

Department of the Air Force

Integrity - Service - Excellence

Mission Engineering and the DAF Operational Imperatives



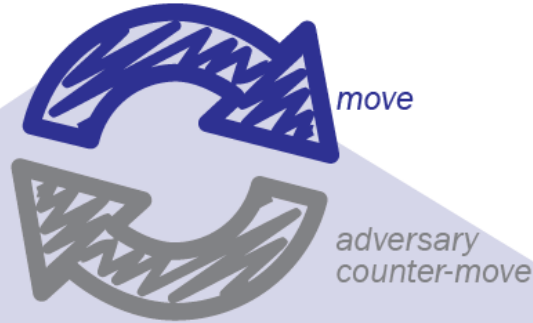
Dr. Timothy Grayson
Special Assistant to the Secretary of the Air Force
1 November 2022



Development of new military concepts must take a mission-centric approach

goal of modernization:

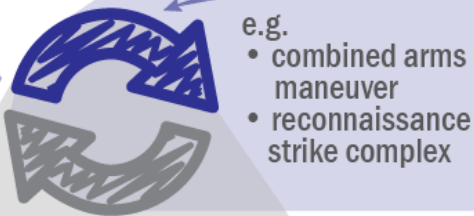
WIN
THE ENDURING
COMPETITION OF
MILITARY SUPERIORITY
(competition of competitions)



PAST & PROVEN PRESENT FUTURE & UNKNOWN

doctrine
tactics
personnel
process
partnerships

WARFIGHTING CONSTRUCT COMPETITIONS



- e.g.
- combined arms maneuver
 - reconnaissance strike complex



- e.g.
- mosaic warfare (adaptive kill webs)
 - cyber warfare



- e.g.
- bio-warfare
 - yet-to-be-invented

TECHNOLOGY COMPETITIONS



communication & counter arms & armor stealth & detection



hypersonics & counter cyber offense/defense spectrum dominance



artificial intelligence & counter bio-engineering yet-to-be-realized



DAF Operational Imperatives

- **Defining Resilient Space Order of Battle and Architectures.**
- **Achieving Operationally-Optimized Advanced Battle Management System (ABMS) / Air Force Joint All Domain Command and Control.**
- **Achieving Moving Target Indication and Tracking at Scale.**
- **Defining the Next Generation Air Dominance Family of Systems.**
- **Defining Optimized Resilient Basing, Sustainment, and Communications in a Contested Environment.**
- **Defining the B-21 Long Range Strike Family of Systems.**
- **Ensure the Ability of the DAF to Transition to a Wartime Posture Against a Peer Competitor.**



Adaptive System of Systems drive the need for Mission Engineering



System of Systems (SoS) delivers lethality by busting the use of only monolithic platforms and networks



Distribution A: Approved for Public Release, Distribution Unlimited



Implementing Scales of Integration

Govt (buyer) as Integrator

Traditional PEO,
current ABMS

Approach

- One or more program offices acquire individual elements of a SoS as a collection of stand-alone programs
- In-house engineers attempt to integrate based upon common standards

Outcome

- Reference architecture limiting and burdensome
- Results in interoperability challenges and loose integration at best



Implementing Scales of Integration

Large System Integrator

Army FCS, AOC
10.2, JMS

Approach

- Large RFP for highly specified full system of systems
- Single award (usually to large prime) to implement as a major platform program

Outcome

- Not aware of any successful examples
- SoS is too complex to system engineer in detail
- Loses flexibility to adapt to mission need
- Unnecessary overhead for little added value

