AP

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A Requirements' Eye View of Product Development

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1: Motivation for paper

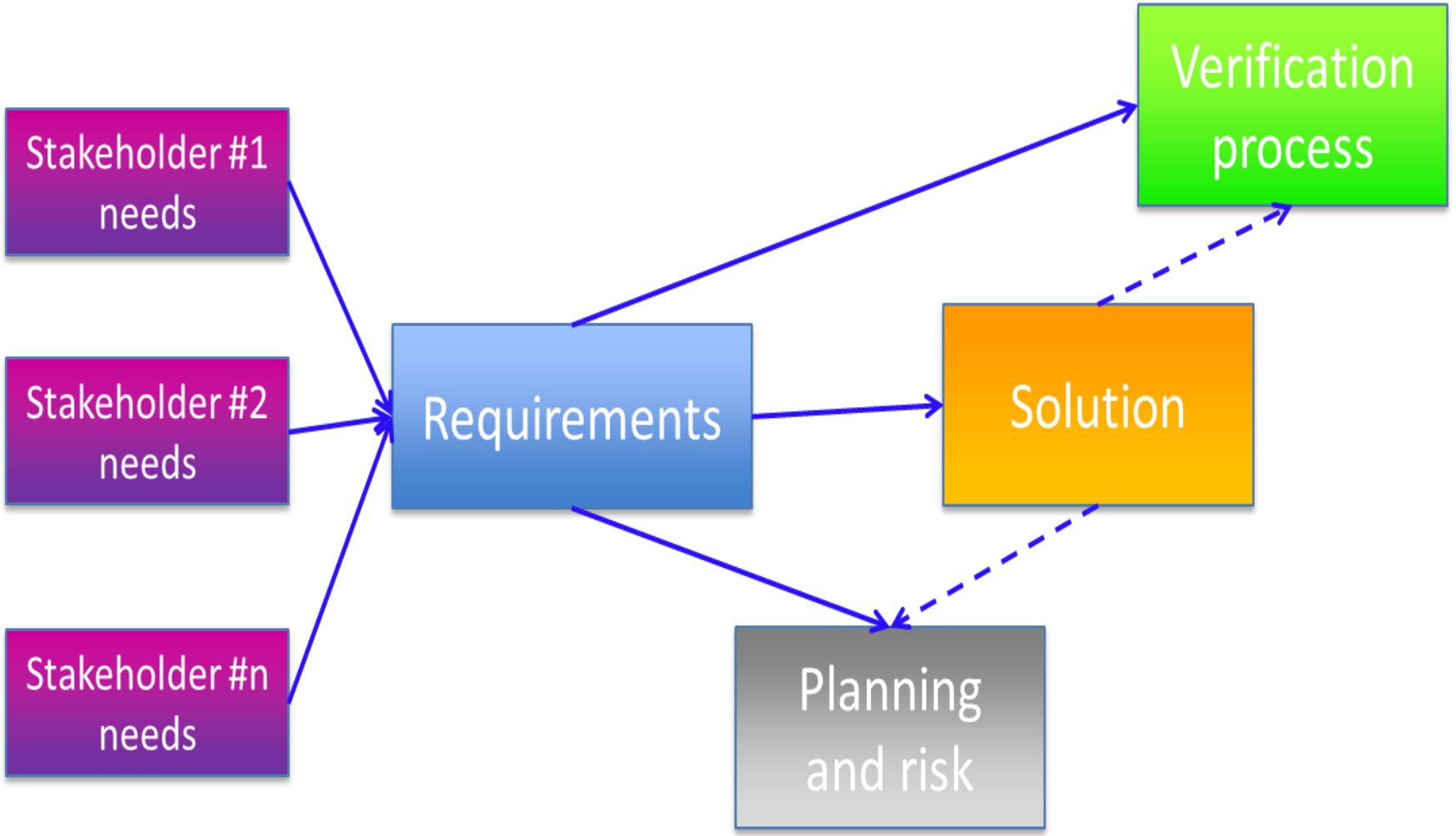
1. Trouble getting people to elicit requirements for their System of Interest (rather than expecting them to be provided)
2. Problems with accepting “tbd” or “tbc” in requirements documents
3. Not recognising requirements change with design iterations (the evolving solution, and integration between levels)
4. Confusion between requirement and specification
5. Issues with flow of requirements between levels of RR designed system being treated as if they are “contracts” between teams

Warning: Therefore this presentation contains variation / tailoring from SE handbook, as needed to explain / embed requirements in design behaviour

