ACQUISITION INNOVATION RESEARCH CENTER

Innovative, Data-Enabled Acquisition Strategy (IDEAS)

Concepts for Driving the Digital Transformation of Defense Acquisition

EXECUTIVE SUMMARY AND REPORT

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ACRONYMS AND ABBREVIATIONS

A	Acquisition
A&S	Acquisition and Sustainment
ACAT	Acquisition Category
Advana	Advance Analytics
AE	Acquisition Enablers [within OUSD(A&S)]
AIR	Acquisition Information Repository
AIRC	Acquisition Innovation Research Center
AoA	Analysis of Alternatives
API	Application programming interface
ARLIS	Applied Research Laboratory for Intelligence and Security
AVSG	Acquisition Visibility Steering Group
CAC	Common Access Card
CDAO	Chief Data and Artificial Intelligence Officer
CIO	Chief Information Officer
CUI	Controlled Unclassified Information
DASD	Deputy Assistant Secretary of Defense
DASD(AE)	Deputy Assistant Secretary of Defense for Acquisition Enablers
DAVE	Defense Acquisition Visibility Environment
DE	Digital Engineering
Dir (AIRC)	Director AIRC
DoD	Department of Defense
DoDD	Department of Defense Directive
DPC	Defense Pricing and Contracts
DSD	Deputy Secretary of Defense
EV	Earned value
EVM-CR	Earned-Value Management—Central Repository
FFRDC	Federally Funded Research and Development Center
FOC	Full Operational Capability
FY	Fiscal year
GAO	Government Accountability Office

HCI	Human Capital Initiative
IAPRs	Integrated Acquisition Portfolio Reviews
IDEAS	Innovative, Data-Enabled Acquisition Strategy
IOC	Initial Operational Capability
IP	Intellectual Property
KPPs	Key performance parameters
KSAs	Key system attributes
ME	Mission Engineering
MVCR	Minimum viable capability release
O&S	Operations and support
OGC	Office of the General Counsel
OSD	Office of the Secretary of Defense
OUSD	Office of the Under Secretary of Defense
PDASD	Principal Deputy Secretary of Defense
PfM	Portfolio management
PM	Program Manager
PMRT	Project Management Resource Tools
PROPIN	Proprietary information
R&E	Research and Engineering
RDAIS	Research, Development, and Acquisition Information System
RDT&E	Research, Development, Test, and Evaluation
S	Sustainment
SAE	Service Acquisition Executive
SARs	Selected Acquisition Reports
SD	Secretary of Defense
SETA	Systems engineering and technical assistance
UARC	University Affiliated Research Center
USD	Under Secretary of Defense
USD(A&S)	Under Secretary of Defense for Acquisition and Sustainment

EXECUTIVE SUMMARY

INNOVATIVE, DATA-ENABLED ACQUISITION STRATEGY (IDEAS): CONCEPTS FOR DRIVING THE DIGITAL TRANSFORMATION OF DEFENSE ACQUISITION

The Department of Defense (DoD) is pursuing defense acquisition system innovations to improve acquisition speed and outcomes given rapidly changing threats, technologies, and business models. A key enabler of such innovation is the digital transformation of acquisition and sustainment processes.

This report lays out a strategy, guiding principles, and a series of recommendations for a DoD *Innovative, Data-Enabled Acquisition Strategy* (IDEAS). As a first step in a living strategy, this document identifies insights, ideas, and concepts from academia, the DoD, and the commercial sector on how the DoD might evolve and improve acquisition execution and outcomes. IDEAS uses four interrelated strategic facets to identify and manage initiatives to improve acquisition outcomes through better use of acquisition data, as illustrated in Figure 1.

- **Information.** Improve secure data, knowledge and insight flows across DoD, industry and academia to inform, improve and accelerate acquisition functions, decisions and outcomes.
- **Acquisition Tools and Functions.** Support and improve acquisition tradecraft to improve processes and decisions for program managers (PMs), functional analysts, and leadership by leveraging information, models and commercial innovation.
- **Decision and Policy Tools.** Assess ideas and inform evidence-based decisions to improve policies and processes through models, test ranges and analytics.
- **People and Culture.** Incentivize and train agile, innovative and outcome-focused acquisition communities.

