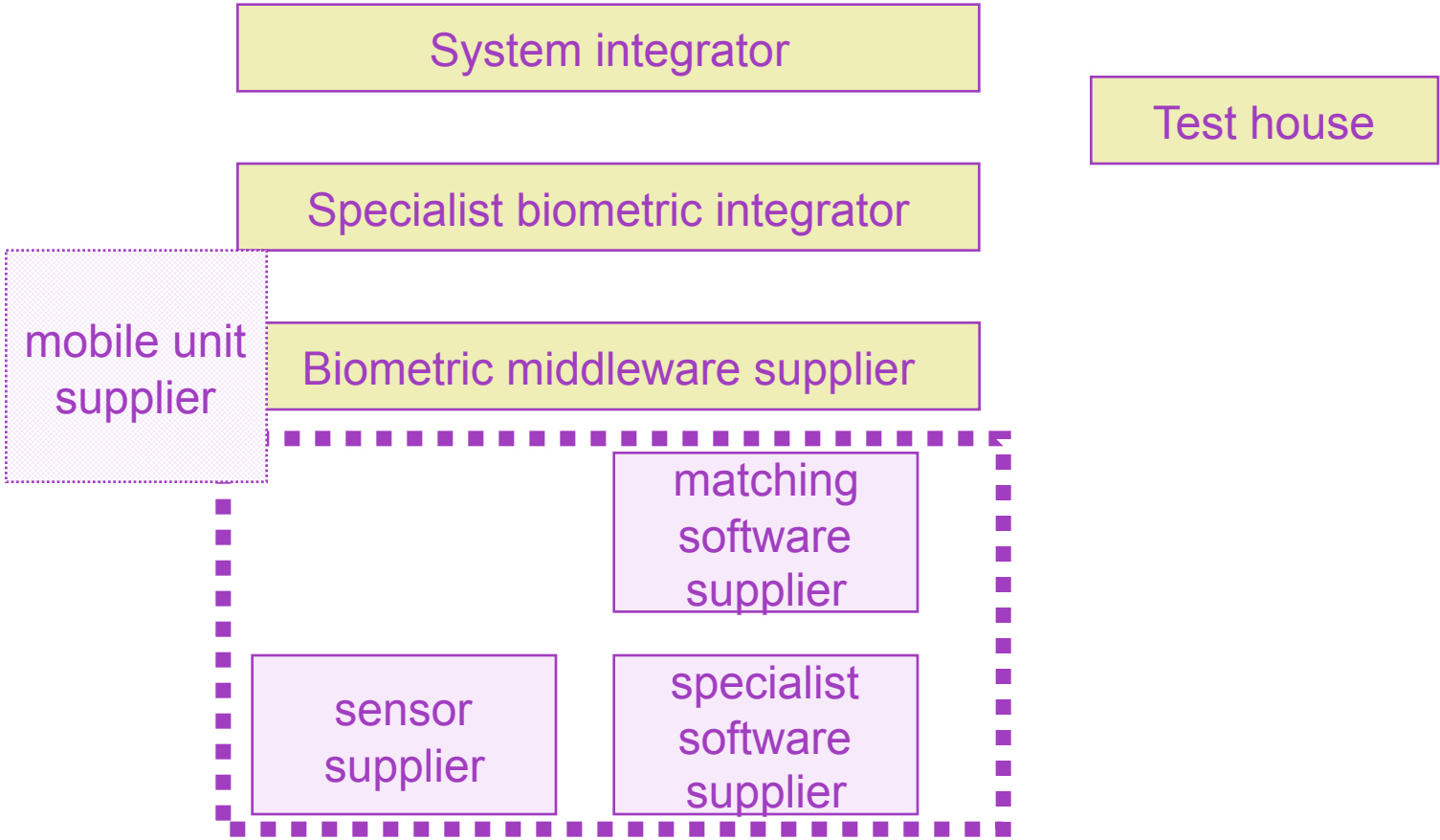
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Supplier context