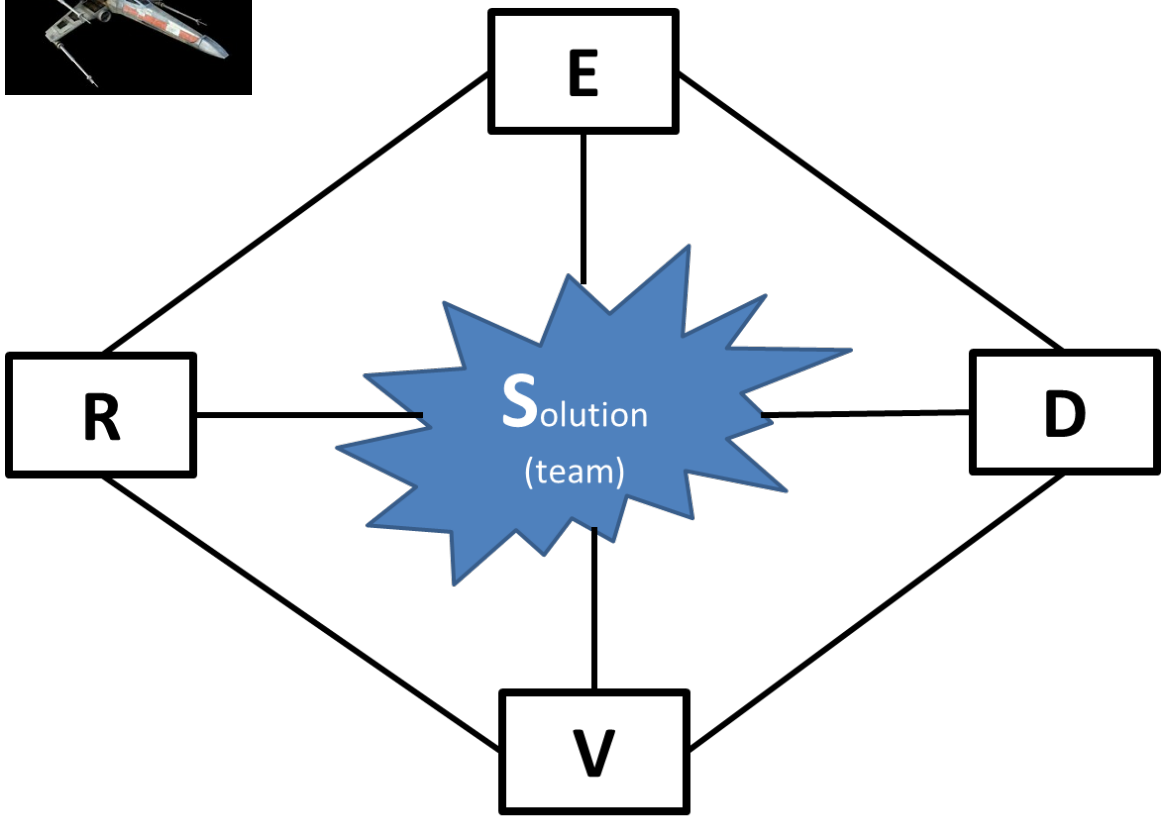
2: Requirements / System basics

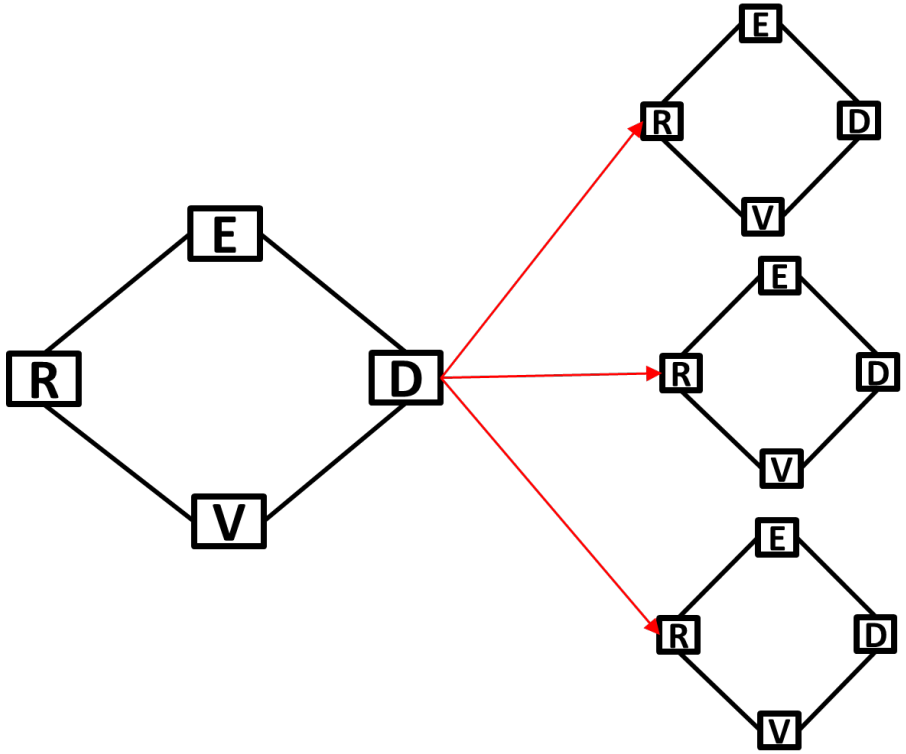
1. Requirements drive everything, come from stakeholders
2. Layers
3. V model – connections
4. REDV information model (Note: this is not covered in the paper)