Of these four facets, information and people provide the basis for developing and applying tools to support acquisition and policy decisions, and should receive priority for implementation. It often takes a while to realize the benefits of workforce initiatives, but they will have an enduring, strategic impact.

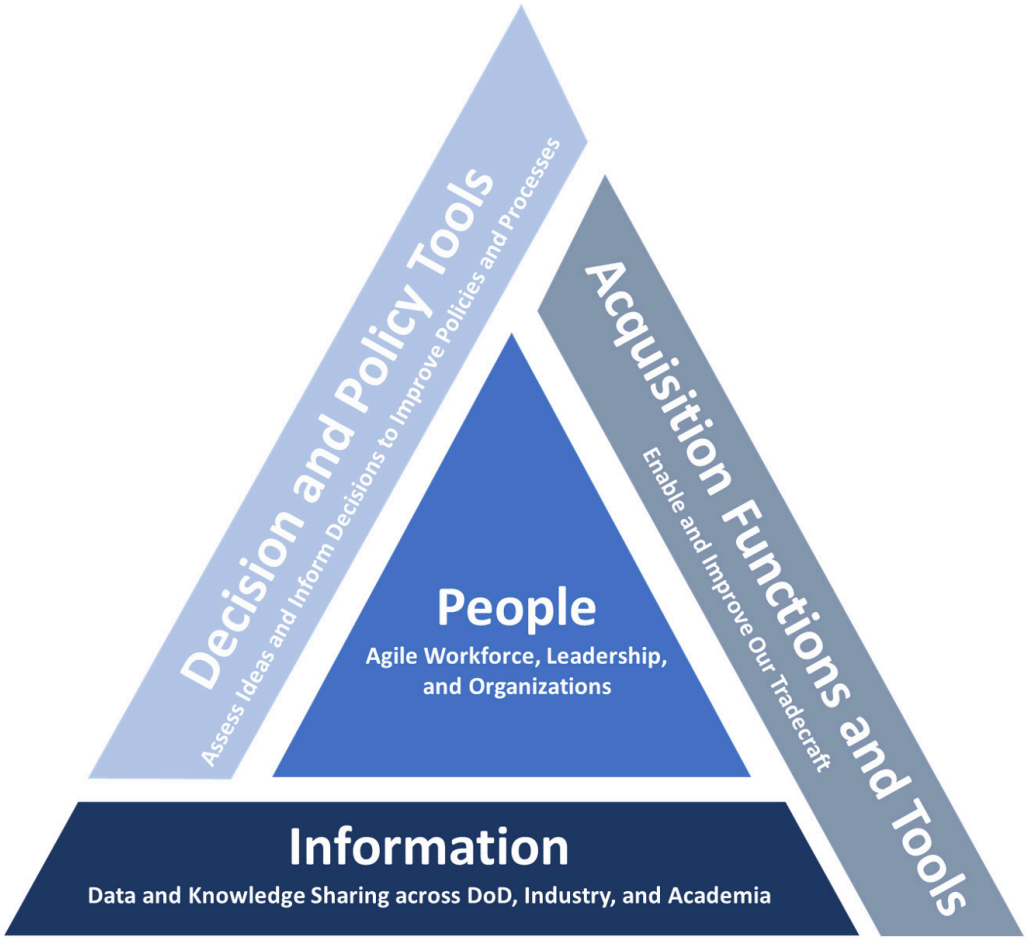

Figure 1: IDEAS Strategic Facets

The AIRC research team recommends that DoD pursue the following initiatives to implement the IDEAS strategy.

Information. DoD acquisition is largely an information-driven process. Acquisition functions consume and process information to generate knowledge to support acquisition decisions. Improving the availability and flow of acquisition data, with appropriate protections, will allow DoD to improve acquisition processes and make better acquisition decisions.