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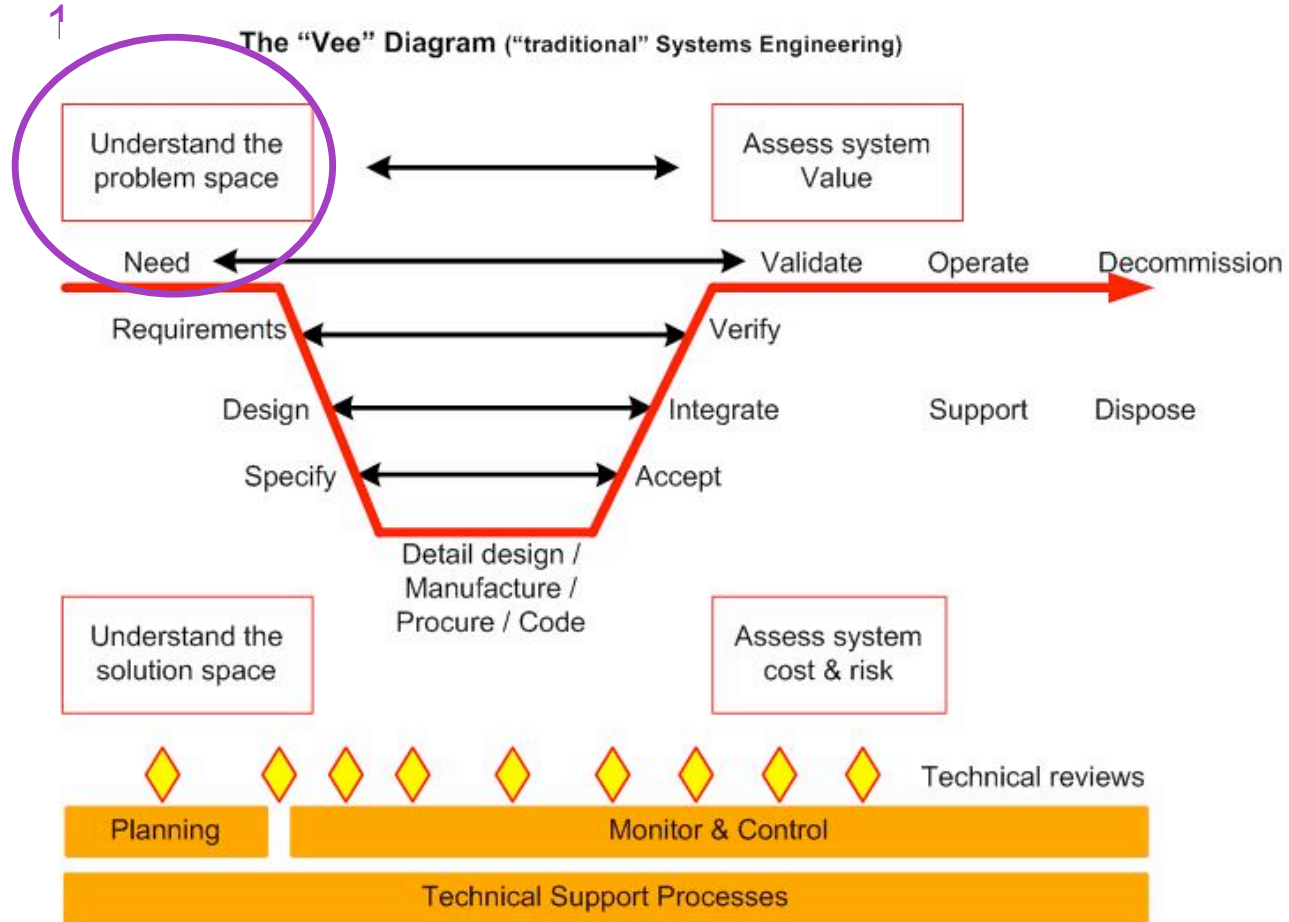
Stakeholder context

- Operating Agency / Authority
- Enrolment Agency / Authority
- Subject
- Subject's Interest Group (trade union, lobby organisation)
- Media
- Auditing Authority
- Regulator

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Initial review (1)

