

Complex Project Management Systemic Innovation

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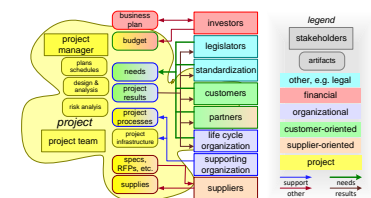
Abstract

Systemic innovation requires organizational competences that ensure that resources and time work properly together to achieve results.

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draft
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Project Management Tasks

Composing the project team

Organizing and facilitating project members

Orchestrating solution design and analysis

Organizing the project infrastructure and processes

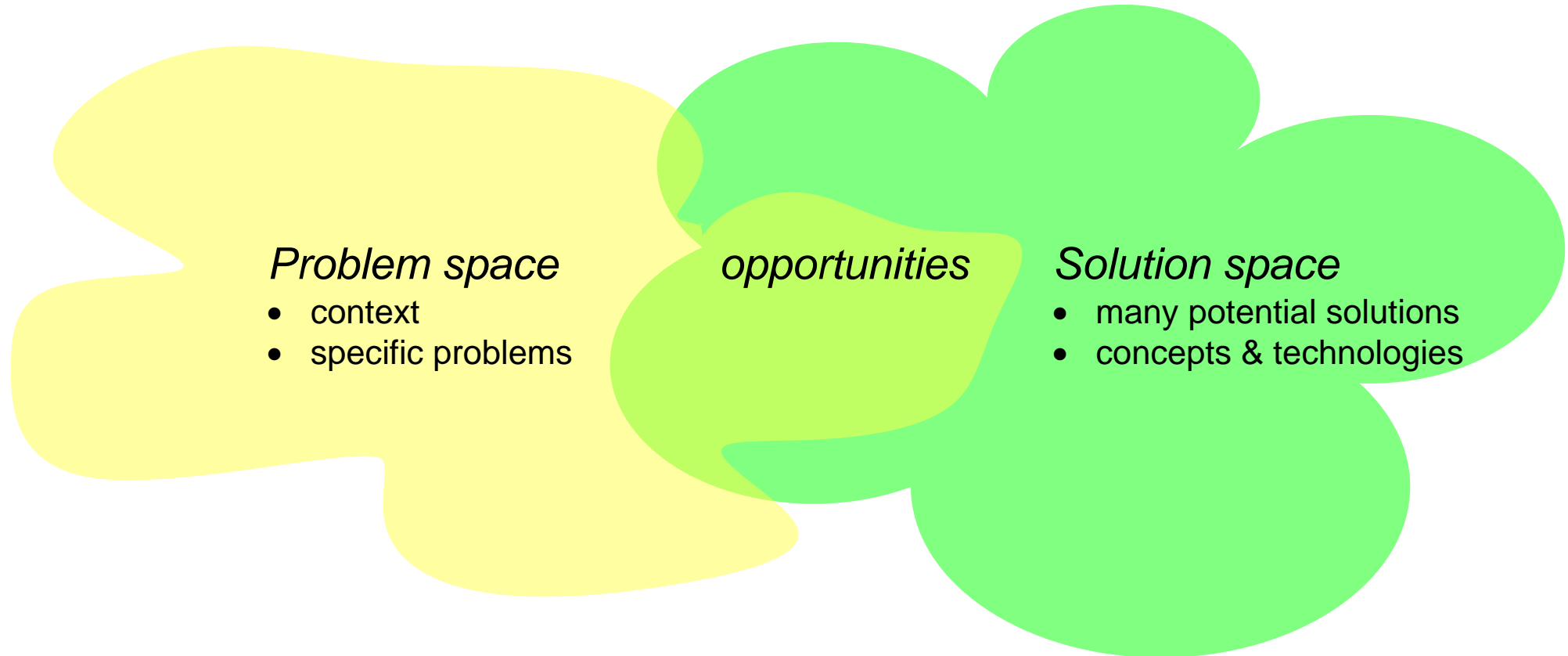
Managing budget and business and project plans