Requirements central to everything



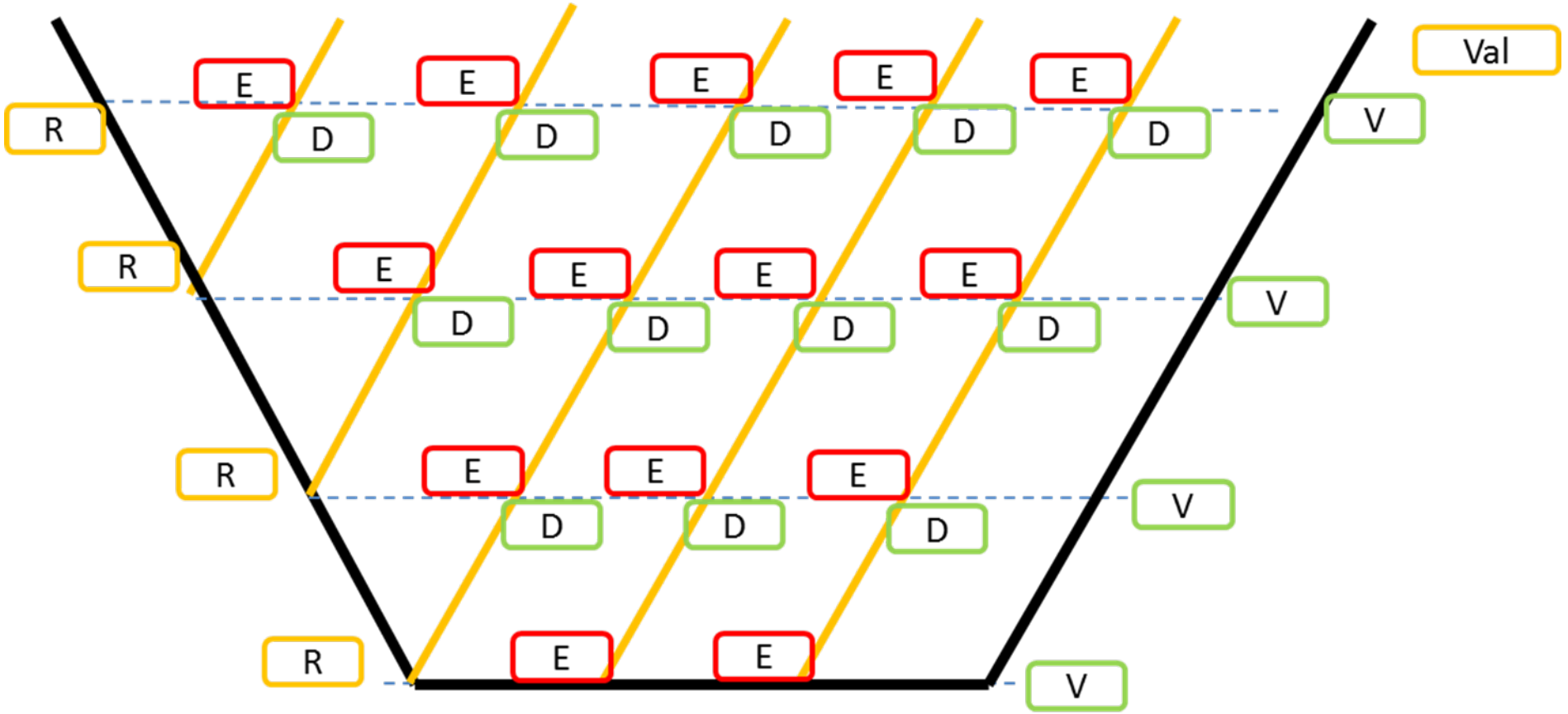
Requirements, Evidence, Definition and Verification – integrated information model