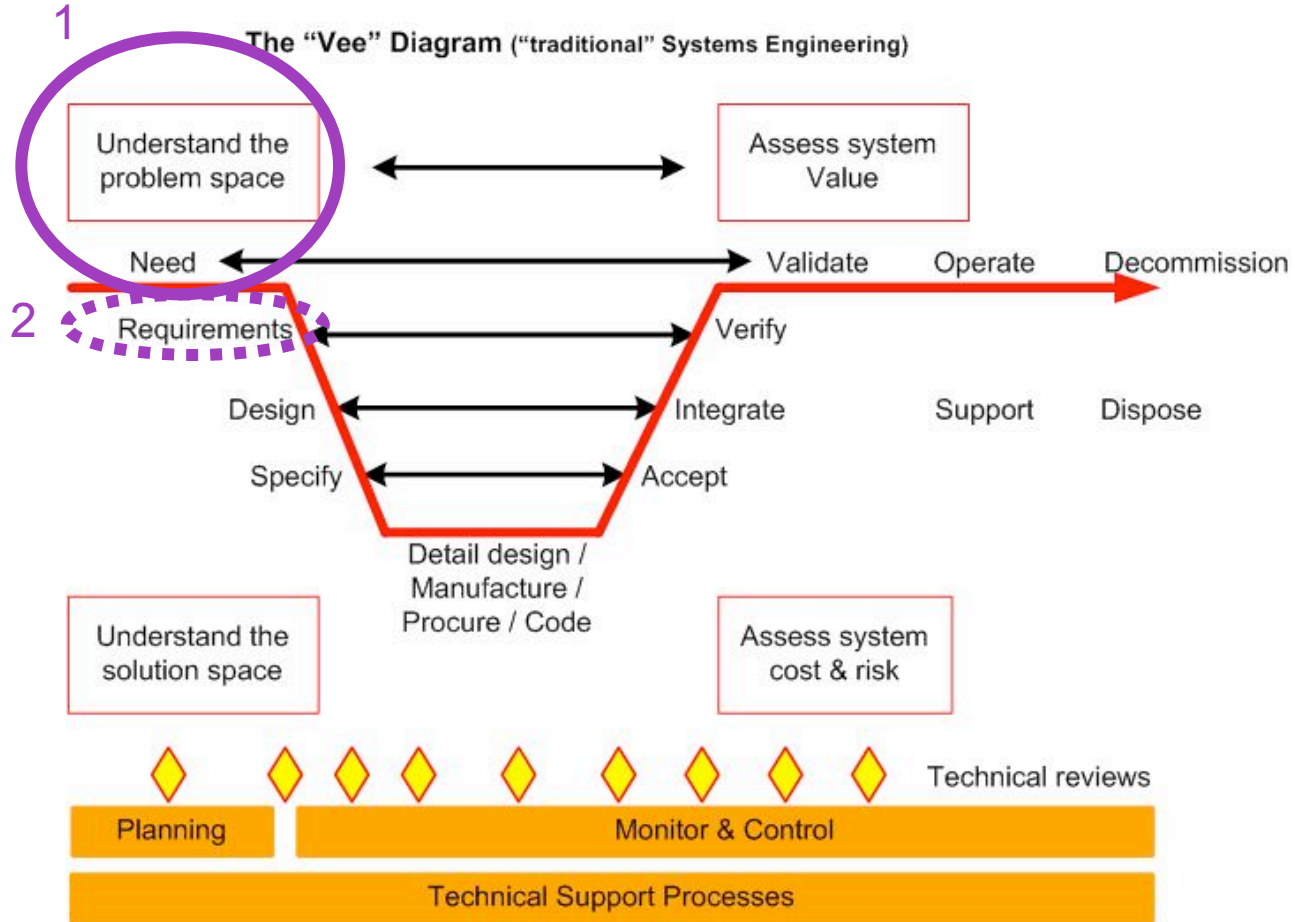
- Key performance indicators?
- Does the technology address this problem space?
 - Do you need biometrics? Why?
- If YES, relative maturity/performance/sourcing of modality/suppliers
- Seek technology / scenario / operational data in similar contexts
 - How different is the proposed application from reference context?
 - environment, demographics, throughput requirements, exception handling, expectations of stakeholders, ...
 - How long ago was the testing done?
 - Who undertook it?
 - Testing and reporting in accordance with standards?
- Comparison with KPIs
- RFP
- How to validate that objectives met (9)?