Recommendations to improve collection, governance and sharing of acquisition data, information and knowledge, listed in order of potential impact:

- Policy – IN1. Develop and implement policies to establish plans and track progress in making acquisition data readily available across *all* functional areas.
- Data Availability and Secure Use Pilots – IN2.
  - » Continue efforts to develop DARCIE[1] and improve methods for analysis of protected data.
  - » Continue efforts to improve acquisition data flows into the Advana[2] and DAVE[3] data analysis environments.
- Data Sharing Pilots – IN3.
  - » Continue efforts to improve data access by developing open application programming interfaces and bulk data downloads, publishing data dictionaries, and increasing use of trust platforms.
  - » Identify and pursue opportunities to improve data access, e.g., Controlled Unclassified Information (CUI) access for labs, University-Affiliated Research Centers (UARCs), Federally Funded Research and Development Centers (FFRDCs) and support contractors.
  - » Open account access with single sign-on.

[1] DARCIE – Defense Acquisition Research Collaboration and Innovation Environment.

[2] Advana – Advanced Analytics

[3] DAVE – Defense Acquisition Visibility Environment

Acquisition Functions and Tools. Many acquisition functions are needed to achieve successful outcomes. Improvements in the efficiency, quality and timeliness of individual functions and their interactions will yield improvements to the overall defense acquisition system.

Recommendations to improve acquisition tradecraft through more effective use of acquisition data include the following, listed in order of their potential impact:

- Improved Acquisition Outcomes – AFT1. Identify, prioritize and pursue efforts to improve acquisition outcomes through more effective use of acquisition data.
  - » Such efforts could include analysis of bid protests, debarment and the Fair Labor Standards Act, and pilot applications of BA-8 software appropriations.
- Digital Acquisition – AFT2. Leverage advances in digital engineering to set the foundation for digital acquisition
  - » e.g., digital twins of acquisition processes and systems
- Data and Analysis Tools – AFT3. Determine whether funding is needed for data and analysis tools to enable the workforce to realize the benefits of their "digital mindset" training.
- Agile Development and Delivery – AFT4. Continue to pursue efforts to adapt agile and DevSecOps commercial practices to DoD acquisition.

Decision and Policy Tools. As a knowledge-driven process, decisions are made throughout the defense acquisition system – at all levels and functions, by acquisition managers, oversight, leaders, and policymakers. Tools and approaches to improve decisions will improve the efficiency, quality, affordability, and timeliness of acquisition functions and processes, ultimately improving warfighter outcomes.

Recommendations to assess ideas and improve evidence-based decision-making, listed in order of potential impact:

- Digital Engineering Tools – DPT1. Develop and apply model-based analytic tools for mission engineering, portfolio management and requirements decisions.
- Streamline Requirements Process – DPT2. Continue efforts to model the requirements process, and assess commercial and foreign best practices for setting requirements.
- Intellectual Property (IP) – DPT3. Continue to develop better ways to store, track and manage IP to evaluate, price and negotiate IP in acquisitions.
- Policy Test Laboratories – DPT4. Continue developing simulation environments to perform policy analysis, uncover non-obvious relationships and provide actionable insight to decision-makers.
- Selected Acquisition Report (SAR) – DPT5. Continue efforts to update SAR content and structure to improve DoD and Congressional analyses, while minimizing the administrative burden.

People and Culture. People are key to an effective acquisition system. Improving workforce culture, incentives, education and training, and leadership will have a direct impact on acquisition outcomes. Workforce impediments, such as incentives that discourage agility and speed, must also be addressed.

Recommendations to improve workforce culture, incentives and training for managing acquisition data, listed in order of potential impact:

- Culture – PC1. Identify and pursue a set of potential short-term, process improvement wins to help establish culture of data-driven innovation in acquisition.
- Training – PC2. Provide classroom and online training to establish a "digital mindset." Provide rotational assignments for people to address acquisition challenges using advanced analytic techniques.
- Incentives – PC3. Continue pilot efforts to align workforce incentives to focus on acquisition outcomes vs. narrow functional performance objectives.
- Community – PC4. Continue using the DoD Acquisition Analytics Forum to help establish a culture of data-driven innovation in acquisition.
- Research – PC5. Continue efforts to develop intelligent tutoring and cognitive assistants, and game simulations for improved training.

Implementation Approach. To make progress against the four strategic facets, DoD should implement the recommendations detailed in the main body of the report. These recommendations address the most fundamental challenges first:

I. Incentives and Empowerment

II. Leveraging Communities Inside and Outside Acquisition

III. Improved Access

IV. Trust and Security

V. Innovation and Agility

VI. Metrics

VII. Incremental Progress and Iteration

Next Steps. The best course of action involves engaging stakeholders to increase awareness of the IDEAS recommendations, identifying organizations and representatives to form a cross-functional team and working group, and initiating plans to implement recommendations for I. Incentives and Empowerment, and II. Leveraging Communities Inside and Outside Acquisition.