Ensuring and monitoring progress

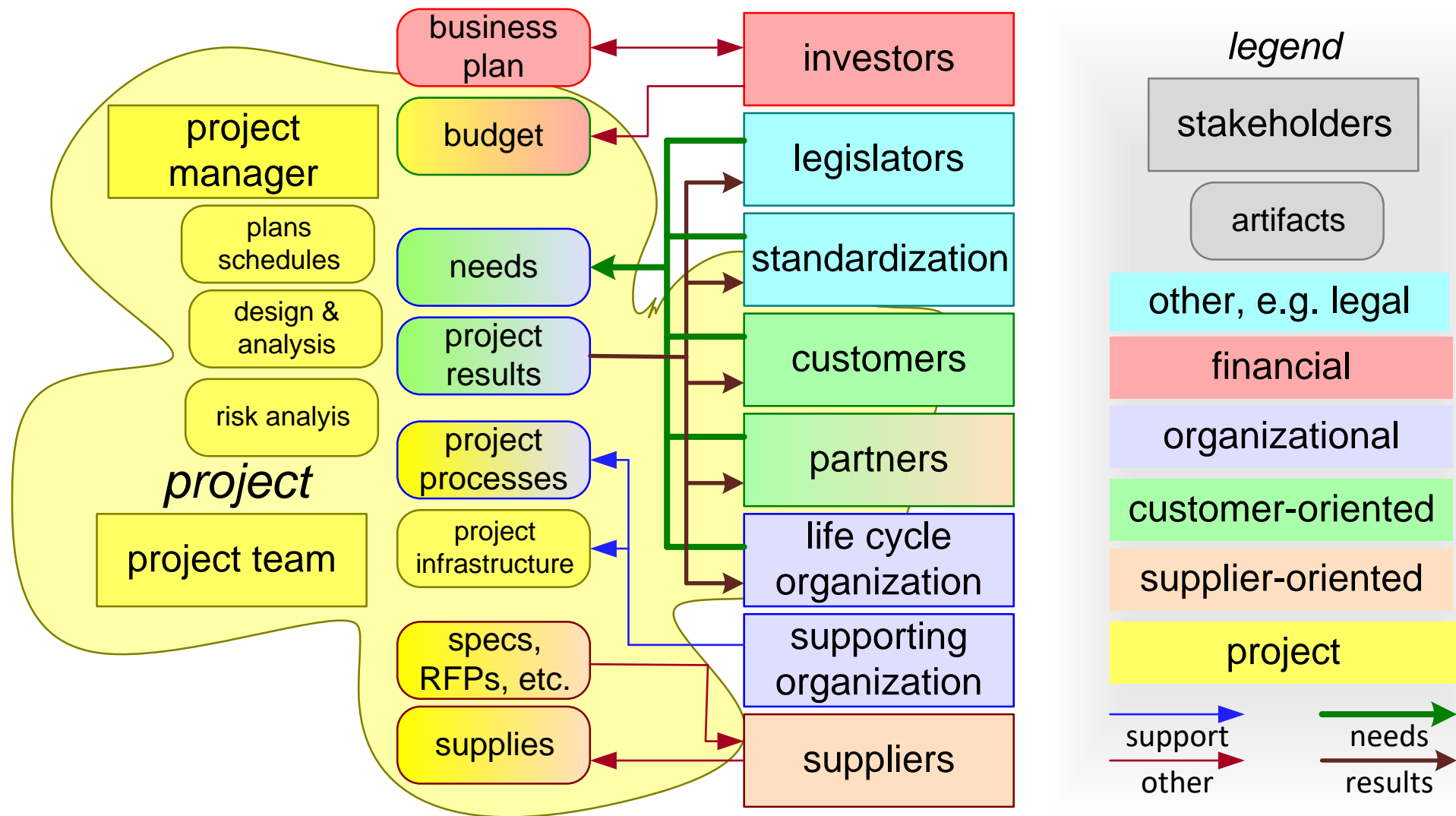
Managing external contacts

Detecting and mitigating risks

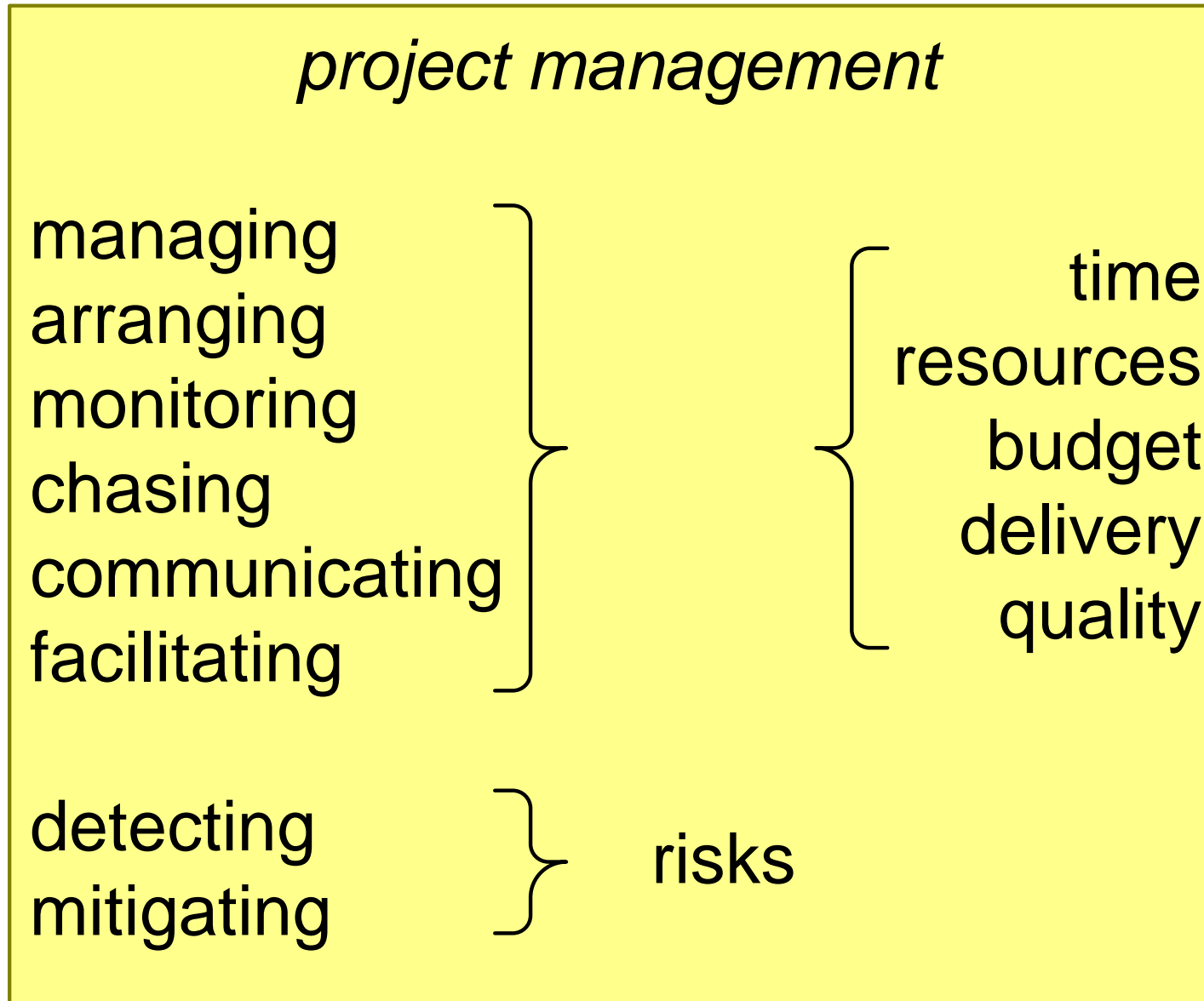
Problem and Solution Space



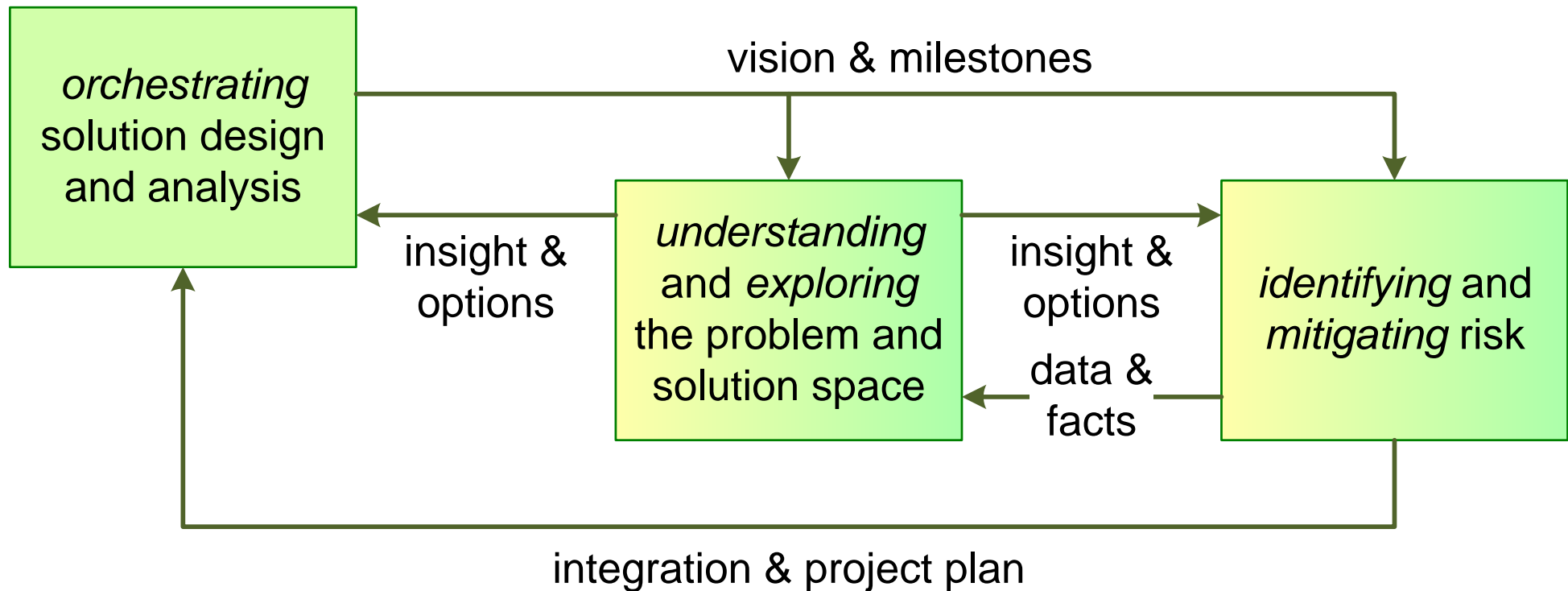
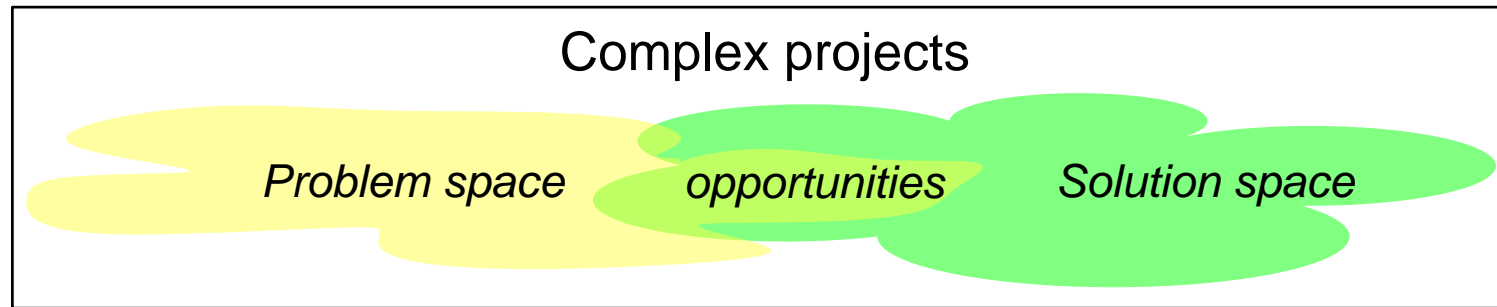
The Landscape for Project Management in Innovation



Project Management Tasks



Value of Tools for Complex Project Management



Planning Methods

<i>planning</i>	<i>decision timing</i>	<i>long term outlook</i>
pacing ¹ agile, wall ² last planner ³ PERT planning ⁴ planning for integration ⁵	set-based design ^{6,7} real option theory ^{8,9} late decision making ¹⁰	roadmapping ^{11,12} foresight ¹³ gigamaps ¹⁴ scenario planning ¹⁵

¹ <https://www.entrepreneur.com/article/288769>

² <http://deepali10dulkars.blogspot.com/2014/07/pm-toolkit-series-release-planning-wall.html>

³ Combating Uncertainty in the Workflow of Systems Engineering Projects, INCOSE 2013

⁴ https://en.wikipedia.org/wiki/Program_evaluation_and_review_technique

⁵ <https://gaudisite.nl/SystemIntegrationHowToPaper.pdf>

⁶ <http://lean-analytics.org/set-based-concurrent-engineering-sbce-why-should-you-be-interested/>

⁷ https://gaudisite.nl/INCOSE2012_Hansen_Muller_SetBasedDesign.pdf

⁸ Ivanovic, A. and America, P., 2008, Economics of architectural investments in industrial practice; 2nd International Workshop on Measurement and Economics of Software Product Lines.

