# Breaking Out

## Systems Engineering To Go

# Historical background

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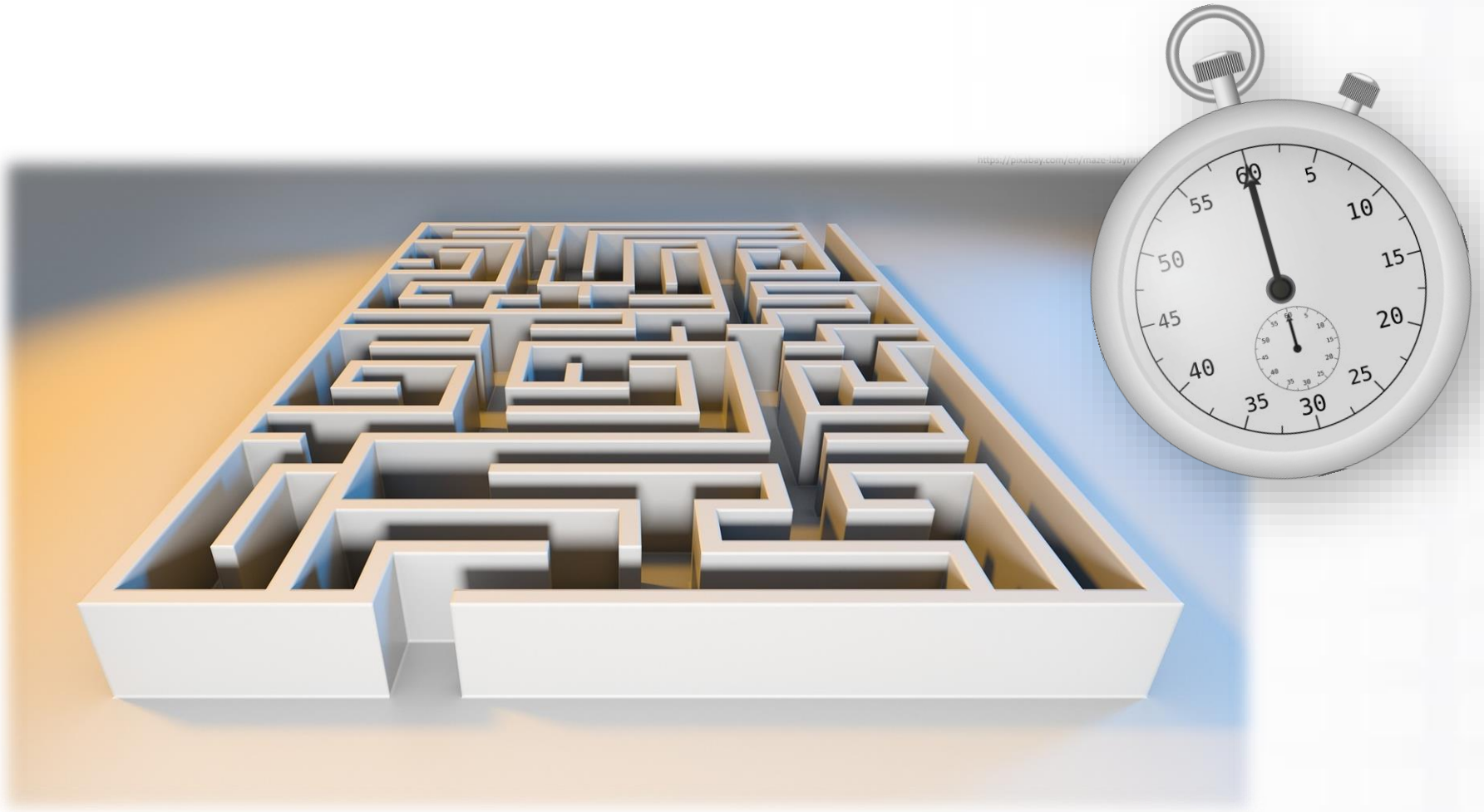
# Drivers = complexity + speed