INTRODUCTION

The Department of Defense (DoD) is pursuing innovation with the goal of improving acquisition speed and outcomes given rapidly changing threats, technologies, and business models. The digital transformation of acquisition processes is key enabler of such innovations.

This *Innovative, Data-Enabled Acquisition Strategy* (IDEAS) report lays out a strategy and guiding principles for DoD consideration. The strategy identifies insights from the DoD, academia, and industry regarding how the DoD can improve acquisition execution and outcomes. The IDEAS strategy guides the department on integrating specific approaches, pilots, and experiments to drive improvement in four broad thematic areas, which are characterized as strategic facets:

1. Information, data, and knowledge;
2. Acquisition functions and tradecraft;
3. Decision-making and analysis; and
4. Workforce culture, incentives and training.

IDEAS provides a vision to leverage and integrate applied pilots, experiments and other efforts, along with recommended implementation activities.

Strategic Approaches. The DoD recognizes the potential of data science and digital transformation to improve defense acquisition enterprise outcomes. This transformation involves creating digital versions of manual and paper-based acquisition functions, leveraging and analyzing authoritative sources of valid data, improving acquisition functions and tradecraft, enabling data-driven decision making and addressing the culture, workforce, and leadership challenges to achieve agility. This transformation is enabled by the underlying collection, curation, protection and analysis of DoD information and data. These data must be relevant to key stakeholder decisions across all acquisition functions and levels. Finally, IDEAS highlights policy, direction and investments required to make progress in implementing the strategy.

STRATEGIC NEEDS FOR TRANSFORMING DEFENSE ACQUISITION

The President's 2021 *Interim National Security Strategic Guidance* outlines necessary improvements in acquisition activities and outcomes. This guidance calls on the DoD to make the following specific improvements:

> *…streamline the processes for developing, testing, acquiring, deploying, and securing…cutting-edge technologies and capabilities that will determine our military and national security advantage in the future (p. 14)*
>
> *…ensure that we have the skilled workforce to acquire, integrate, and operate [these capabilities] (p. 14)*
>
> *…reform and rethink our agencies, departments, interagency processes (p. 22)*
>
> *…emphasize professional integrity, accountability, and transparency (p. 22)*

The strategic changes will improve the Department's ability to acquire the systems needed to defend the nation.

DATA DECREES IN THE DOD

To support digital acquisition and digital transformation, the acquisition community follows the five "DoD Data Decrees" from the Deputy Secretary of Defense's (DSD) "Creating Data Advantage" memorandum (DSD, 2021):

1. *Maximize data sharing and rights for data use: all DoD data [are] enterprise resource[s].*
2. *Publish data assets in the DoD federated data catalog along with common interface specifications, and a set of [application programming interfaces (APIs)]/services to allow industry to adapt data models for consumption.*
3. *Use automated data interfaces[4] that are externally accessible and machine-readable; ensure interfaces use industry-standard, non-proprietary, preferably open-source technologies, protocols, and payloads.*
4. *Store data in a manner that is platform and environment-agnostic, uncoupled from hardware or software dependencies.*
5. *Implement industry best practices for secure authentication, access management, encryption, monitoring, and protection of data at rest, in transit, and in use.*

More specifically, Under Secretary of Defense for Acquisition and Sustainment's (USD(A&S)) "Data Transparency to Enable Acquisition Pathways" memorandum (2020) clarified that:

> *…in support of the A&S Data and Analytics Strategy, the Services shall contribute and support all efforts to:*
>
> - *Identify common acquisition and sustainment data to facilitate DoD-wide analysis*
> - *Ensure that all data are available for consumption and extraction from relevant systems*
> - *Establish a forum to govern acquisition and sustainment data to ensure data transparency.*

These efforts are aligned with Section 1513 of the FY23 NDAA – Establishing Projects for Data Management, Artificial Intelligence and Digital Solutions, which codifies the DSD's five data decrees. These changes will provide the data and analysis needed for more effective acquisition across the Department.