Layers in system

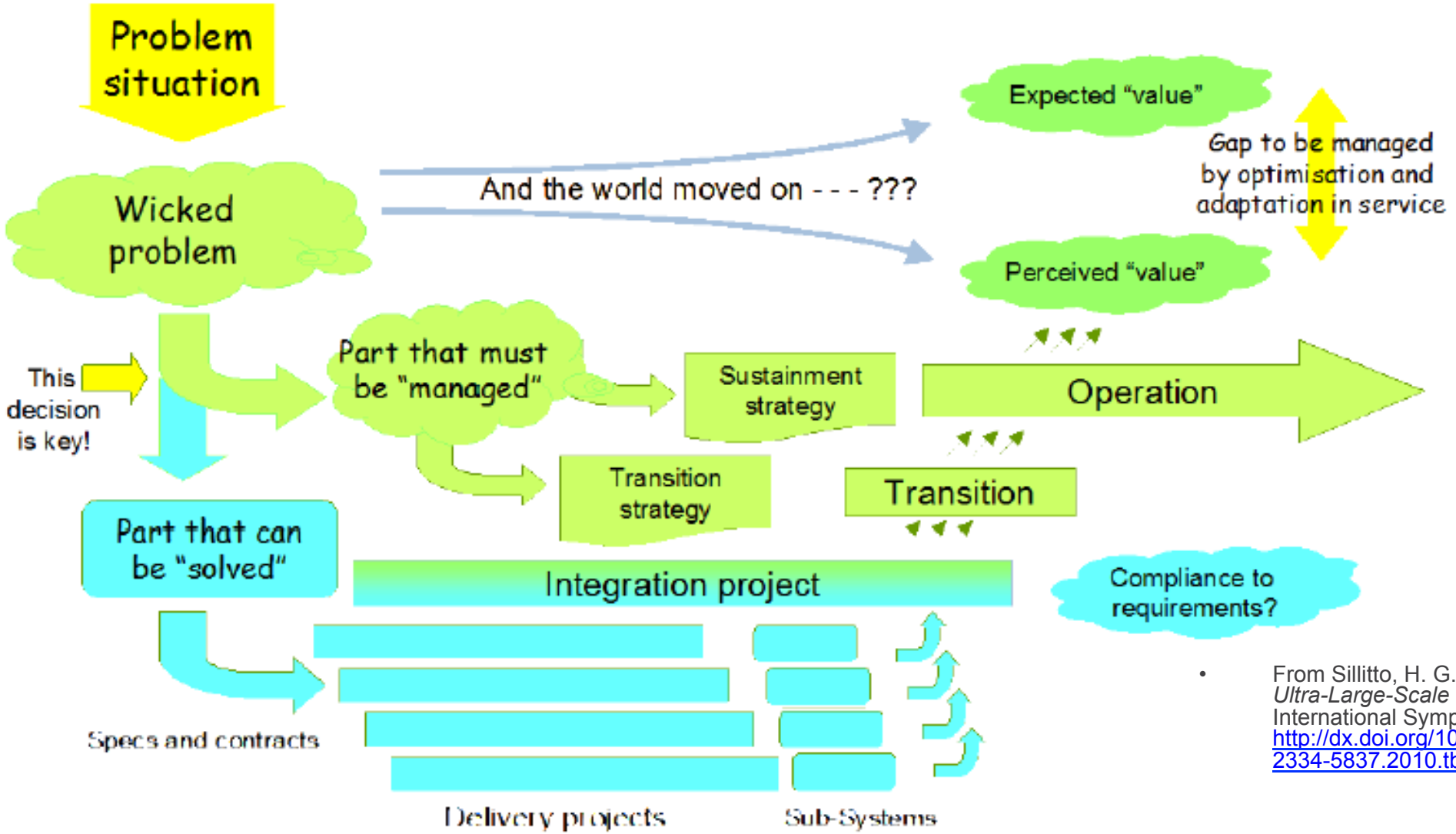
- Adaptation of “assurance V” model



This is based on Paper “V-model Views” – K Forsberg and D Scheithauer, INCOSE IS 2013, Philadelphia.

Wicked problem / complex systems

from Sillitto 2010



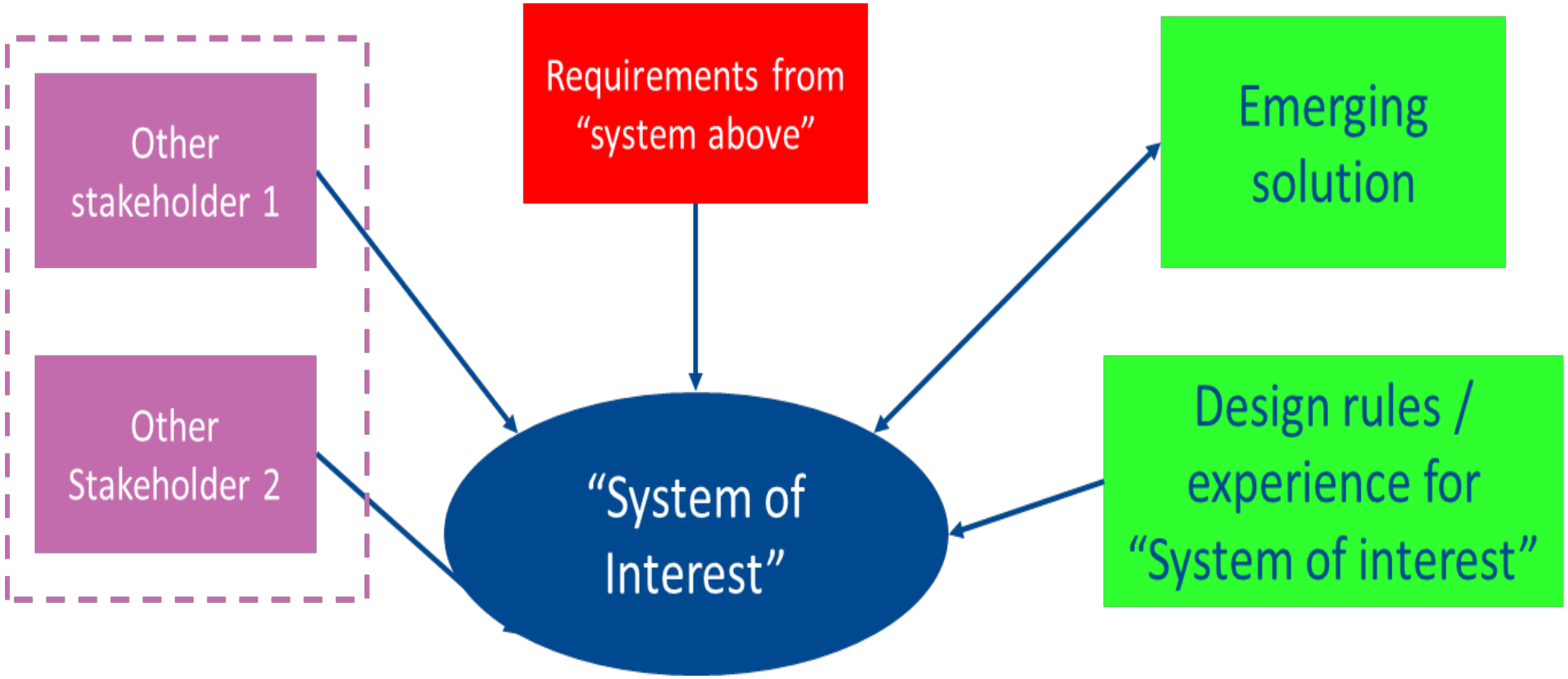
- From Sillitto, H. G. 2010, *Design principles for Ultra-Large-Scale (ULS) Systems*. INCOSE International Symposium, 20: 63–82. http://dx.doi.org/10.1002/j.2334-5837.2010.tb01057.x