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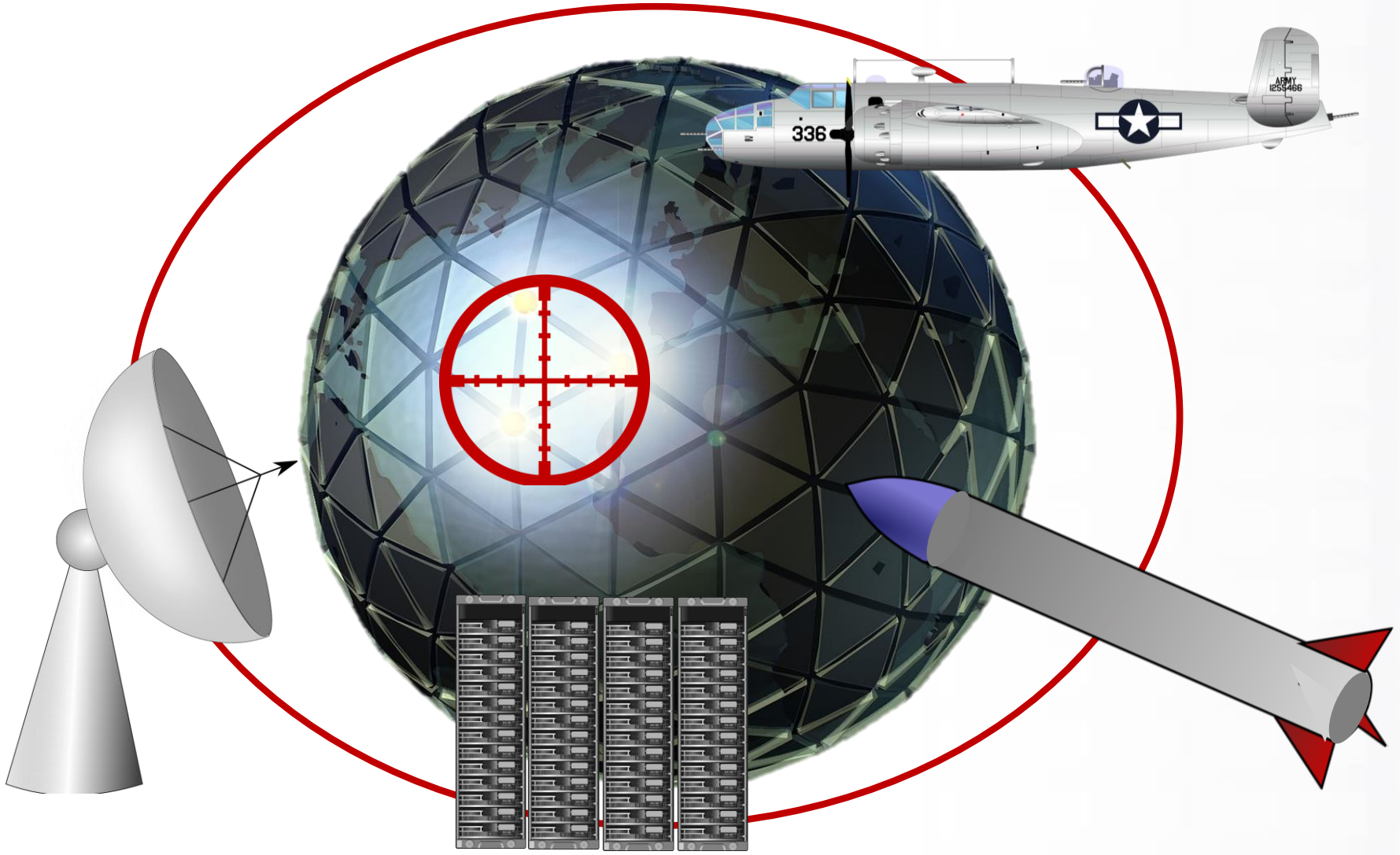
# Complexity