⁹ Ivanovic, A. and America, P., 2008, Economics of investments in evolvable architecture in industrial practice, ICSM08

¹⁰ <https://electricalfundablog.com/agile-model-methodology/>

¹¹ <http://www.cambridgeroadmapping.net/>

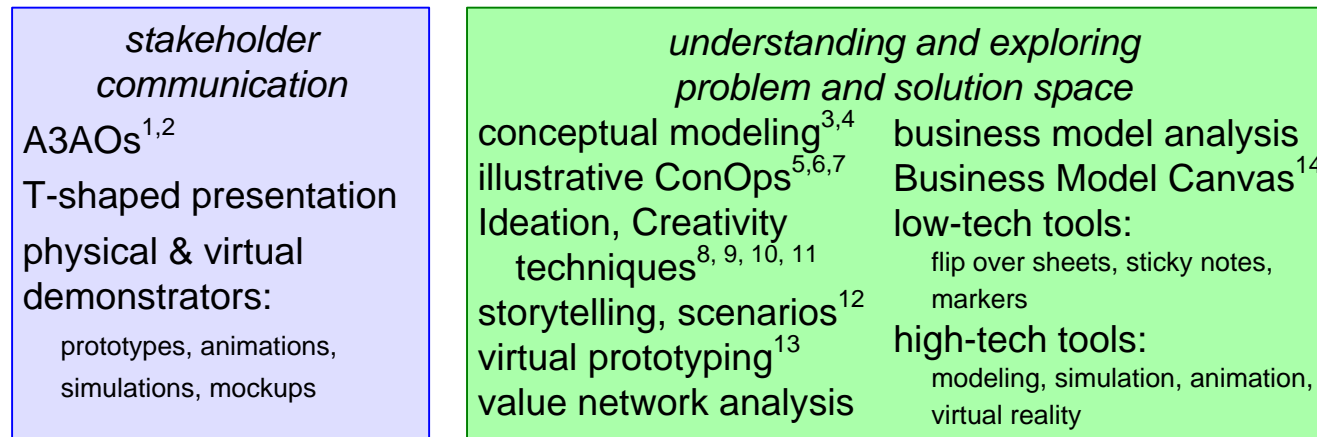
¹² <https://gaudisite.nl/RoadmappingPaper.pdf>

¹³ Miles, I., Saritas, O., and Sokolov, A., 2016. Foresight for Science, Technology and Innovation. Springer

¹⁴ Skjelten, E.B.: Complexity & other beasts a guide to mapping workshops. The Oslo School of Architecture and Design, Oslo (2014).

¹⁵ Wilkinson, A. and Kupers, 2013, R. Living in the Future, Harvard Business Review, May 2013

Stakeholder Methods



¹ Borches D, 2010 A3 architecture overviews: a tool for effective communication in product evolution.

² <https://gaudisite.nl/BorchesCookbookA3architectureOverview.pdf>

³ Muller, G. Challenges in Teaching Conceptual Modeling for Systems Architecting, ER 2015

⁴ Muller, G. Teaching conceptual modeling at multiple system levels using multiple views, CIRP 2014

⁵ https://gaudisite.nl/INCOSE2016_Solli_Muller_VisualConOps.pdf

⁶ https://gaudisite.nl/INCOSE2015_MullerEtAl_SubseaOverviewA3.pdf

⁷ ISO/IEC 2011. Systems and software engineering - Life cycle processes - Requirements engineering.

⁸ <https://www.ideou.com/pages/ideation-method-mash-up>

⁹ Skjelten, E.B.: Complexity & other beasts a guide to mapping workshops. The Oslo School of Architecture and Design, Oslo (2014).

¹⁰ Young, J.W. 2016: A Technique for Producing Ideas, Stellar Editions.

¹¹ Bhattacharya, Hemerling & Waltermann, 2010, Competing for Advantage; How to Succeed in the new Global Reality. Boston Consulting Group <https://www.bcg.com/documents/file37656.pdf>

¹² Muller, G., 2011, Systems Architecting; a Business Perspective, CRC Press

¹³ http://www.esi.nl/innovation-support/documents/symposium-2016/2-PT_Virtual-Prototyping-Interventional-X-Ray-Systems.pdf

¹⁴ Osterwalder, A. et al., 2004, The business model ontology: A proposition in a design science approach.

Planning Methods

planning

pacing¹

agile, wall²

last planner³

PERT planning⁴

planning for integration⁵

decision timing

set-based design^{6,7}

real option theory^{8,9}

late decision making¹⁰

long term outlook

roadmapping^{11,12}

foresight¹³

gigamaps¹⁴

scenario planning¹⁵

Stakeholder Methods

stakeholder communication

A3AOs^{1,2}

T-shaped presentation

physical & virtual demonstrators:

prototypes, animations, simulations, mockups

understanding and exploring problem and solution space

conceptual modeling^{3,4}

illustrative ConOps^{5,6,7}

Ideation, Creativity

techniques^{8, 9, 10, 11}

storytelling, scenarios¹²

virtual prototyping¹³

value network analysis

business model analysis

Business Model Canvas¹⁴

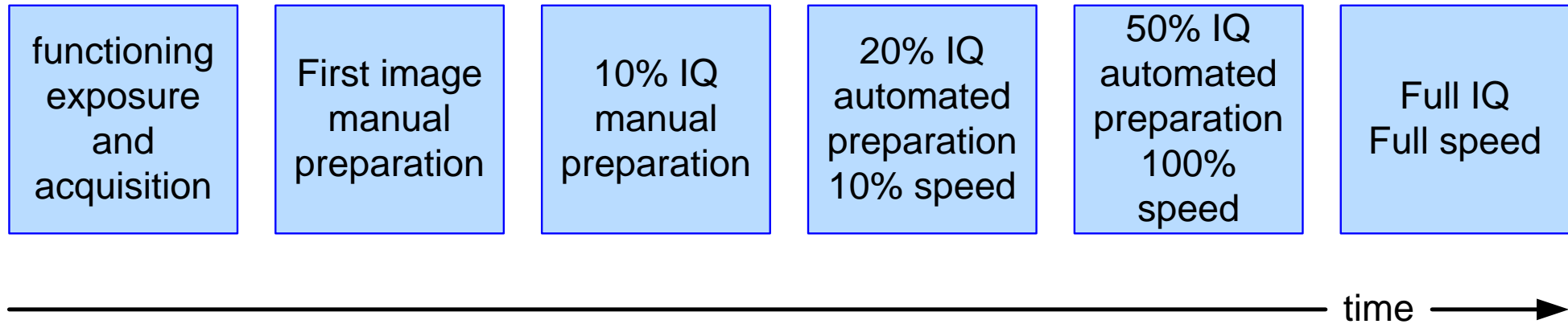
low-tech tools:

flip over sheets, sticky notes, markers

high-tech tools:

modeling, simulation, animation, virtual reality

Example of Pacing Milestones

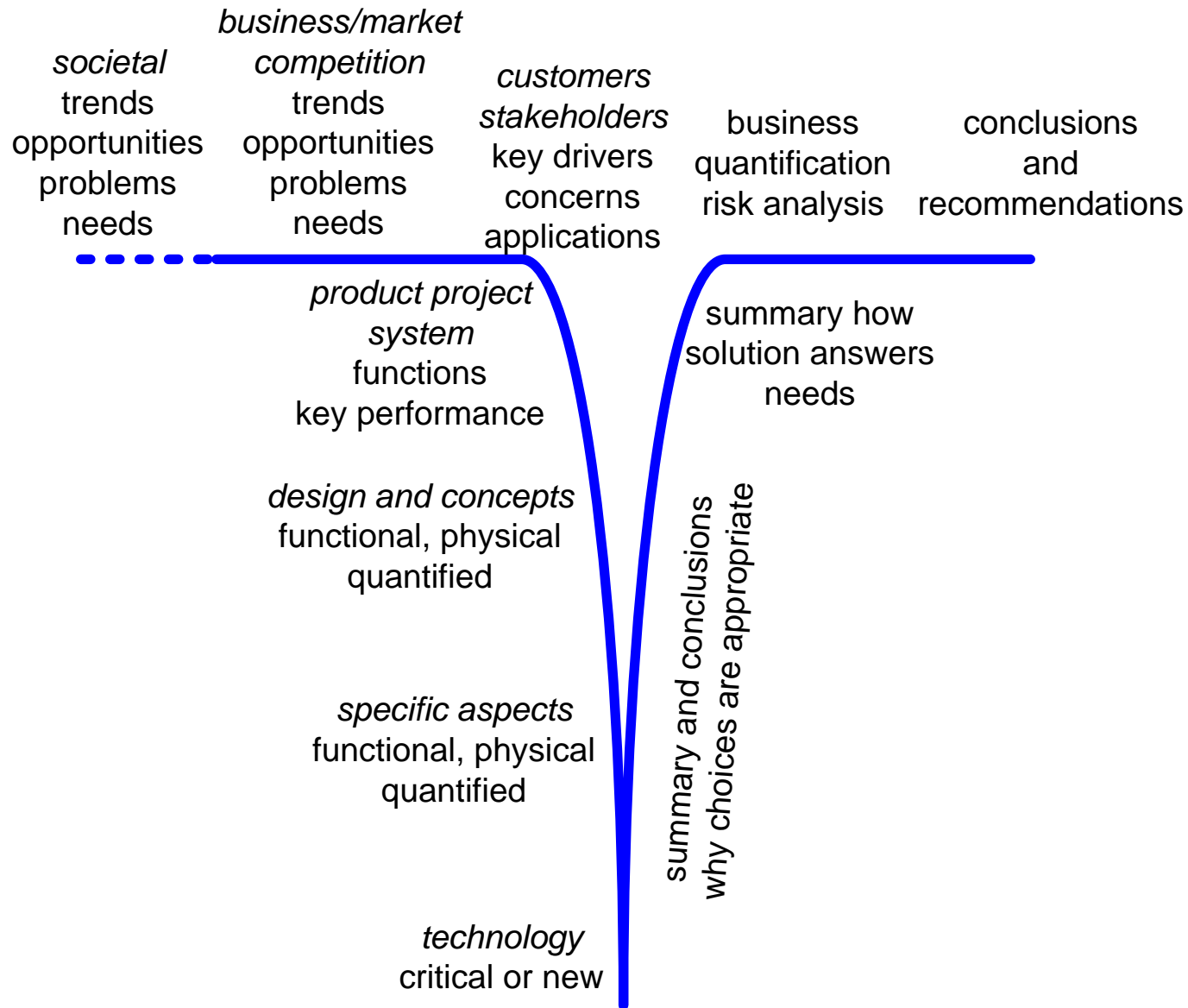


pacing:

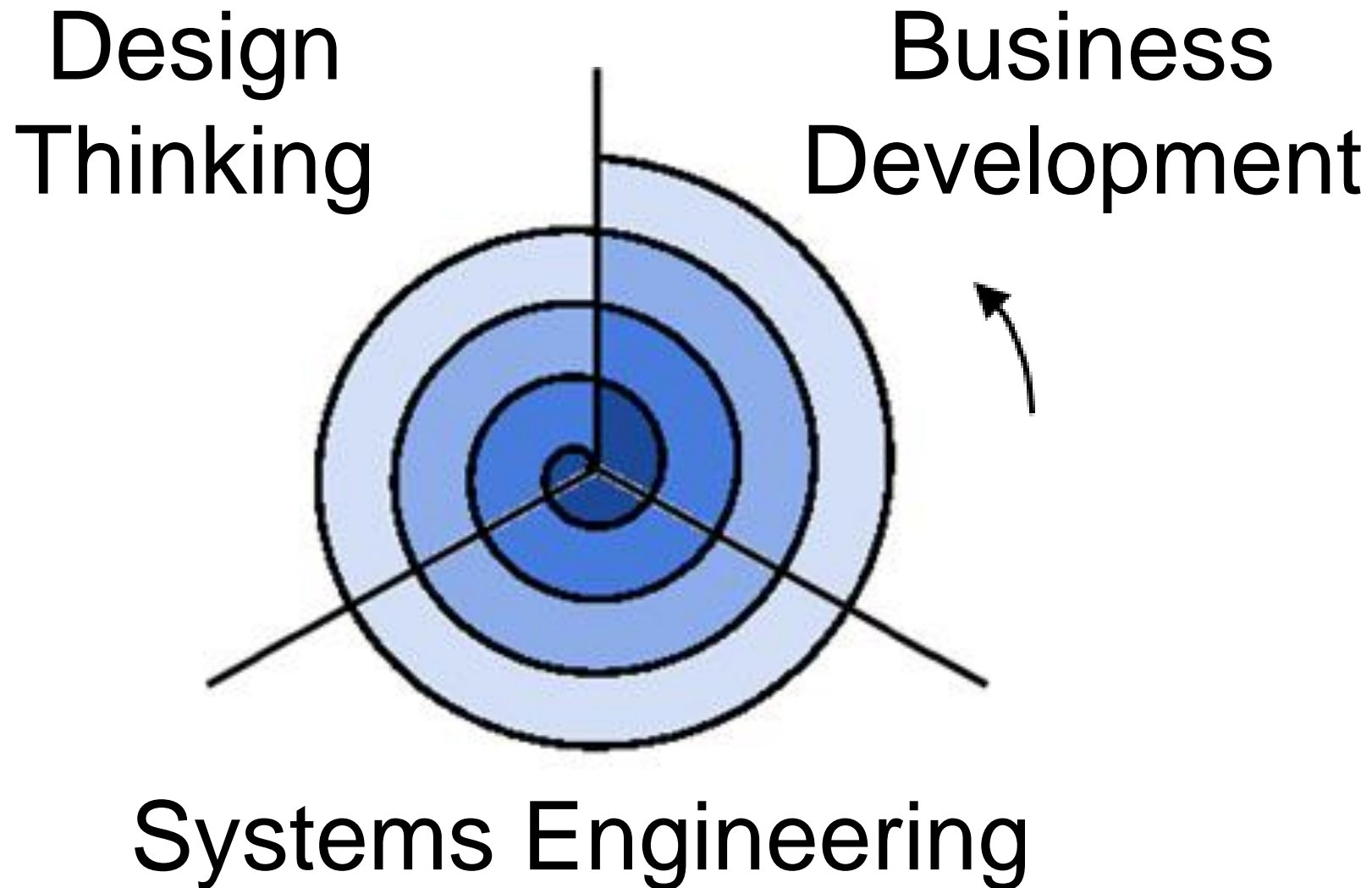
maximum 6 month between milestones

depending on technology and domain

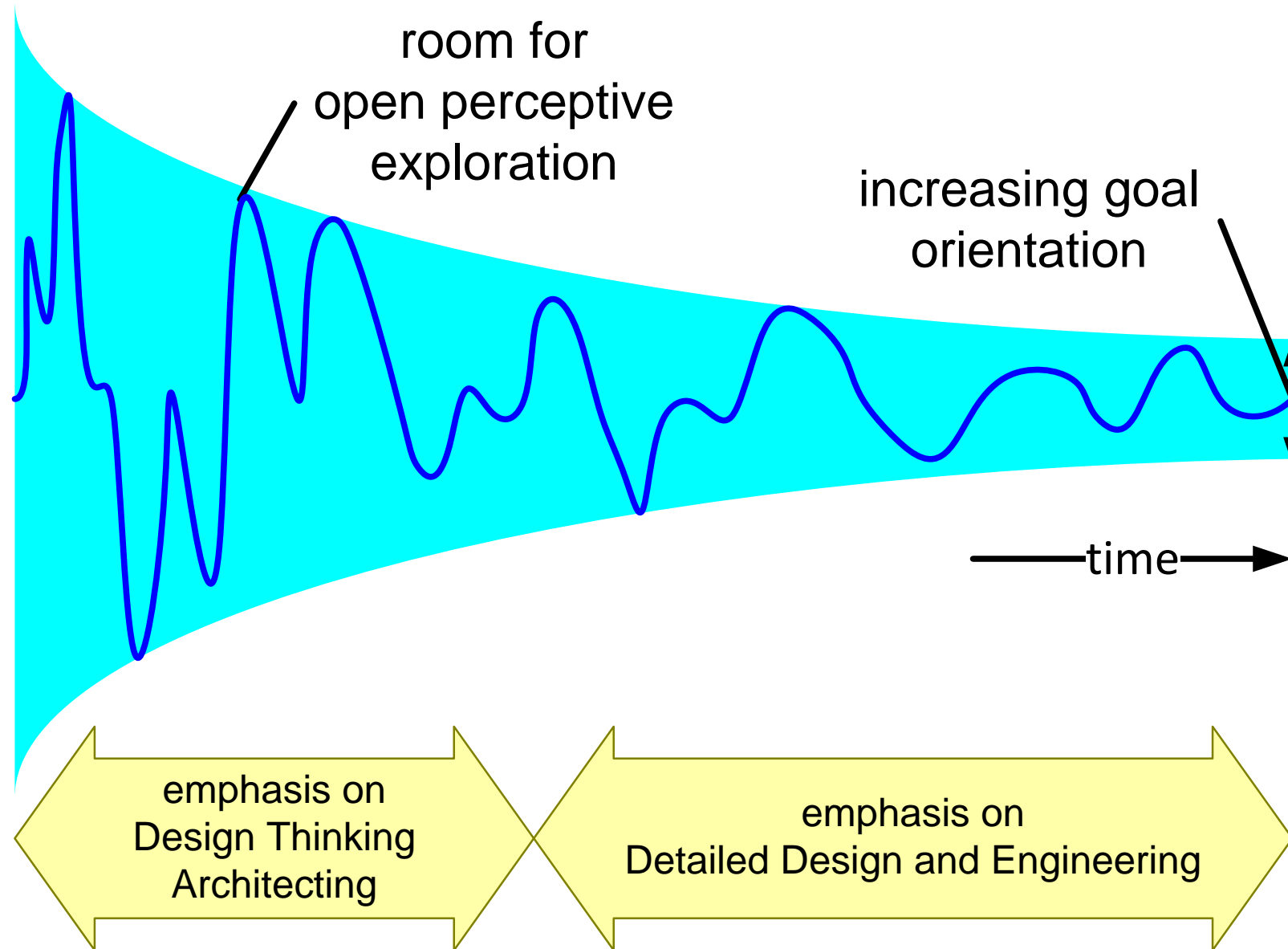
T-shaped Presentation



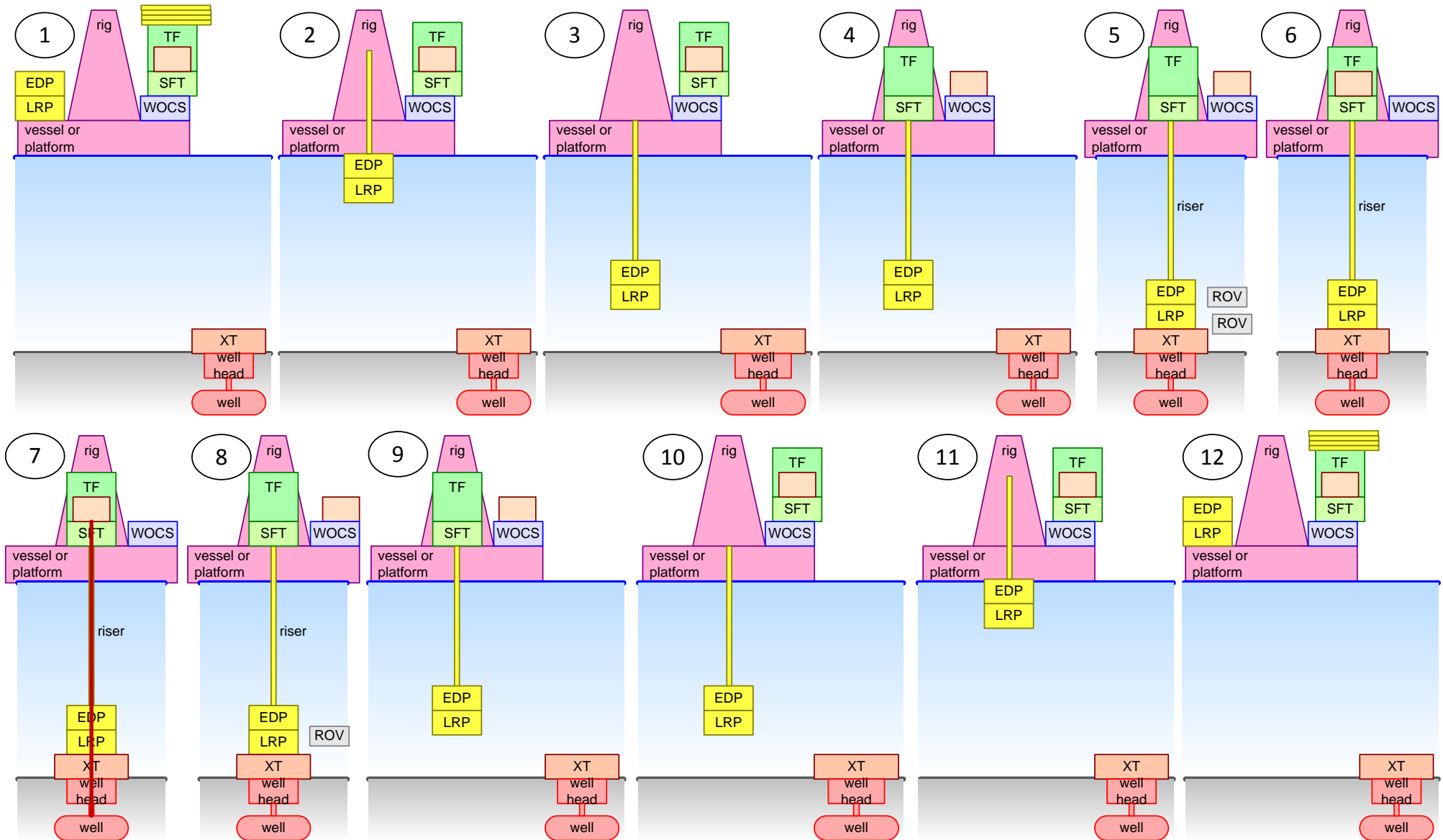
The development spiral



The mindset of the project team shifts over time



Example of an Illustrative ConOps

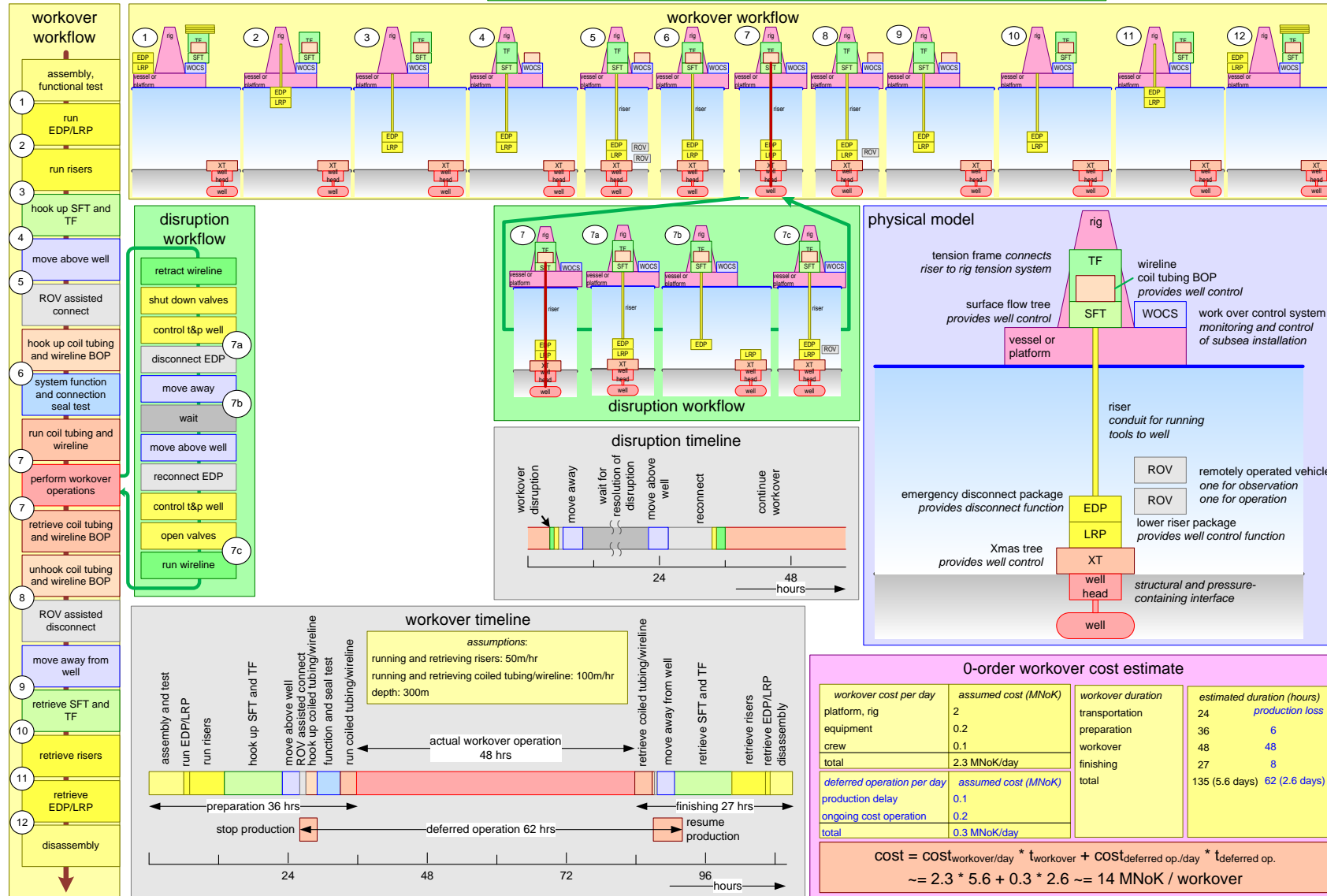


Example A3AO from Offshore Energy

Workover operation; architecture overview

This A3 based on the work of SEMA participants: Martin Moberg³, Tormod Strand⁴, Vazgen Karlsen⁵, and Damien Wee¹, and the master project paper by Dag Jostein Klever⁶. ³Aker Solutions, ⁴FMC Technologies

version 2.2 Gerrit Muller

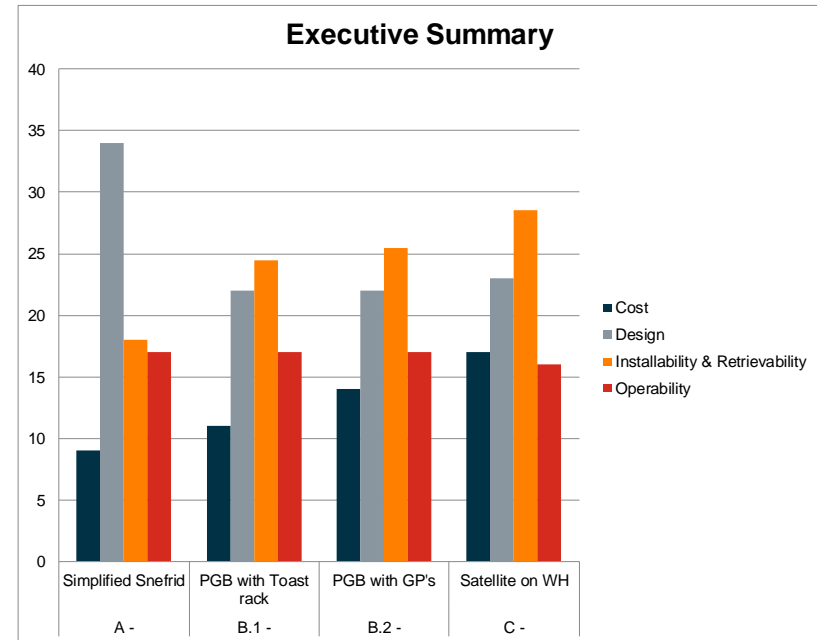


Example Pugh Matrix

Criteria		Priority setting	A	B.1	B.2	C
			Simplified Snefrid	PGB with Toast rack	PGB with GP's	Satellite XT on WH
Cost	Hardware Cost	High	2	3	4	5
	Installation Cost	Standard	2	2	3	4
	Operational Cost	Standard	3	3	3	3
Design	Engineering hours (Amount of new engineering, re-use, analysis)	Standard	5	3	3	2