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Requirements capture (2)

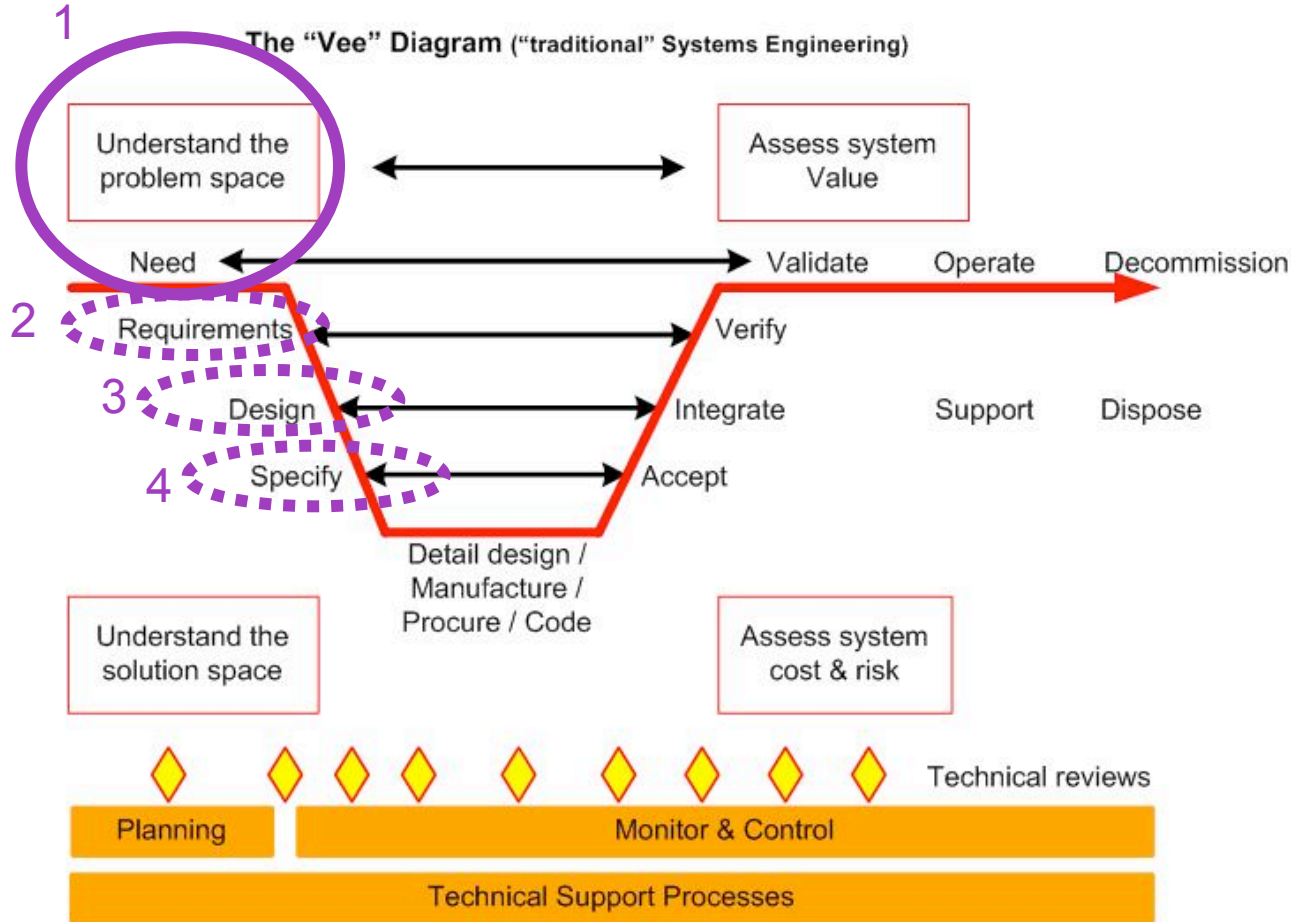
- Focus of SE approach
- Functional and non-functional requirements
- Relating application KPIs to biometric metrics
 - Environmental context
 - Error rates
 - Usability indices
 - Acceptability criteria
 - Throughput rates
 - Interface/Conformance
 - Security and safety
- Design for verification (8) and in-life testing (10)
 - Clarity of definitions (ISO vocabulary)
 - Reference implementation