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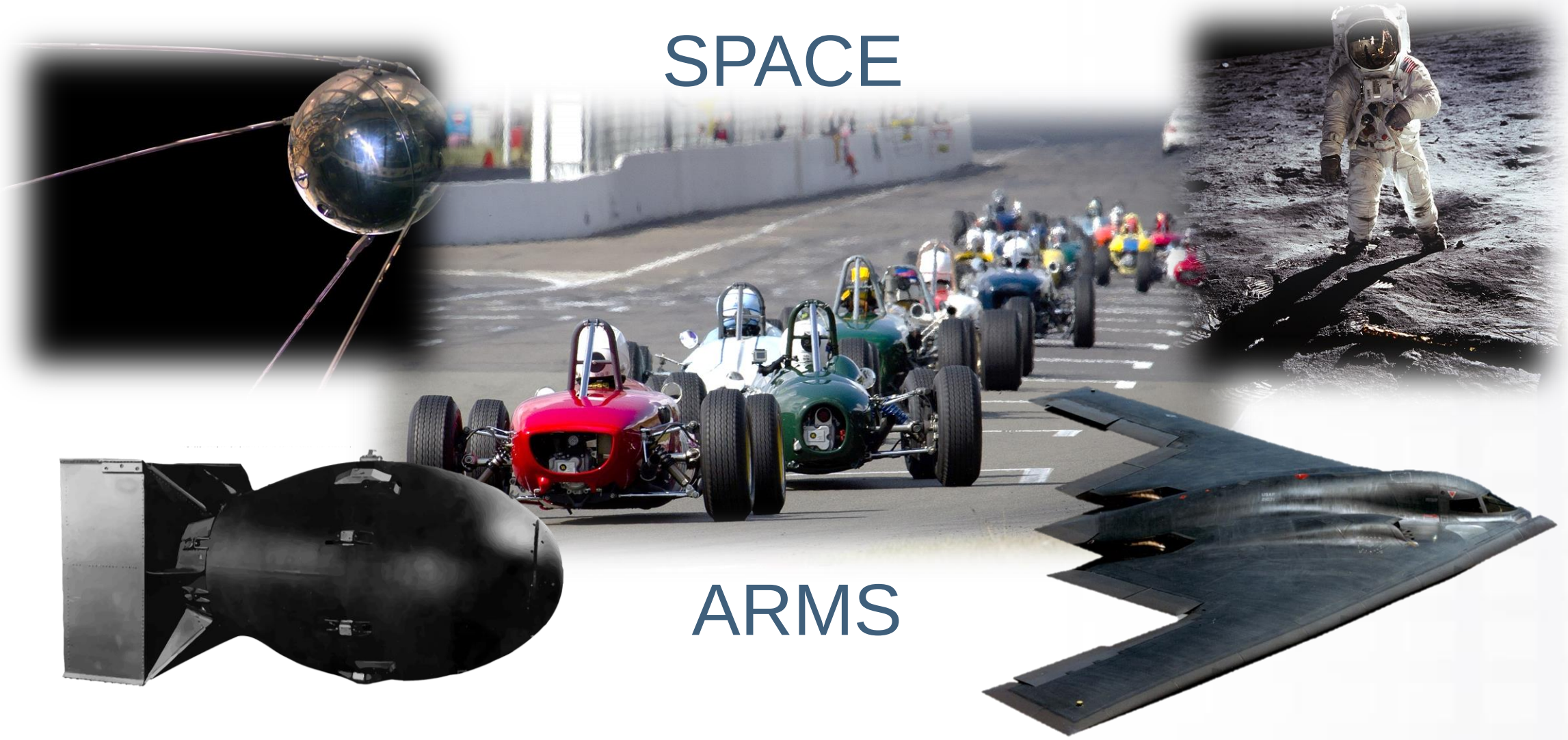
# Pace-Race

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# Application-based transfer

Rockets Ships Vehicles Space Submarines

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# Issues and Problems

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# Baked-in

Heuristics Processes Algorithms

Product

Software

Vocabulary

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# Expansion

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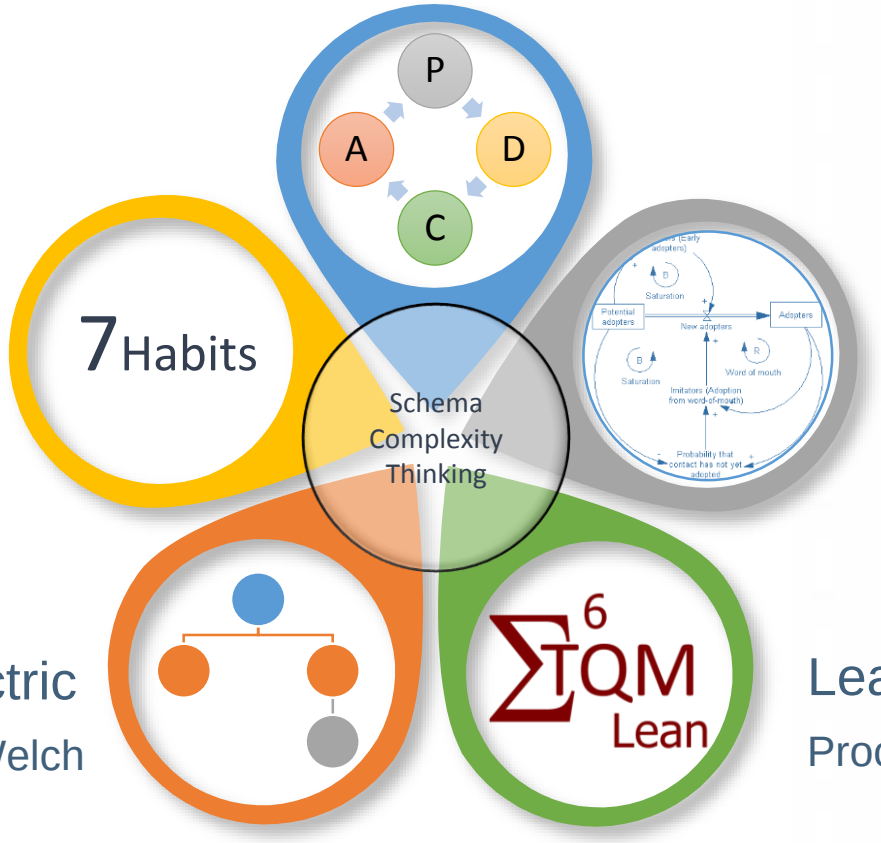
# Concepts Map To:

PDCA
Plan, Do, Check, Act

7 Habits of Highly Successful People
Steven Covey




Systems Dynamics
5th Discipline
Peter Senge

General Electric
Jack Welch

Lean Six Sigma/TQM
Process improvement

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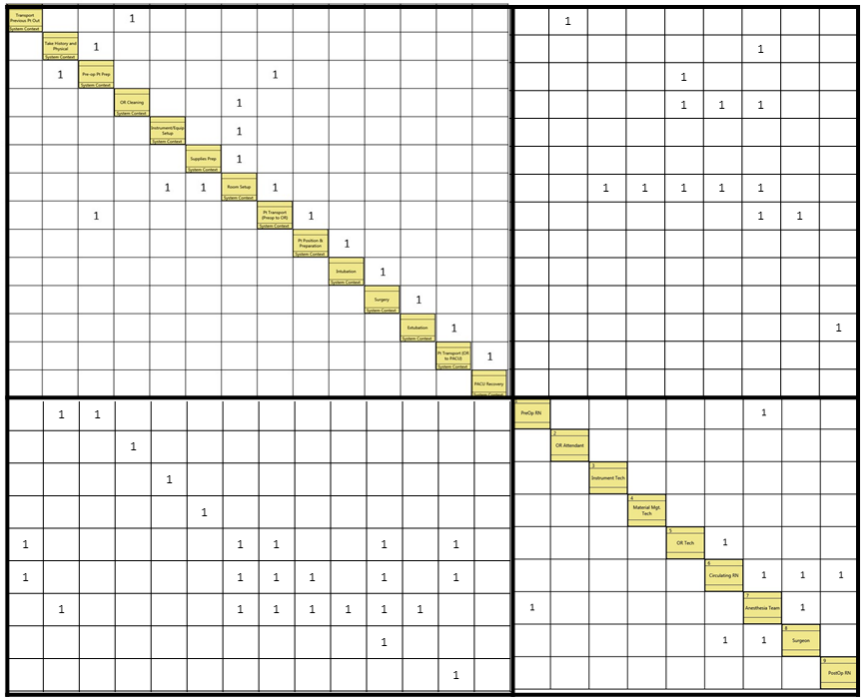
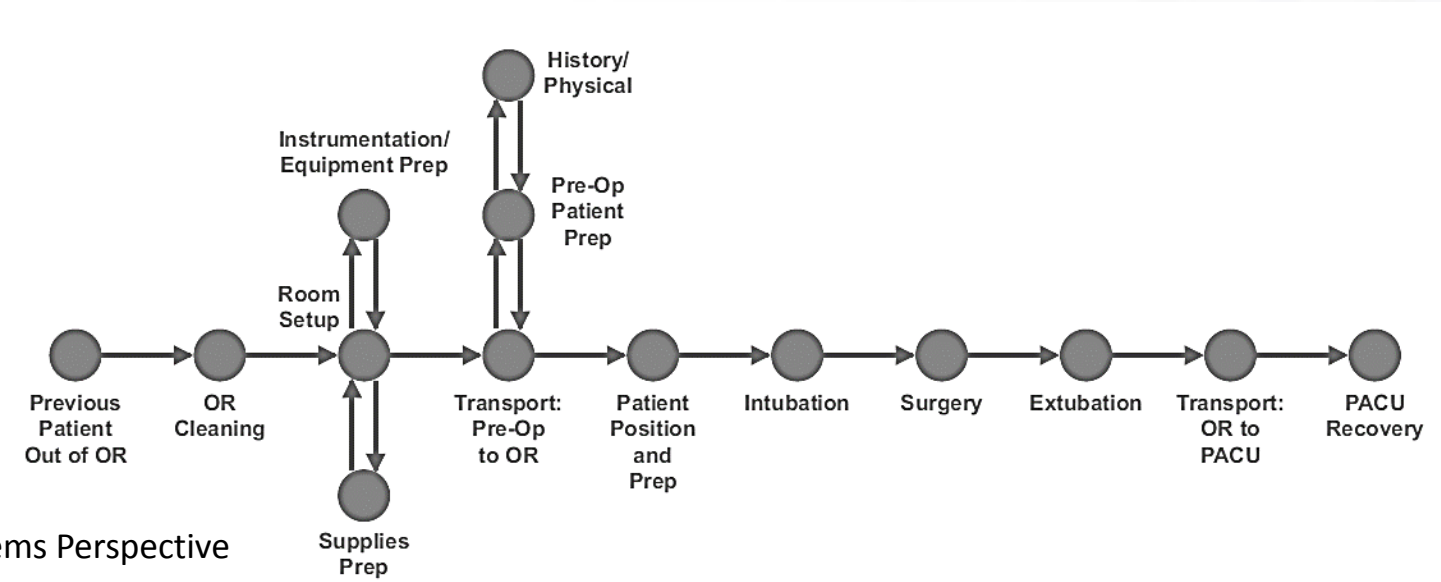
"While the DSM provides a valuable tool for visualizing complex processes, it actually is not the most intuitive means of graphically displaying dependencies in simpler systems like this one."