Govt (buyer) as Integrator

Traditional PEO,
current ABMS

Approach

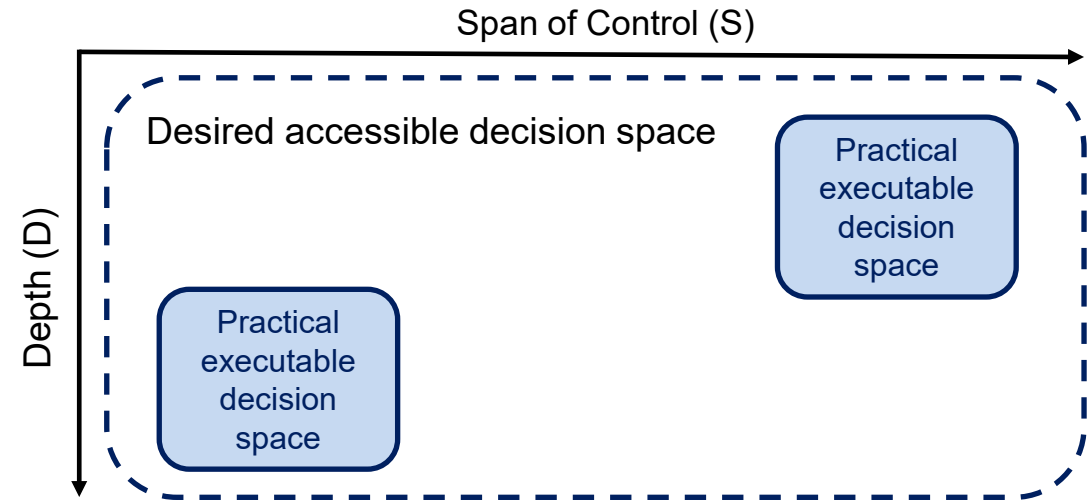
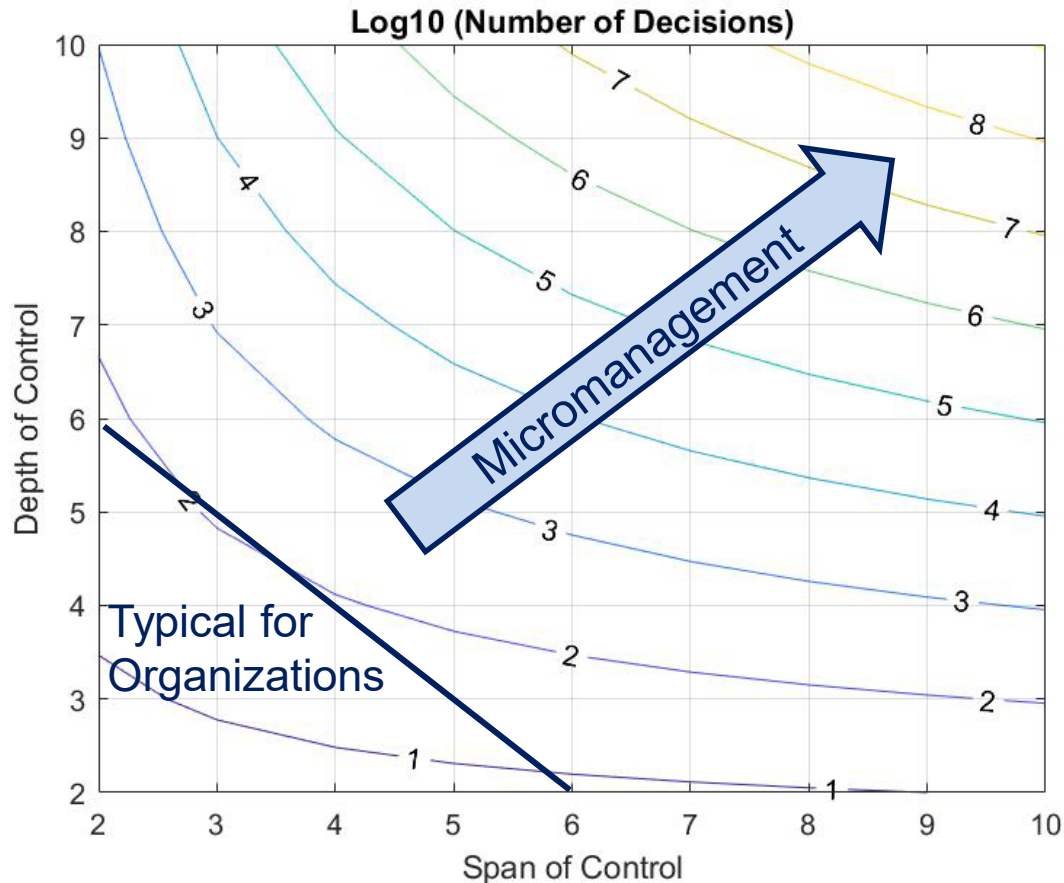
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Maximizing options while minimizing complexity



Challenge: How to provide the greatest range of options while managing complexity of decision making (for humans and AI)?