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Design and Specification (3 and 4)

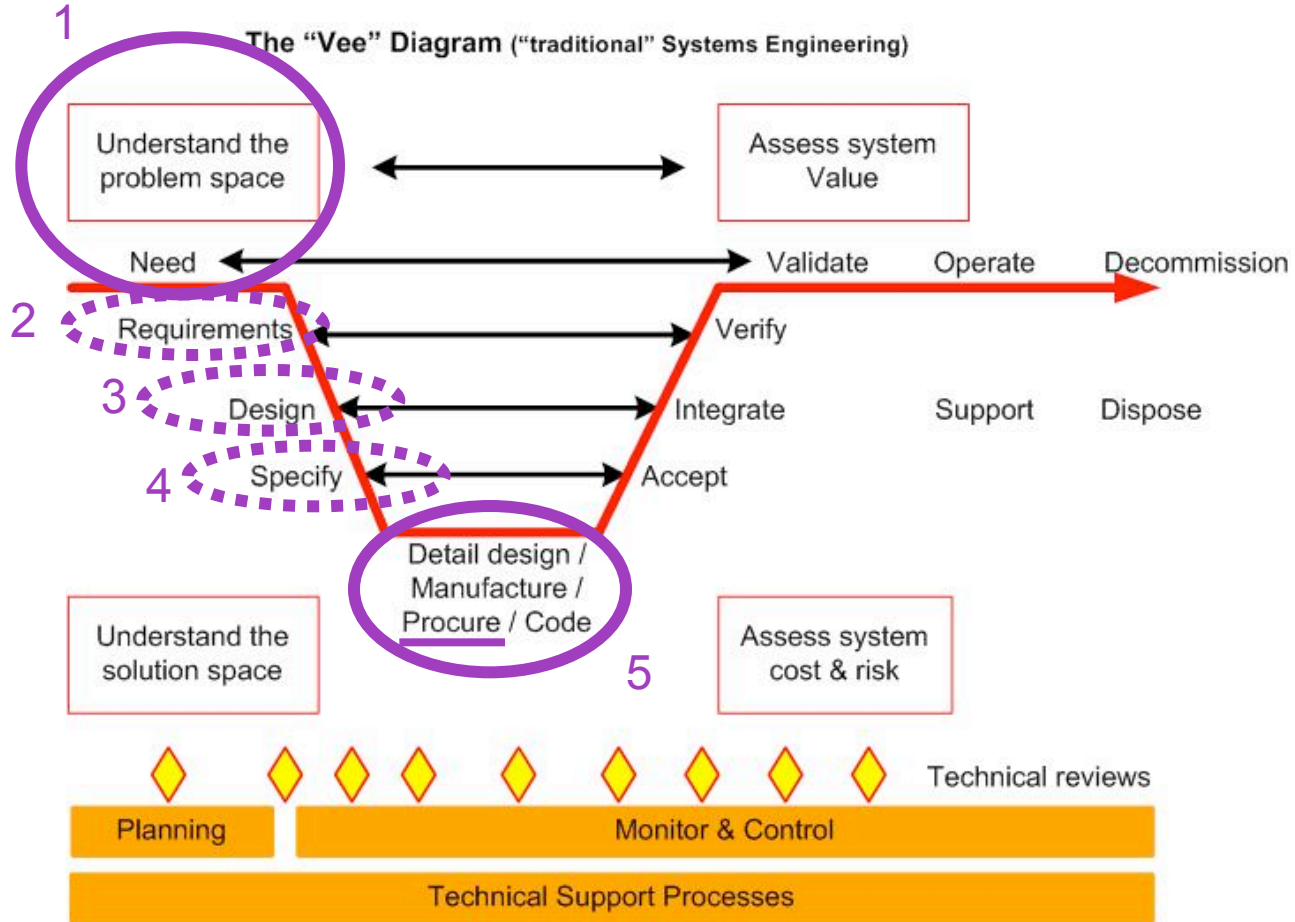
- Work towards acceptance and integration testing (6 + 7)
 - What mix of technology, scenario and quasi-operational approaches?
 - Specially designed harnesses?
 - In parallel, option for modelling and simulation to examine trade-offs?
 - Agreement on datasets to be used in acceptance and integration testing?
 - How representative and challenging should these datasets be?
 - Who supplies?
- Off-the-shelf standards and interfaces?
 - May require application profiles and adaptation of interface specifications
- Dispute resolution procedures
 - Impact of change control if adjustments needed after delivery