Process Modeling in the Operating Room: A Socio-Technical Systems Perspective
Sarah M. Bonzo, David McLain, Mark Avnet
Systems Engineering Vol. 19, No. 3, 2016

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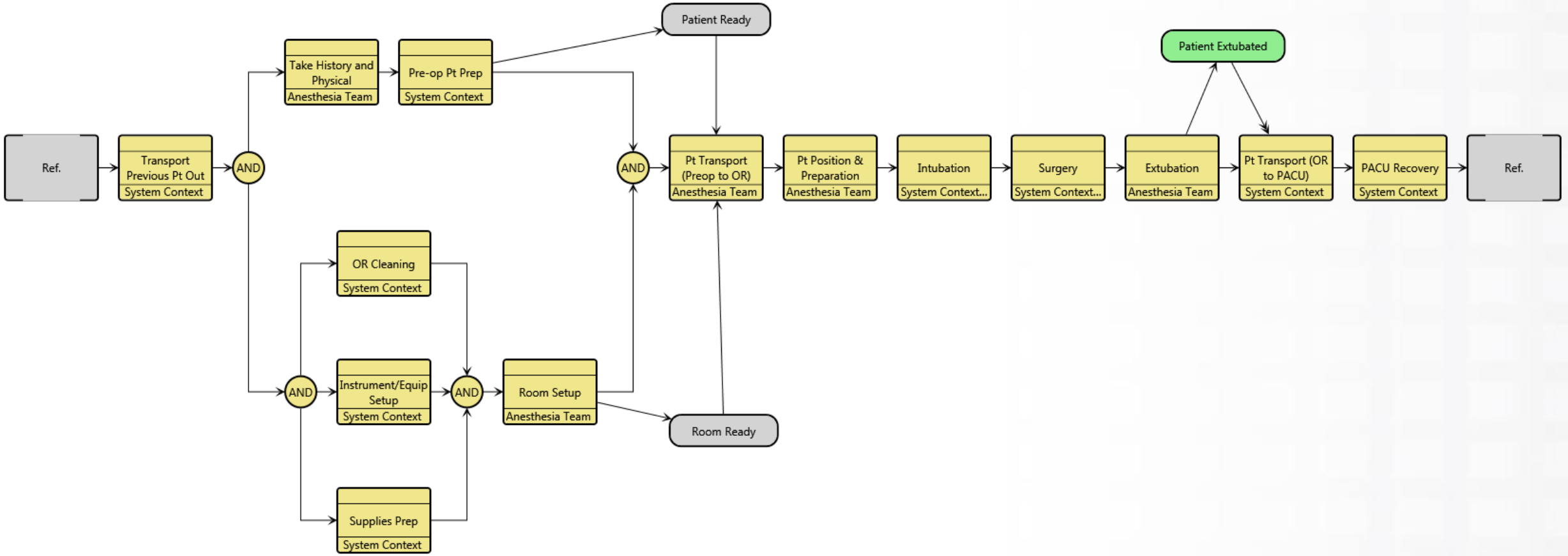