3: Sources of Requirements

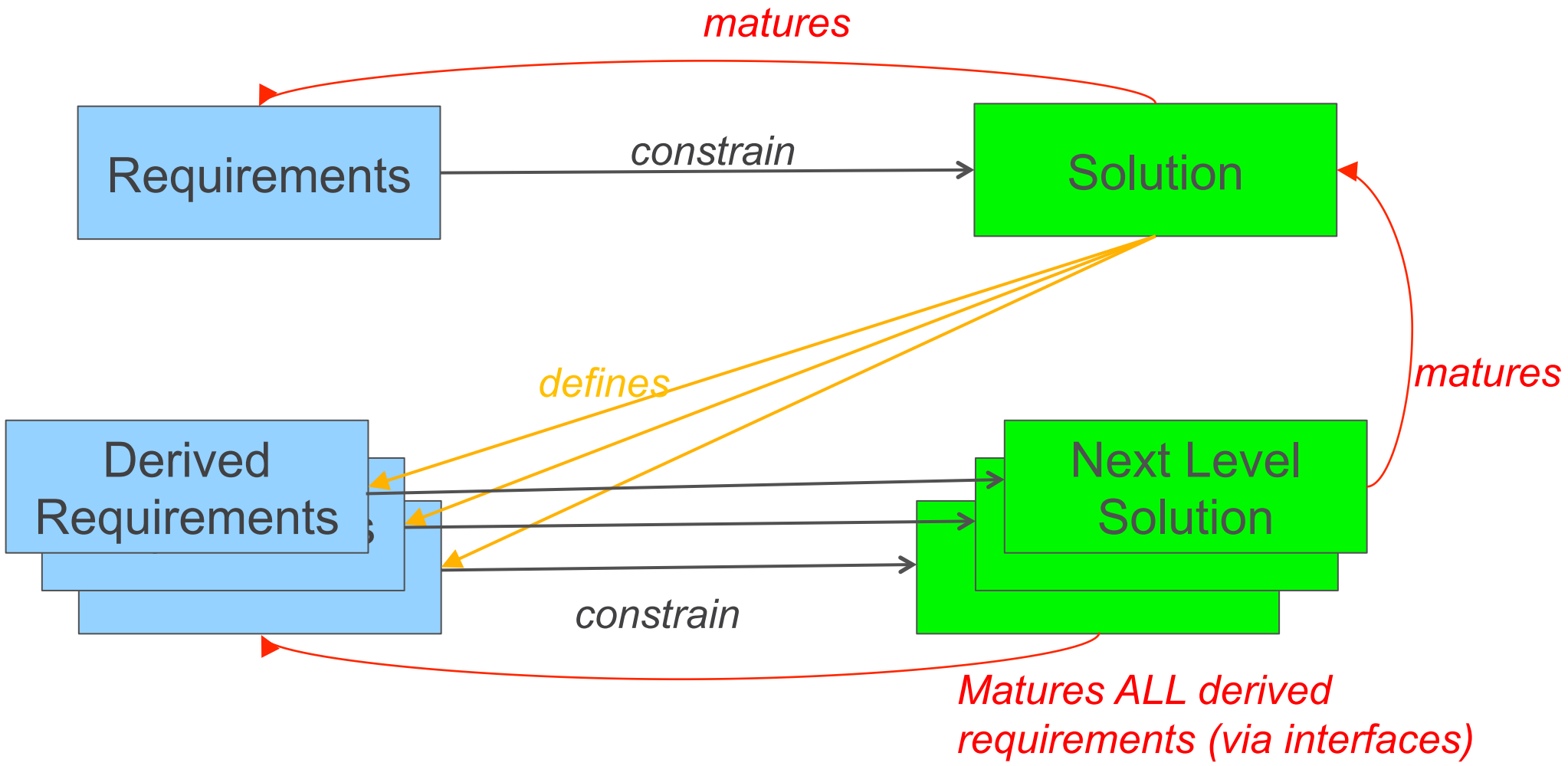
We suggest four classes of source:

1. Expressed need from an acknowledged stakeholder
2. Unexpressed need from an acknowledged stakeholder
3. Need from an unacknowledged stakeholder (obviously unexpressed!)
4. Need (for the current system of interest) generated by the selected solution concept

