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A Complex Systems Perspective of Risk Mitigation and Modeling in Development and Acquisition Programs

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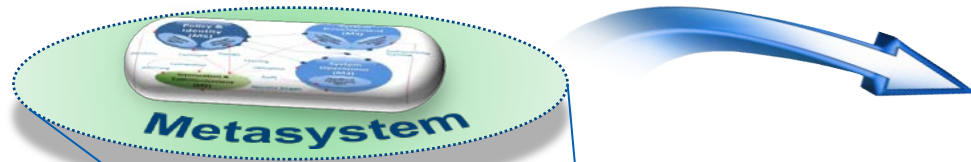
Complex System Governance for Defense Acquisition

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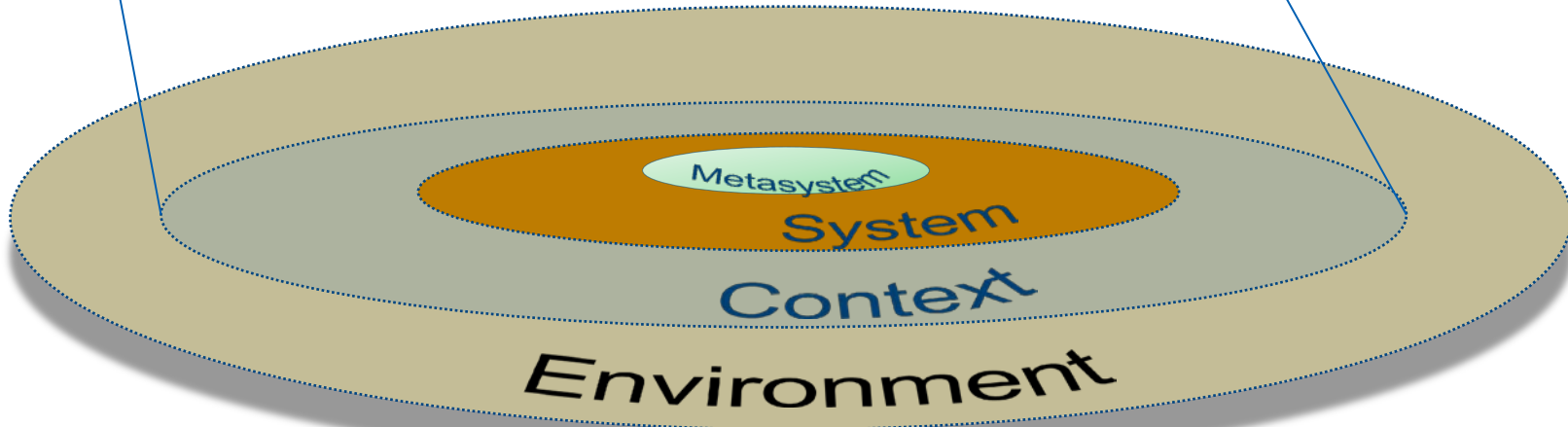
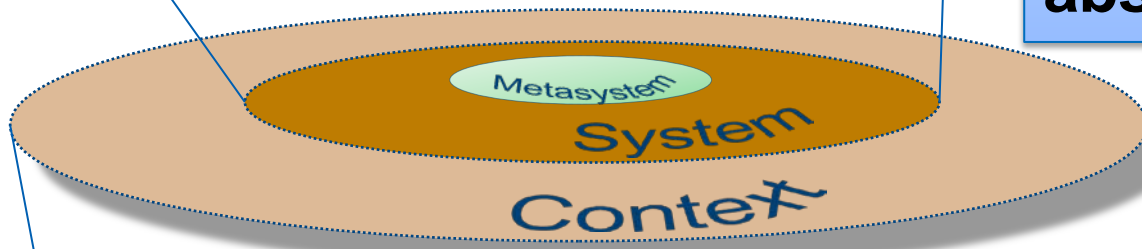
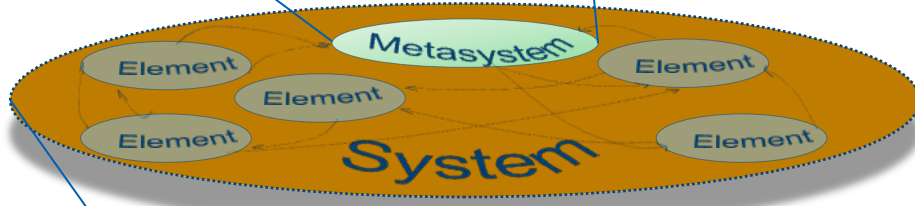