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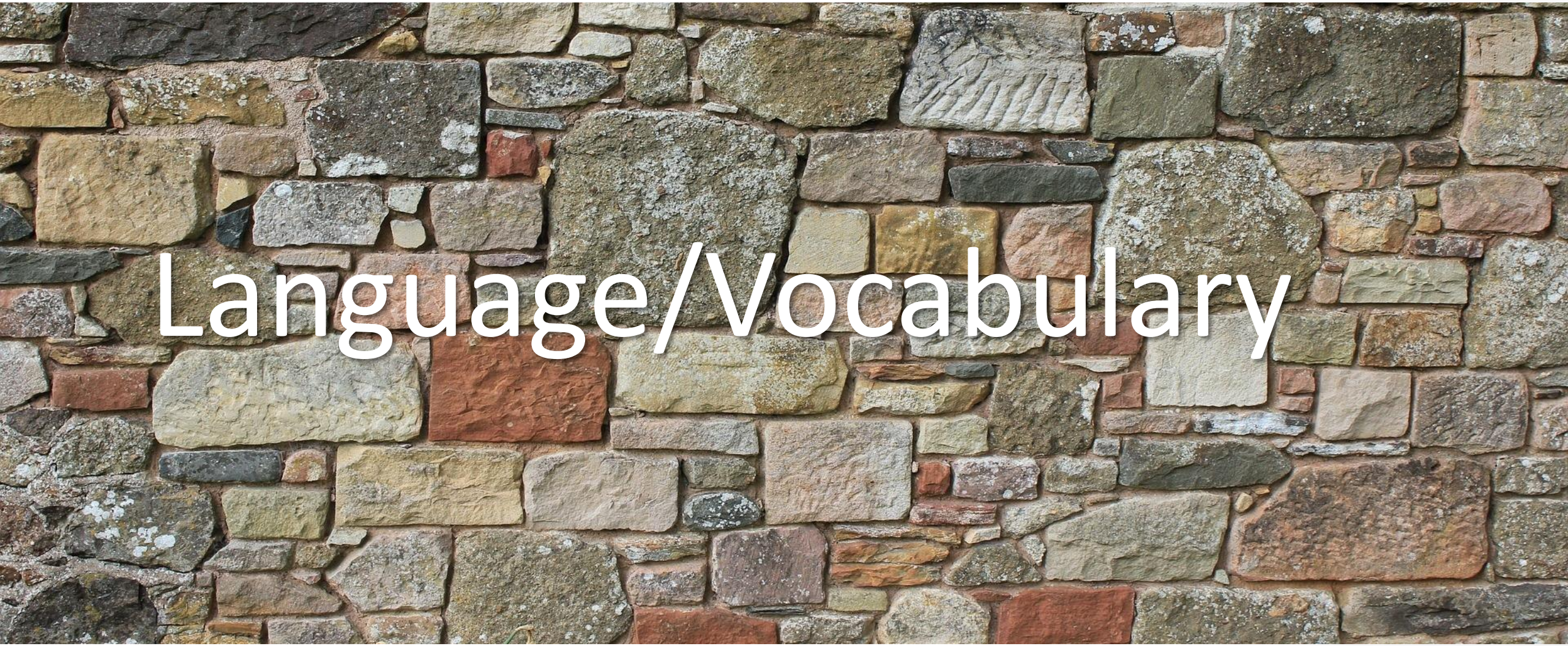
# Impediment

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# Path Forward

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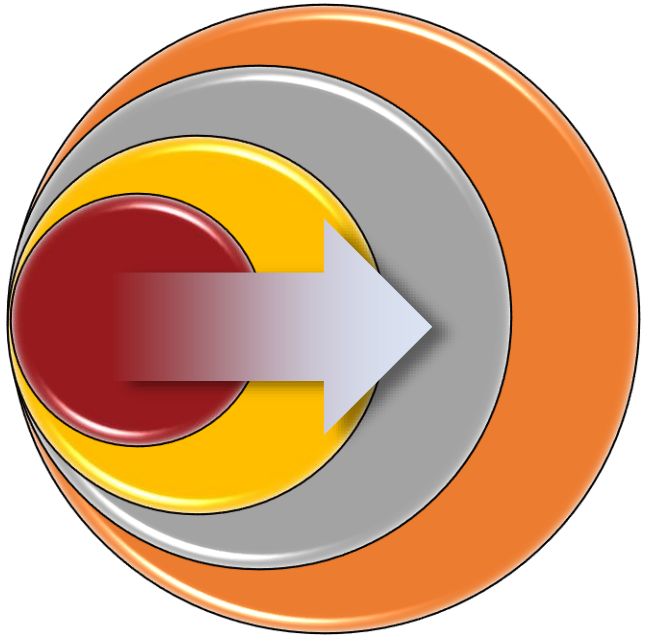
# Path Forward- Step 1