SCOPE

This strategy addresses improvements to the full range and lifecycle of DoD acquisition activities, as well as the relationships with other communities in DoD, Congress, industry, and academia. The following definition by the DSD in DoD Directive (DoDD) 5135.02 clarifies the scope of acquisition in the DoD.

> ***Acquisition***
> *The conceptualization, initiation, design, development, test, contracting, production, deployment, integrated product support, modification, and disposal of weapons and other systems, supplies, or services (including construction) to satisfy DoD needs, intended for use in, or in support of, military missions.* DSD (2020a)

In IDEAS, the term "*acquisition*" includes the full lifecycle of capabilities, extending beyond initiation, development and production into sustainment and disposal.

[4] e.g., application programming interfaces (APIs)

DIGITAL ACQUISITION AS A TRANSFORMATIONAL CONCEPT

The overarching concept in IDEAS is the pursuit of digital acquisition. AIRC defines digital acquisition as follows:

> **Digital Acquisition**
> *The use of quality pervasive digital information, models, data, and analysis*
> *to empower cultural changes and innovation*
> *by improving acquisition workforce decisions, policies, functions, and processes*
> *to produce better and more timely outcomes and value for the warfighter.*

***Recommendation 1**: The DoD should adopt and publish a definition of Digital Acquisition along the lines specified above.*

Explicitly defining digital acquisition highlights the areas where digital acquisition can improve current processes. Many DoD processes and activities are manual, document-based and siloed. Digital acquisition shifts acquisition functions to become more interconnected, cross-functional, technology-enabled and information-sharing activities. This transition has the potential to significantly reduce redundancy, increase data flow, to improve transparency, decision making, affordability and the timely delivery of effective capabilities to the warfighter and supporting system operators. Digital acquisition integrates information technology advances within each acquisition function.

Digital acquisition includes not only data (numbers and text) but broader information models of various forms and analytic results. Beyond creating digital versions and sharing data to enable existing functions and processes, digital acquisition will also increase information content and modalities to enable improvements in acquisition functions and processes in fundamentally new ways. Such innovations should enable and be enabled by reshaping DoD's methods for information sharing, coordination and function. Such changes should reduce inefficiencies, enable better decisions, and improve tradecraft with a focus on outcomes and values that enable DoD operations and warfighting.

Digital acquisition faces several challenges that must be addressed. Notably, pervasive collection, sharing and access of quality information will require breaking down barriers while maintaining appropriate security controls. Moreover, the current practice of restricting information to address security, reduce misuse of data and minimizing the bureaucratic burden must be directly addressed if this transformation is to happen. Fortunately, recent technology solutions, such as algorithmic approaches to data privacy and zero trust architectures, can preserve appropriate security restrictions while ensuring that information is available when needed.

It is important to break down barriers to leveraging new technologies which would provide extraordinary opportunities to improve acquisition outcomes through digital transformation. Advances in data science and technology are mature and readily available from the commercial sector. Access to such advances would increase secure information sharing and improve analytic insight, providing localized and enterprise-wide benefits. Innovative approaches, such as model-based acquisition and incentives reengineering, are ready for application from academia and industry. Cultural barriers can be addressed by aligning incentives, addressing disincentives, and showing value to program managers (PMs), acquisition functional analysts, support staff, acquisition leaders and oversight stakeholders. Last, but not least, leadership support from the Secretary of Defense (SD) and DSD on down provides strategic direction necessary to implement this strategy.

Acquisition integrates a wide range of information, including the information listed in Table 1.

Table 1. Examples of Key Types of Acquisition Information

• Science and technology • Market data • Intelligence, providing: » Requirement considerations » Operational input feeds • Requirements • Budgetary • Program system performance, such as: » Programmatic cost, schedule and technical performance, reported through systems such as: ◊ Advana ◊ the Defense Acquisition Visibility Environment (DAVE) ◊ Air Force and Army's Project Management Resource Tools (PMRT) ◊ Navy's Research, Development, and Acquisition Information System (RDAIS) • Test and Evaluation (developmental and operational) • Operational feedback	• Industrial base » Market research • Contract management (e.g., Procure-to-Pay) • Engineering and system designs, models, interfaces, and architectures • Production process data • Intellectual Property • Sustainment, including: » Reliability » Maintenance • Logistics • Installations • Disposal

While each information type has its own communities and information stovepipes, the DoD could make information feeds available *across* domains to facilitate functional improvements and provide better insights into policy and process barriers. For example, the systems engineering field produces model-based designs that, if shared with the program and requirements communities, could form a basis for improved, faster, simulation-based exploration of alternative system concepts in an analysis of alternatives (AoA). Model-based designs could also be shared with the cost estimating community to generate more-informed cost estimates, which could be readily updated as the design model evolves over time.