Difficult conditions confront us

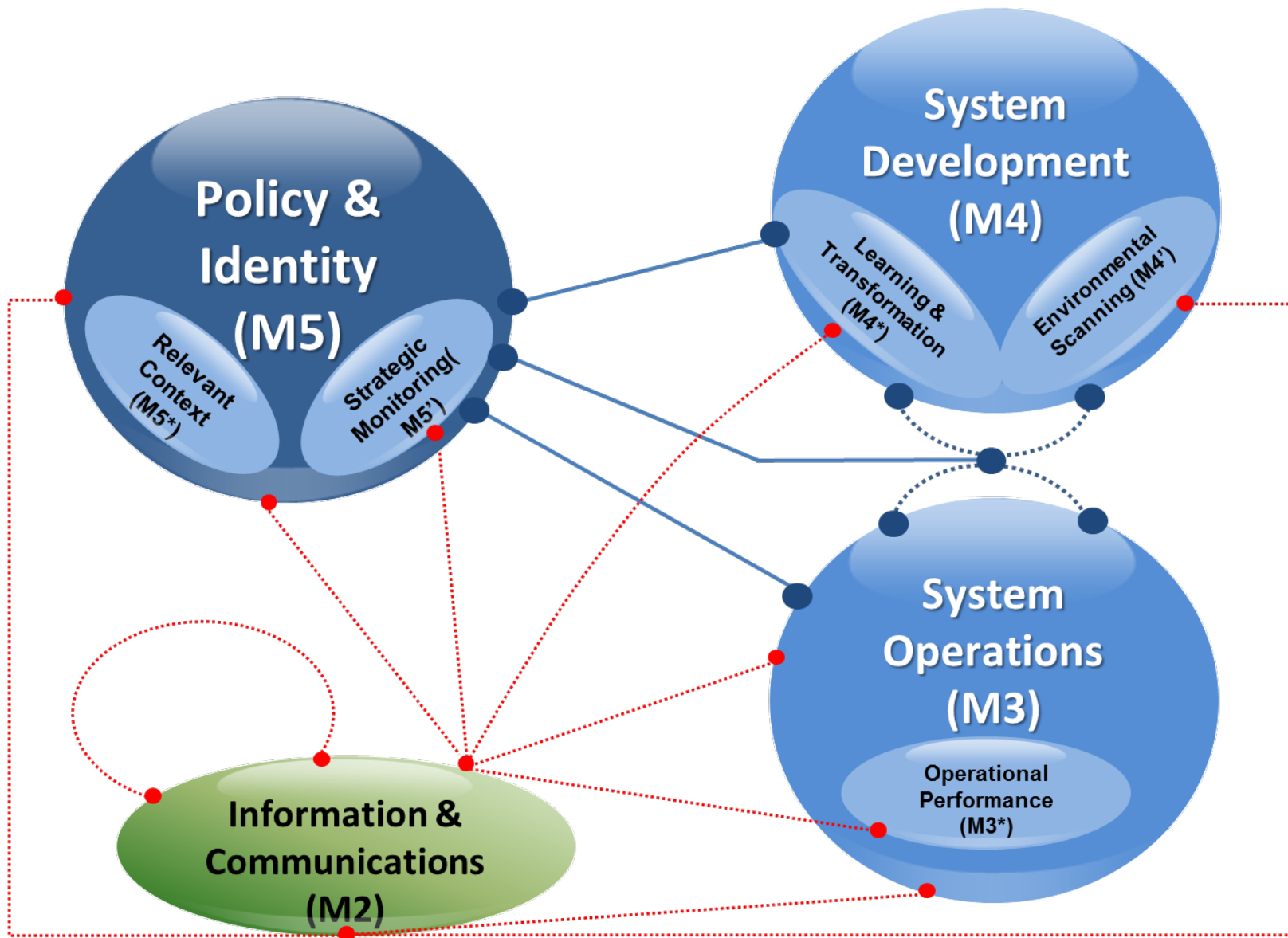




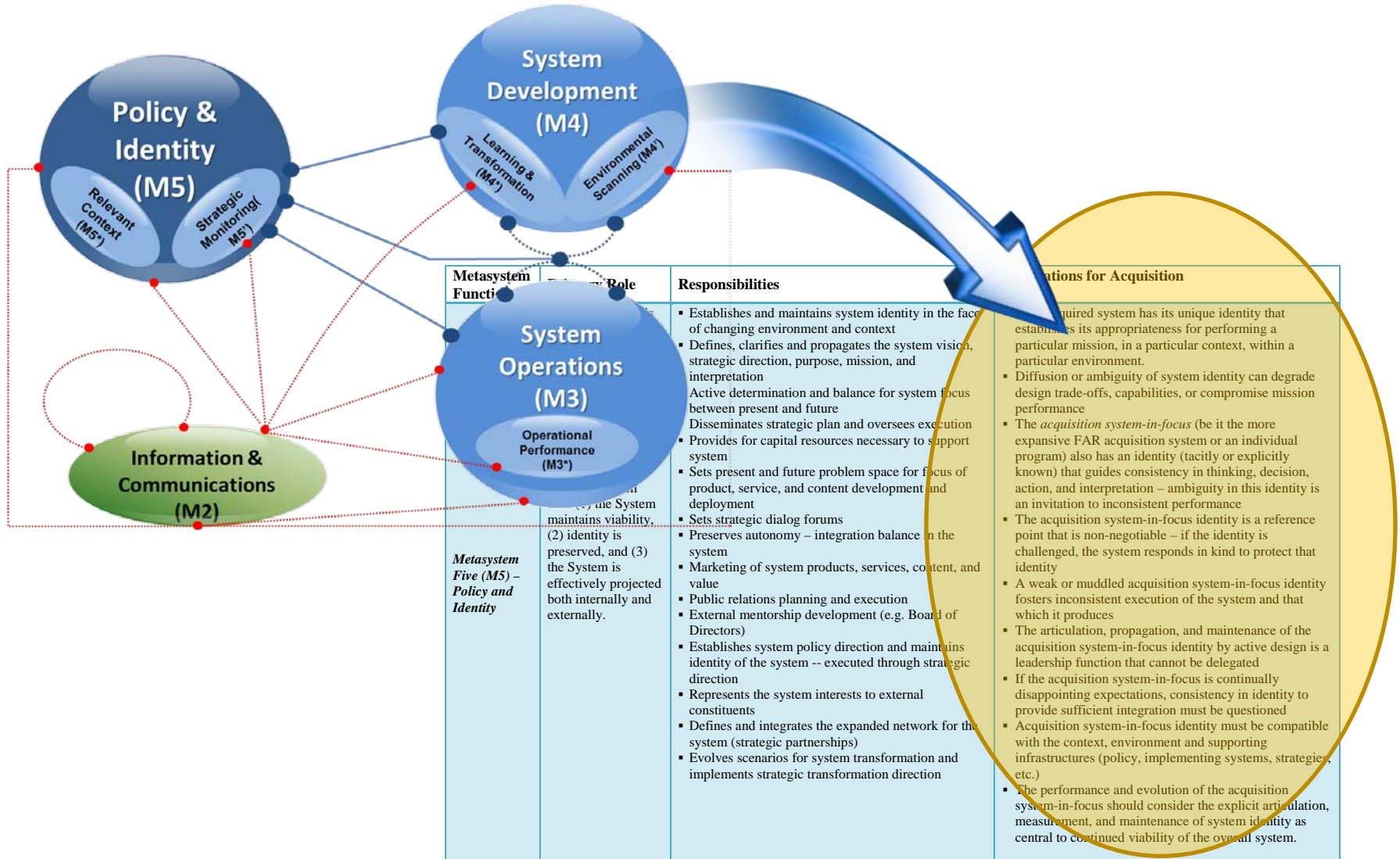
Environment, context, system, and metasystem are inseparably interconnected. Separation is for convenience of analysis and always subject to abstraction error.