## Reproductive Thinking



## Incremental

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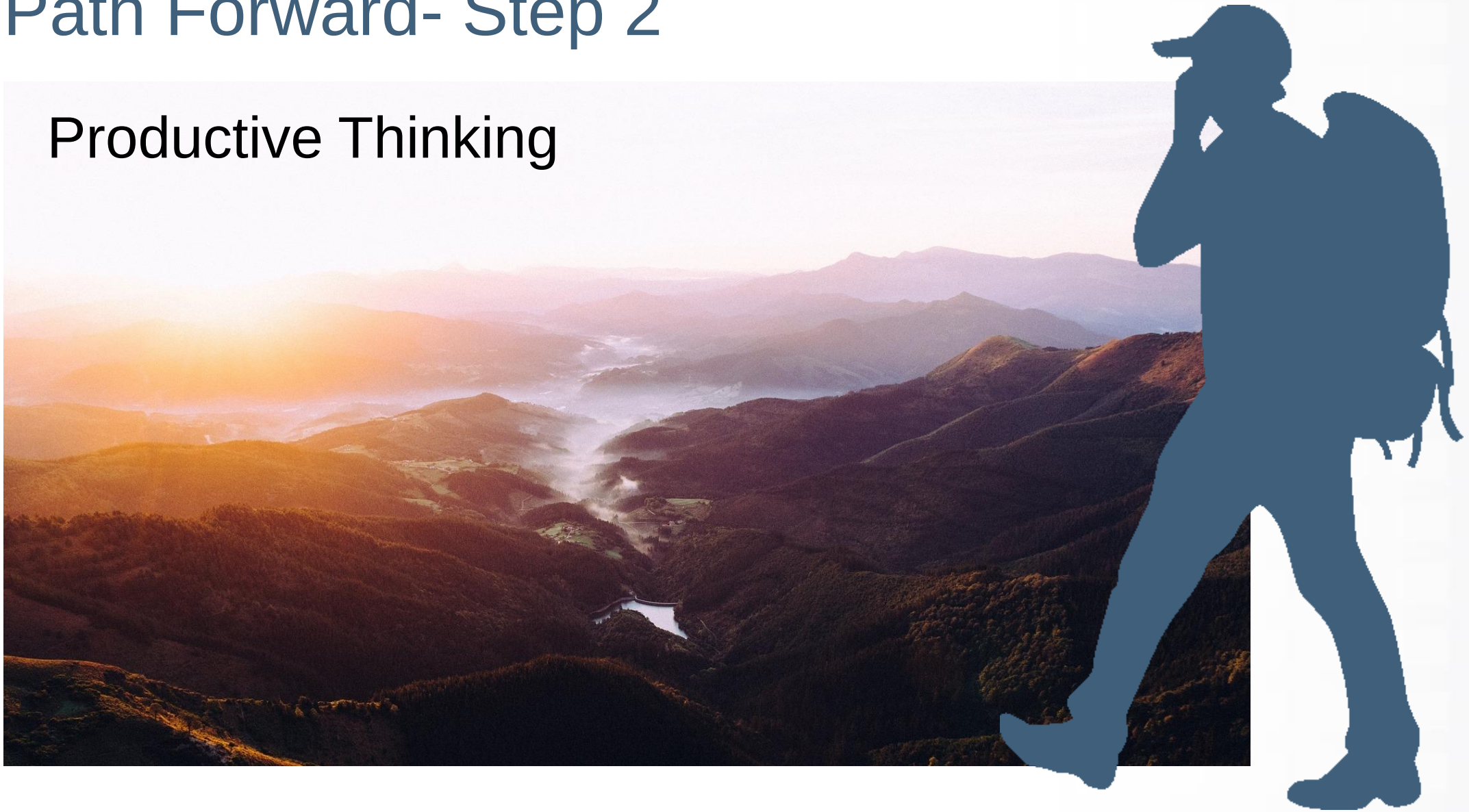
# Path Forward- Step 2