Requirements flow for a System of Interest



Iteration – Requirements, solutions and levels

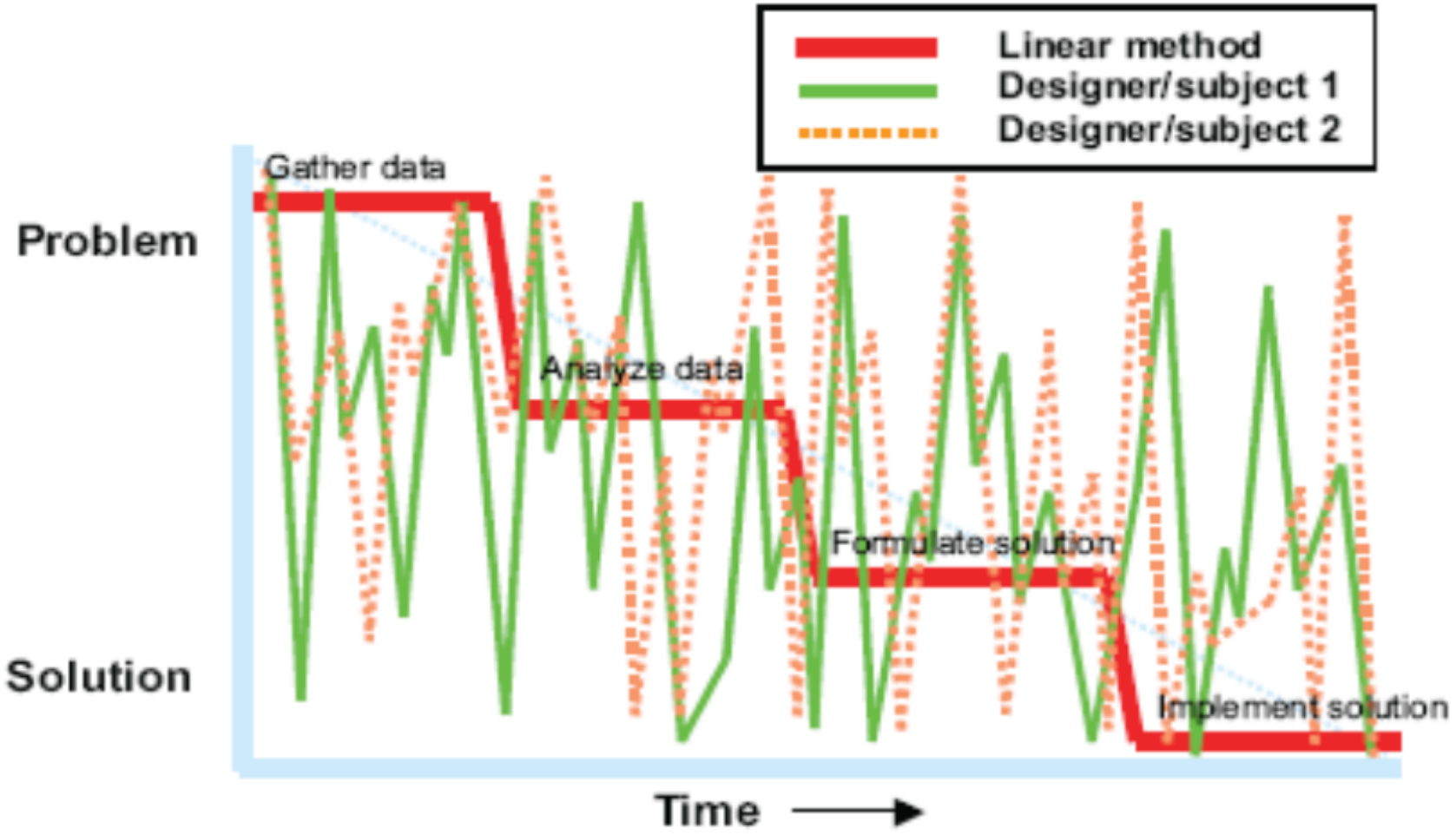


4: Requirement States

The requirement states we have identified are

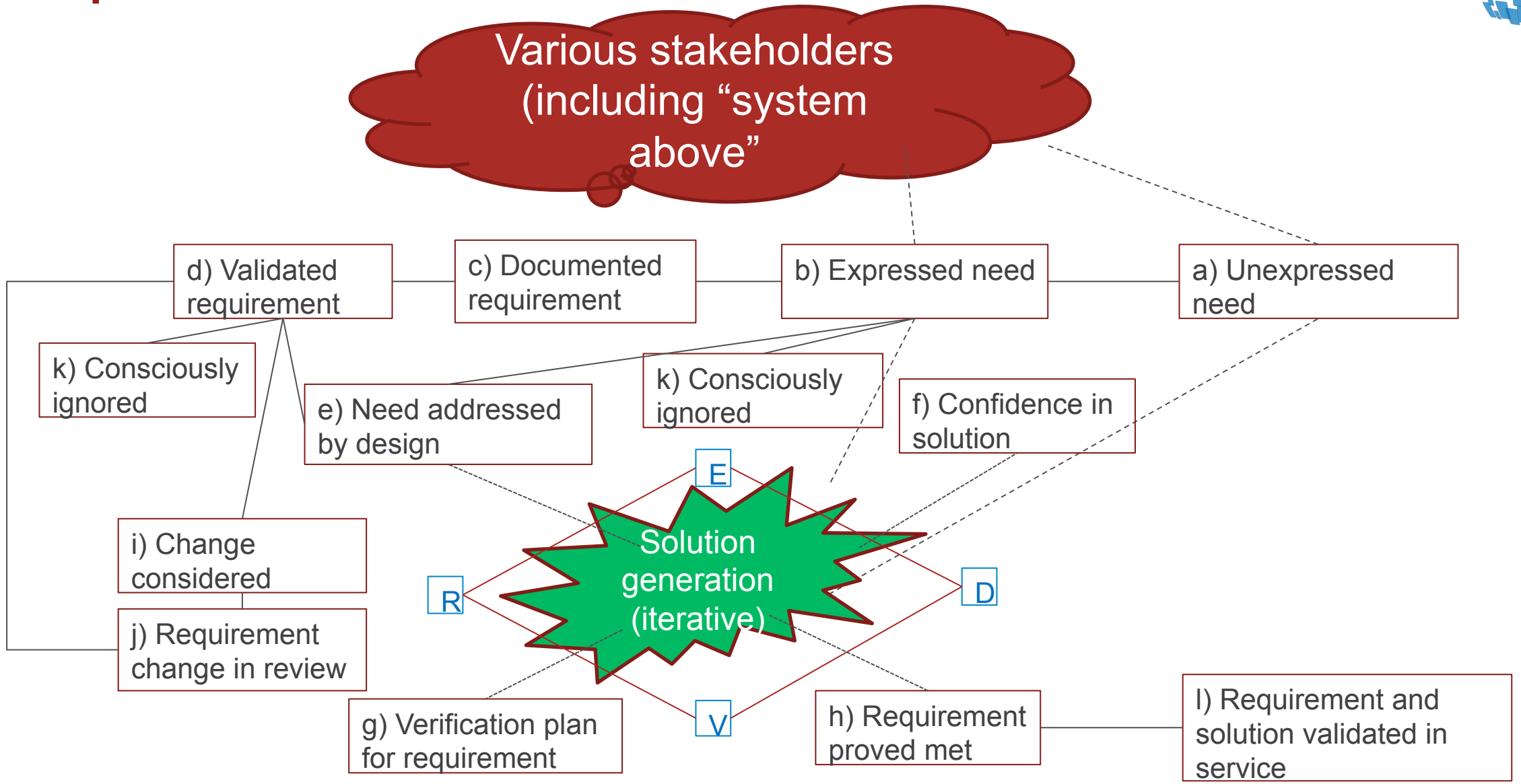
a) Unexpressed need
b) Expressed / recognized need
c) Documented requirement with plan for validation
d) Baselined / accepted / validated requirement
e) Need / requirement addressed by design
f) Confidence (from design evaluation) that design can meet requirement
g) Verification plan exists to prove requirement met
h) Requirement proven to have been met (by verification)
i) Required being considered for a change
j) Requirement change being reviewed
k) Requirement being (consciously) ignored
l) Requirement (and associated solution) shown by service experience to be valid

Real Variation Between Design and Solution Thinking



Conklin, J, 2005, *Wicked Problems and social complexity* – from Chapter 1 of Dialog mapping: building shared understanding of Wicked Problems, Wiley, November 2005. See http://cognexus.org/wpf/wickedproblems.pdf, accessed 7th October 2016