Nine Meta-functions provide System Governance



The CSG Reference model applied to Defense Acquisition develops implications

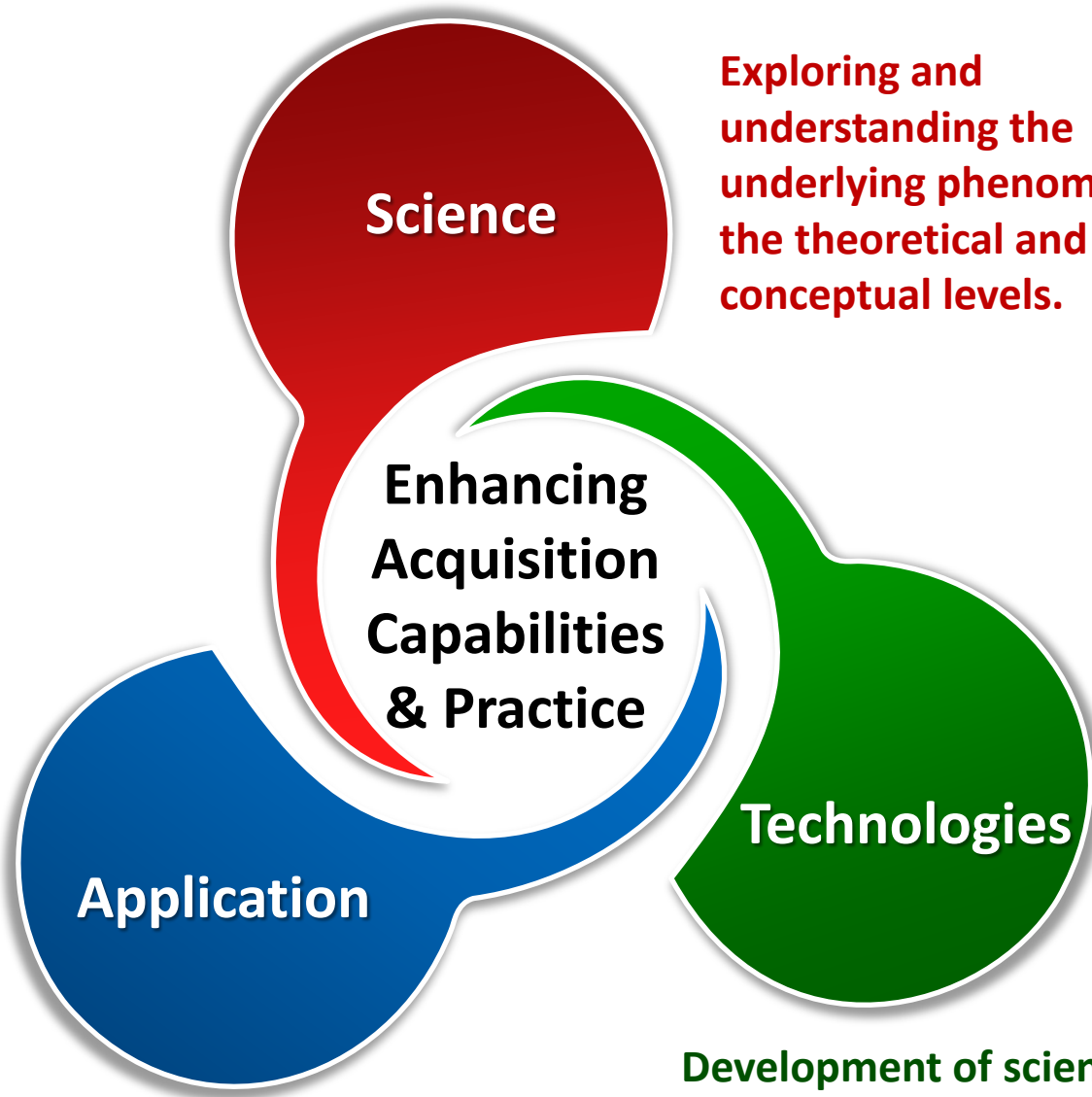


Analysis of GAO documents

Table 2: Analysis of troubled programs through the lens of CSG

DOD program/ Report Source	Does the problem/failure appear to be governance related?	Does the language in the report indicate a similar meaning for governance as the Complex System Governance?	Is there any concrete indication that CSG would have helped this program?
<i>Zumwalt Class Destroyers (DDG1000) GAO-08-904 [1,2]</i>	Yes	No model/framework of governance – Milestone C suggested – won't help with alignment of perspectives or understanding decisions and actions (communication channel – dialog) among others	Yes – this initiative seems to lack clear vision/strategy. Report suggests that channels of communication are weak (p. 45 for example)
<i>Ford Class Aircraft Carrier (CVN78) GAO-16-847 [26]</i>	Yes	Yes, the report seems to identify many governance issues that can be mapped to metasystem functions within the CSG Reference Model	Yes – contextual assessment to evaluate acquisition culture. The ship is already built though, so now the asset needs to be protected and maintained.
<i>Total Asset Visibility (Air Force) GAO-08-866 [3, 27]</i>	Yes	Yes, especially the “transformation plans” demonstrating initiative to evolve meta-systemic functioning	Yes – systems thinking likely not present in development, poor coordination of unsuccessful program
<i>Major Automated Information Systems (MAIS) GAO-12-629 [25]</i>	Yes	Yes, GAO seems to have an idea of the metasystem governance expected of a complex system, as well as realistic expectations regarding scope	Yes – some metasystem functions are clearly missing or inadequate, ex. poor coordination and communication (25, p. 57,58)
<i>National Security Cutter (Coast Guard/Navy) GAO-16-148 [24]</i>	Yes	Yes, report seems to capture design/execution elements necessary for control/communication/coordination/integration (but possibly not sufficient?)	Yes – CSG embraces varying perspectives – the CG & Navy did not seem prepared align perspectives and have poor communications

Deployment of technology-based capabilities to enhance acquisition practice.