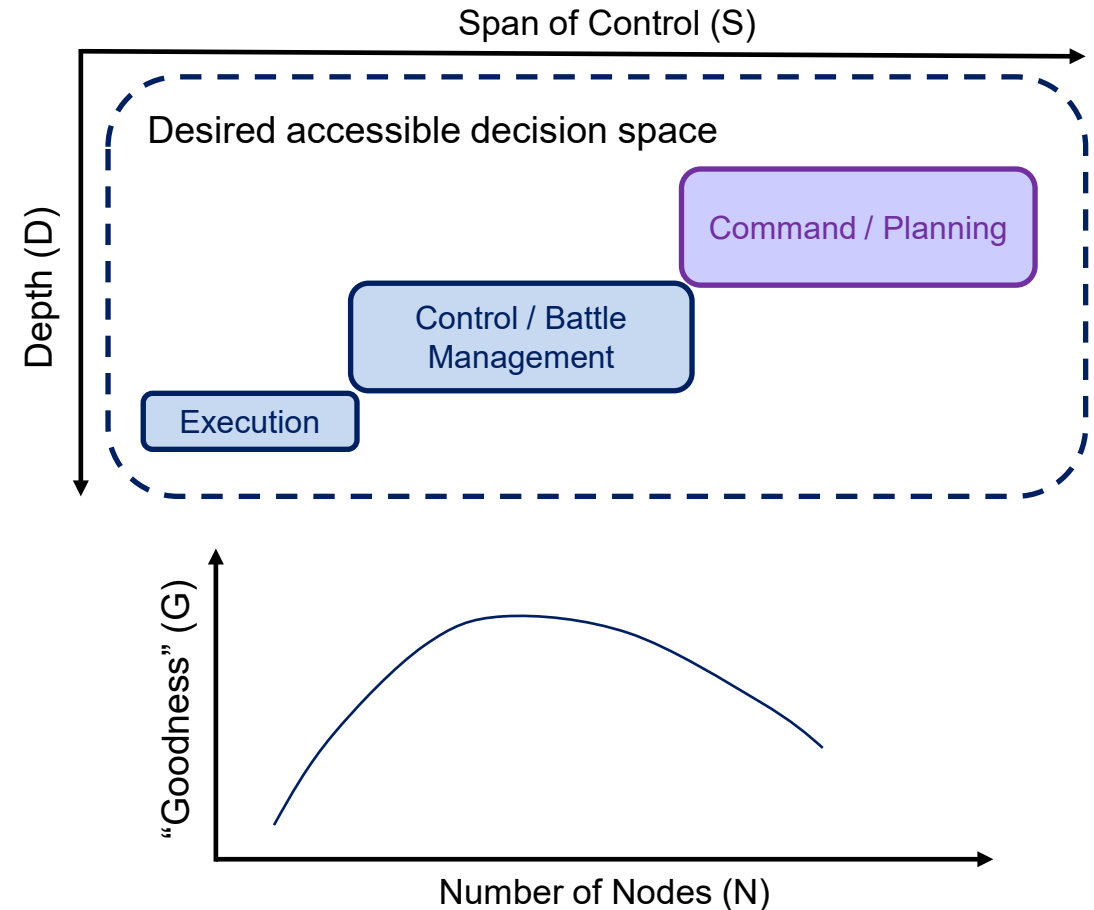
DAF Operational Imperatives #2: Operationally-Optimized Advanced Battle Management System (ABMS) / Air Force Joint All Domain Command and Control (JADC2)

Approach: Create Separability of Command from Control, Distributed Battle Management

Objectives:

- *Speed* – Must manage complexity
- *Agility* – Must maintain interoperability
- *Resilience* – Must maintain redundancy

Can start Mission-specific in order to build up to large-scale jointness





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“lite System Integrator”

Likely sweet spot for ABMS

C2S/C2E
STITCHES

Approach

- General requirement to engineering services contractor to build platform, integrate tools, and scale
- My bring mix of own and external IP

Outcome

- Commercial-like model
- Taps industry expertise to develop platform and workflow for efficiency
- Risk of vendor lock

Govt (builder) as Integrator

NSDC
Overmatch

Approach

- Technically empowered program office builds platform, buys individual tools, and integrates
- Govt reference architecture, in-house contractors, tool consortia

Outcome

- Agility in selecting tools and adapting/scaling platform
- Can tailor to current mission and operator need (DevOps)
- Avoids vendor lock, but also potentially limited in marketplace and tool sophistication

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