	Design familiarity (Is the design known in AkSo? Previously delivered?)	Standard	4	2	3	3
	Requirement compliance	Standard	5	4	3	2
	Deliverytime from call-off (Long lead items, fabrication time)	High	3	3	3	4
	Amount of new qualifications (TQP's)	High	5	2	2	2
	On-shore Testability (Availability of necessary equipment and procedures)	Standard	4	3	3	4
	Number of installation runs required	Standard	1	2	2	5
Installability & Retrievability	Installation time	Standard	1	2	3	4
	Weather vulnerability (Metocean constraints, Hs)	Low	2	4	4	4
	Need for special tools	Low	4	3	3	3
	Guide system robustness	High	4	4	3	2
	Size of vessel required (Rig, heavy lift vessel, installation vessel)	Standard	1	2	3	5
	Weight & Size	Standard	1	3	4	5
	Retrieval flexibility of equipment	Standard	3	4	4	2
Operability	ROV access	Standard	3	4	4	4
	Flow assurance (Hydrate/Scale, pipeline friction, pressure bleed-off)	Standard	3	3	3	3
	Dewatering & start-up (Service access, injection points, etc.)	Standard	3	4	4	4
	Reliability	Standard	3	4	4	4
	Interchangeability	Standard	5	2	2	1
Indicating summary:			78	74,5	78,5	84,5

The priority setting enables you to prioritize individual criteria to a higher or lower importance. If the priority is set to low for a criteria, that criteria will count less compared to a standard or higher prioritized one.

Rating	Description
1	Unfavorable performance
2	Less than satisfactory performance
3	Satisfactory performance
4	More than satisfactory performance
5	Excelent performance



Stepwise Approach to Planning for Integration

Understand Solution Design and Context
Parts inside solution and in context, their interactions,
emergence of Key Performance Parameters

Identify Risks
gaps in knowledge of problem and solution space,
uncertainties, and ambiguity

Determine an Integration Sequence to get Key
Performance Parameters functioning ASAP
using a pacing process (regular visible results)

Merge Constraints from Test Configurations,
Suppliers, Partners, Resources, etc.
with a mindset to fail early

From Integration Sequence to Project Master Plan