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Procurement, Design, Development (5)

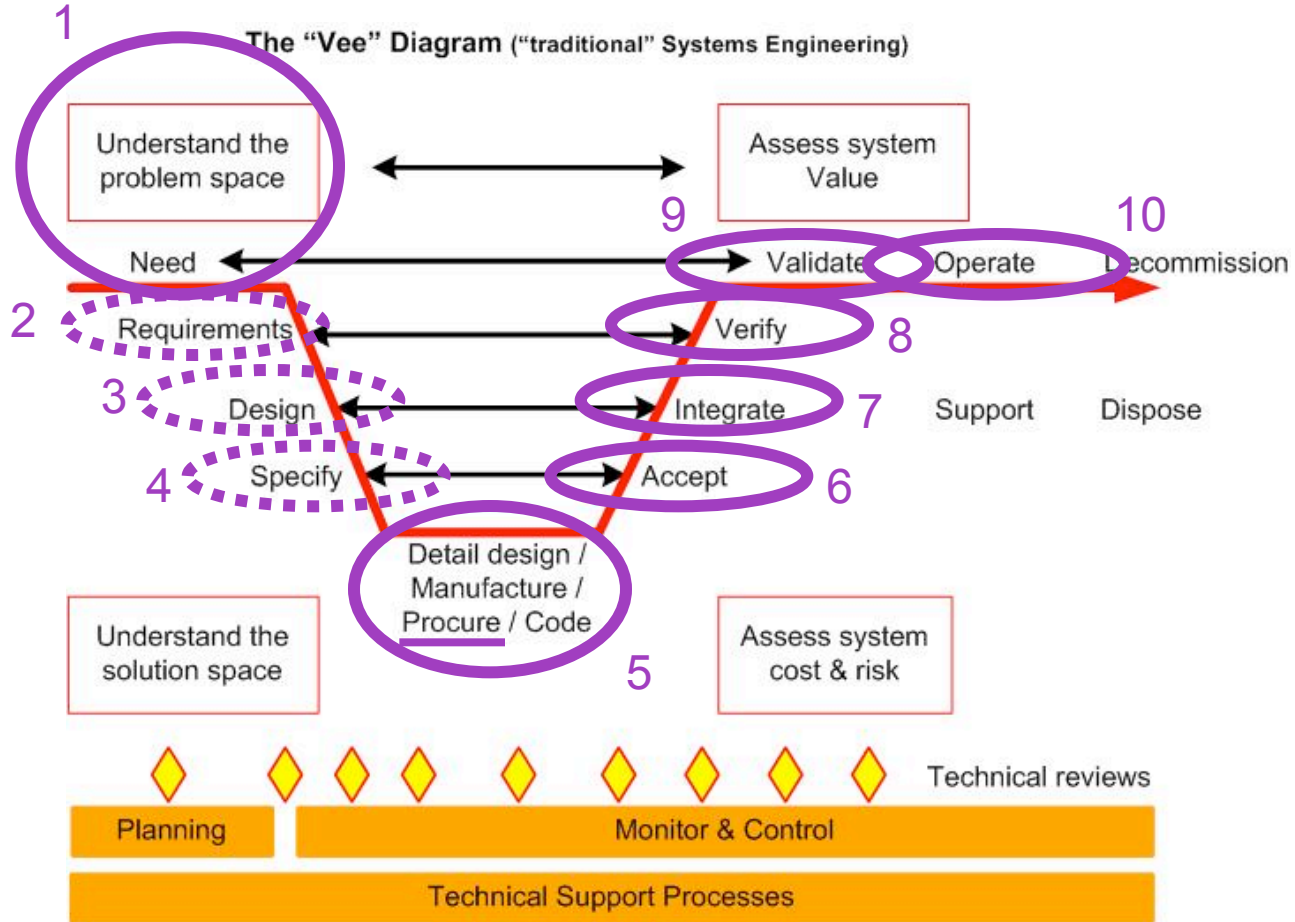
- Testing of bidder's claims during procurement
 - focussing on the unknowns and highest risks
 - alternatives
 - development of reference model + independent tests?
 - simulation or modelling – sensitivity analysis + spot checks?
 - benchmarking / assessment of reference deployments
- Demonstration of effectiveness of consortium working together
- Costs
 - Shared? Benefits to both parties
- Involvement of stakeholders other than Authority and Bidder?
- Proposals to adjust during design and development
 - based on internal testing and additional knowledge
 - how involved is the customer in change management?