Science

Exploring and understanding the underlying phenomena at the theoretical and conceptual levels.

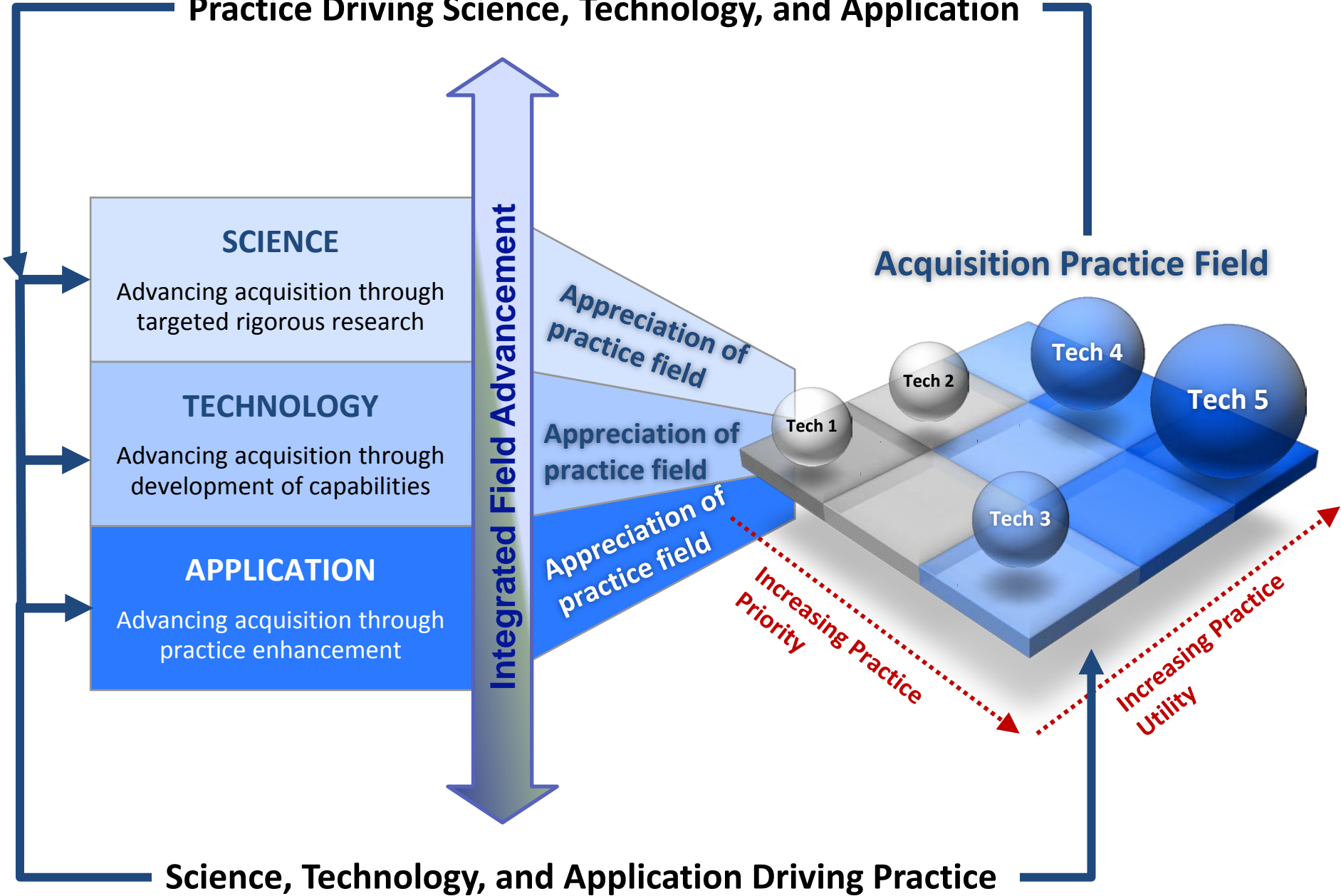
**Enhancing
Acquisition
Capabilities
& Practice**

Application

Technologies

Development of science-based implements to support enhanced capabilities that promote improved practice.

Practice Driving Science, Technology, and Application



Science, Technology, and Application Driving Practice

Where do we go from here?



01

From CSG perspective, map the current state and pathologies in the acquisition governance system

02

Explore application of CSG system science for acquisition system governance

03

Identify existing and developmental acquisition technologies needed to address system pathologies

04

Preparation of applications of CSG technologies for deployment in the field

05

Engage the acquisition practice field to meter CSG developmental priorities across science, technology, and application thrusts

Questions??

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