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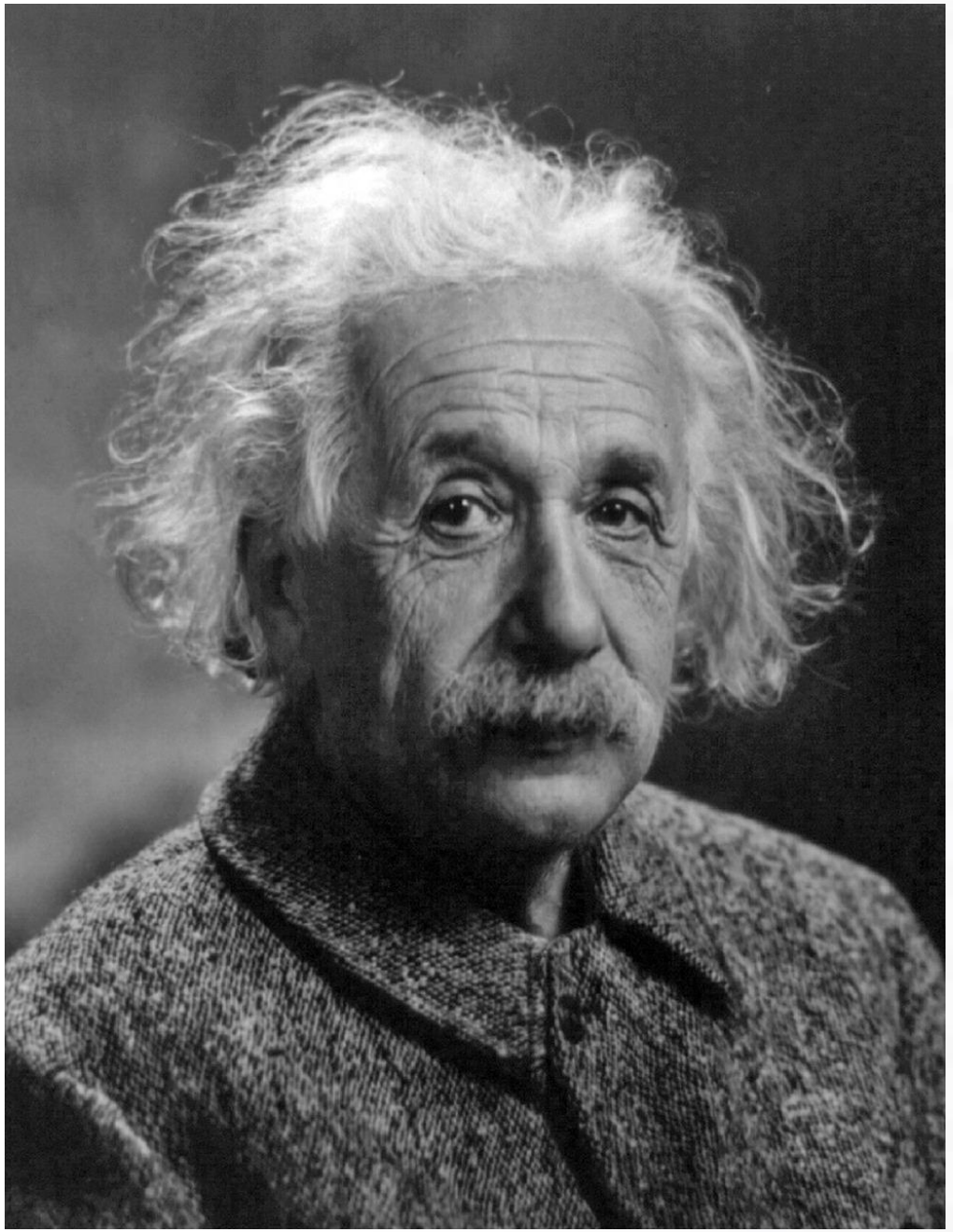
# Combinatorial Play

"The first [principle is] that an idea is nothing more nor less than a new combination of old elements." (Vilfredo Pareto, 1935)



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# James Webb Young

Five Steps for generating ideas:

1. Gather material
2. Digest material
3. Process unconsciously
4. Ah-Ha moment of insight
5. Tailor the idea to reality

Curiosity

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# Warning!

- “But you didn’t offer examples of other areas”
- On purpose!
  - Encourages reproductive thinking
  - Plenty of examples (e.g.- A World In Motion)

# Breaking Out: Systems Engineering To Go

Zane Scott, Vitech Corporation

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