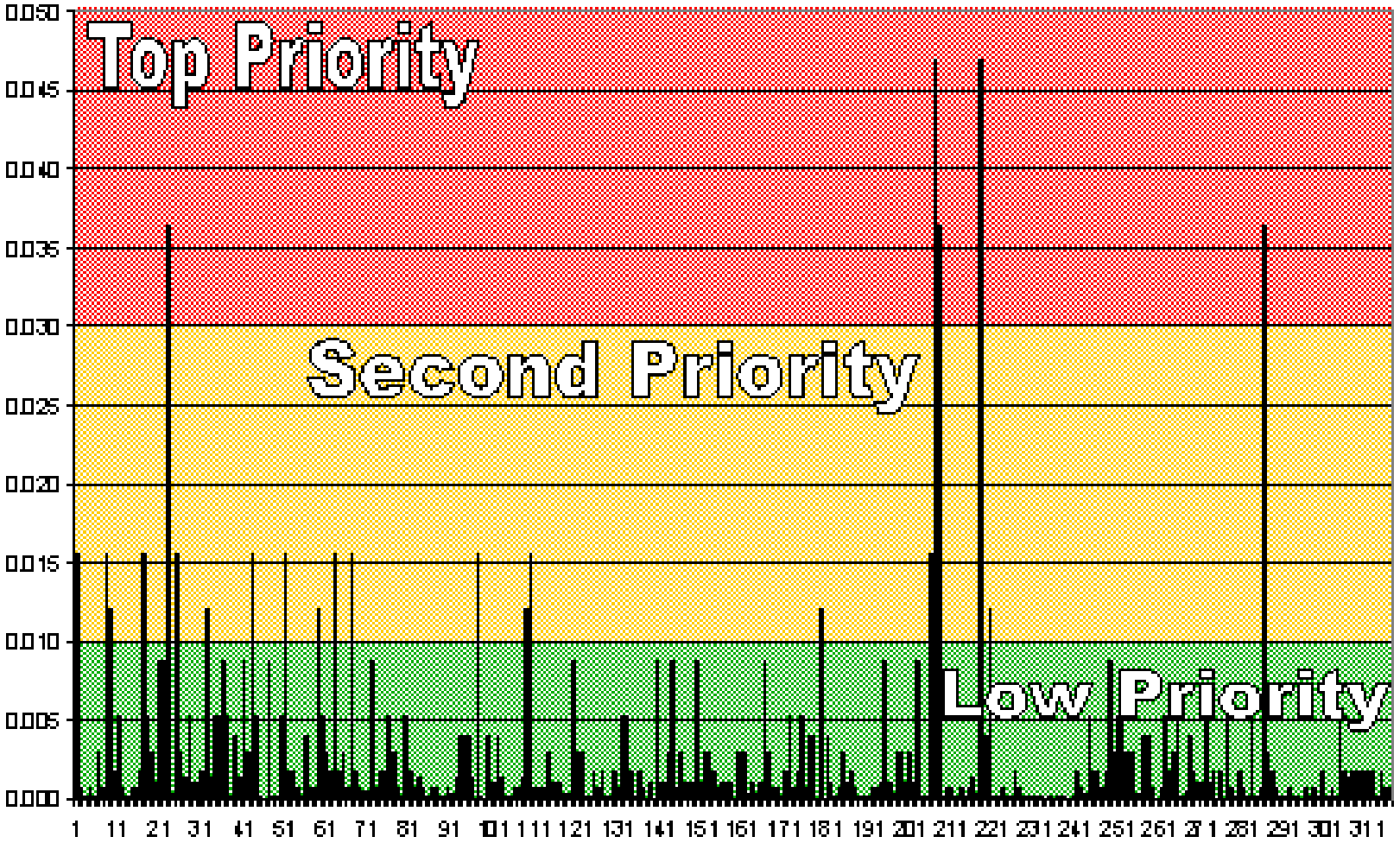
Requirement States



5: State changes

1. Needs to requirements
2. Handling the blanks
3. Structured verification
4. Change of requirement
5. Requirement (consciously) ignored
6. Unexpressed needs - go digging!

5.2: Handling the Blanks – Requirements Maturity Assessment



5: State changes

1. Needs to requirements
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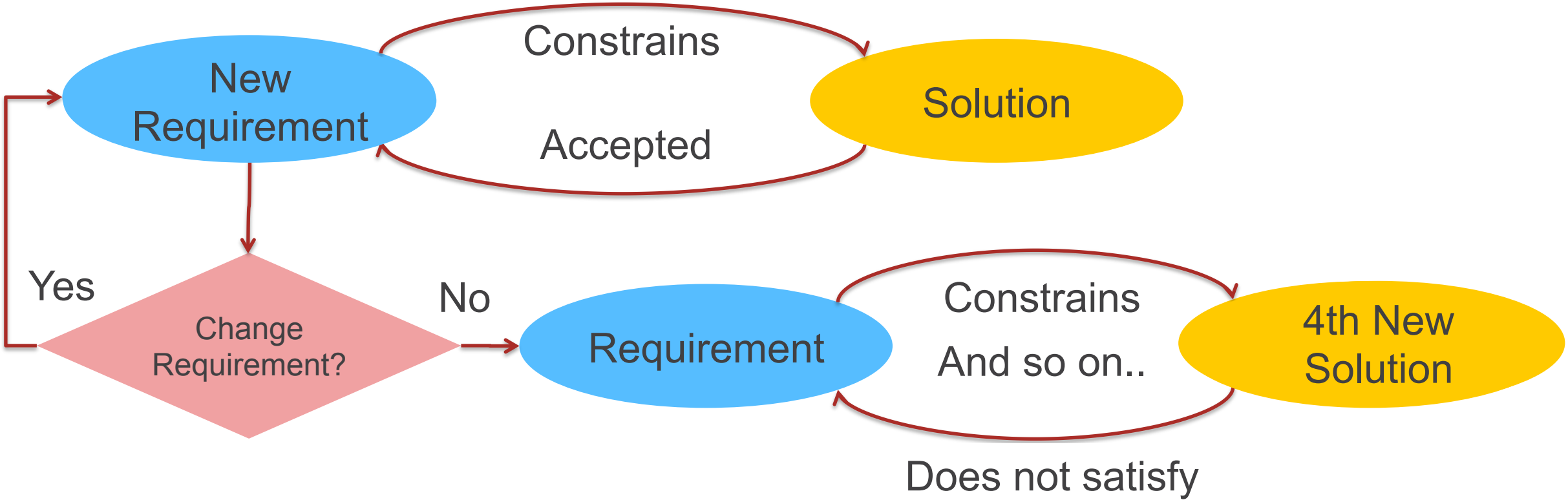
6: Other points

Requirements or specification?

- Requirement: Something that you need or want; something that is compulsory
- Specification: A detailed description of the design and materials used to make something
- Suppliers: Design and Development vs. Make to Print

6: Other points
Proper Iteration Management



7: Conclusions

For Development of a system of interest must be sure

1. Team has, or are going to get ALL the requirements, accurately representing the needs of relevant stakeholders, and understand them.
2. All the requirements are being addressed, and the solution either will (during development) or does (after completion) meet the requirements, or, if not, are accommodated and documented.
3. Changes (in requirement – either understanding or actual requirement) are known, being addressed and the full impact understood and embedded throughout the system.
4. Requirements (and associated solutions) of all levels / elements of the system are joined up and integrated / consistent
5. A joined-up requirements based view prevents sub-optimization of parts or single attributes at all stages in the lifecycle – by keeping a consistent systems view of the system (looking at the whole not any part in isolation).

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