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Operational testing (10)

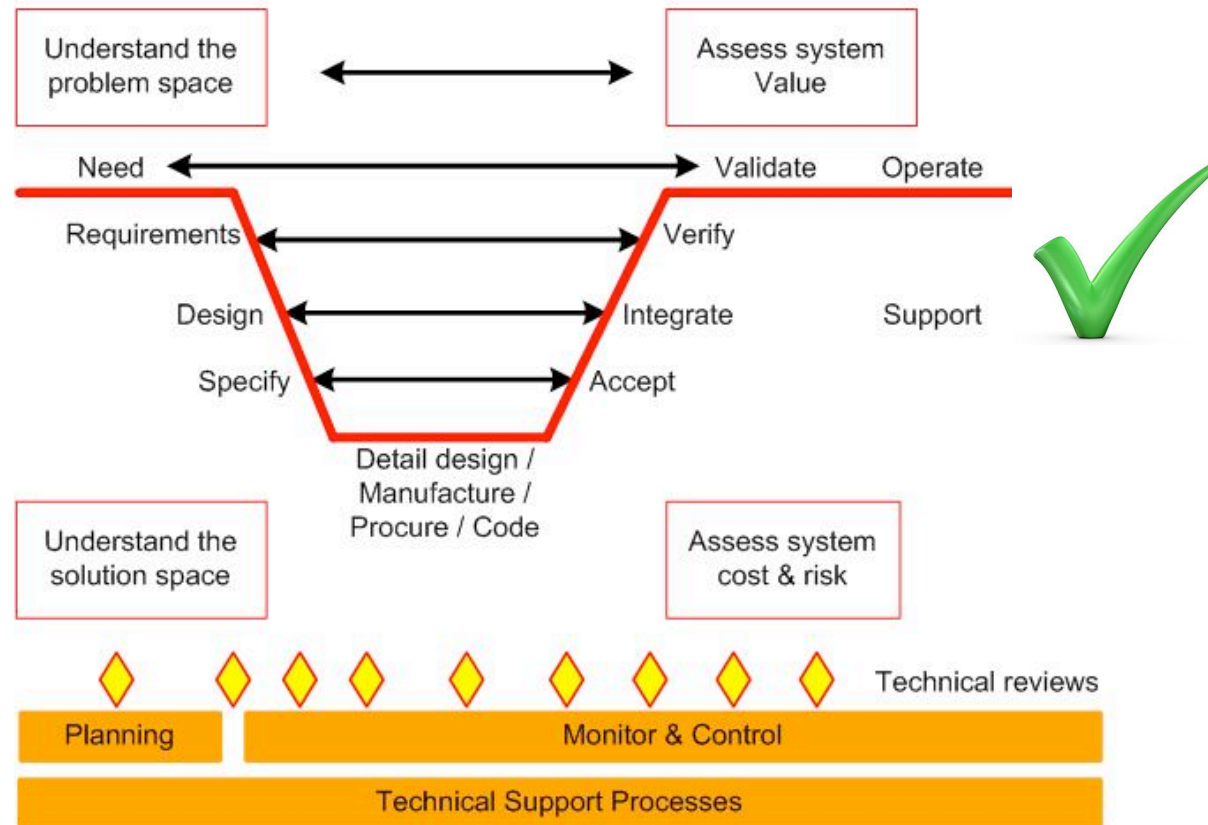
- Comparative performance
 - across time
 - across sites and terminals
 - as introduce upgrades
- Collect both Application KPIs and Biometric Metrics
- Aim:
 - assurance of performance
 - early warning of problems
 - support for continual improvement and cost reduction

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The "Vee" Diagram ("traditional" Systems Engineering)



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