Figure 2 illustrates many of the acquisition data dimensions, their uses, and how digital acquisition and data strategy, governance and architectures cut across these elements.

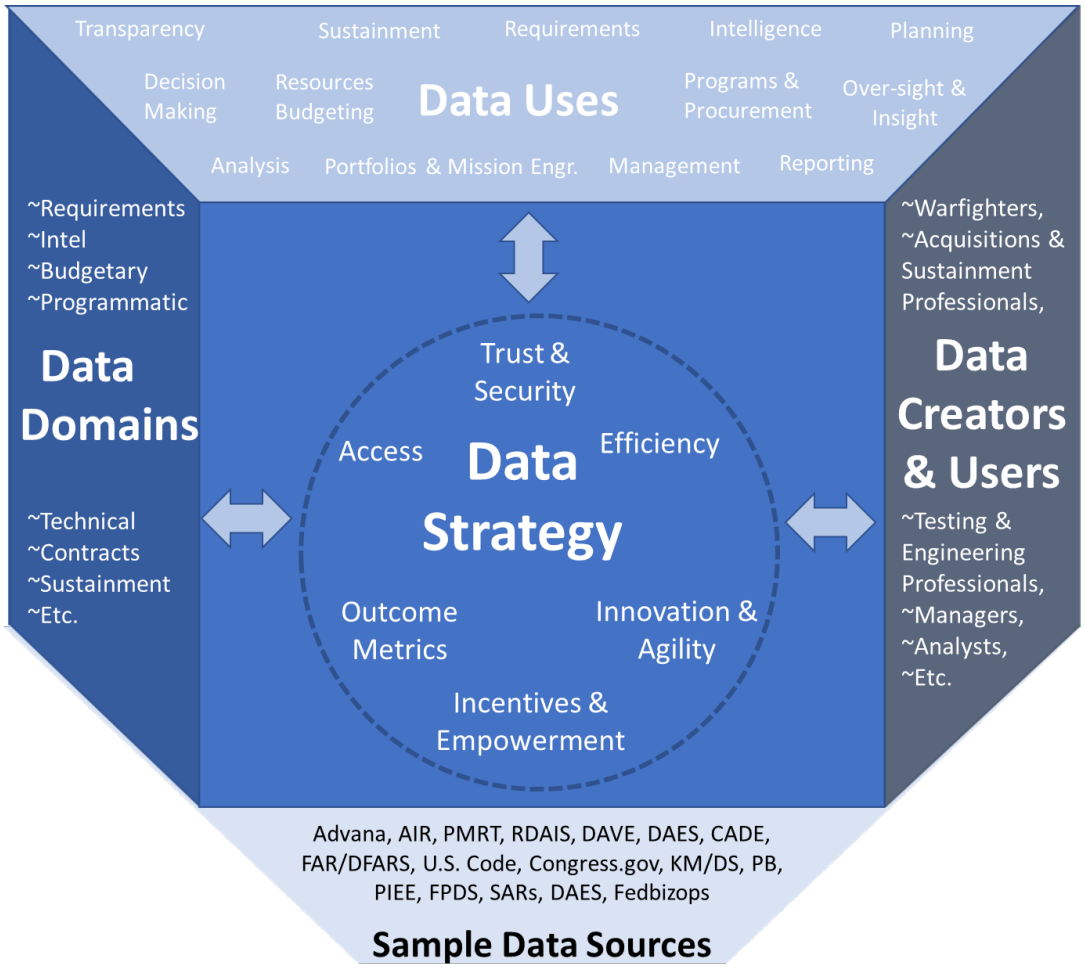

Figure 2: Conceptual Model of Acquisition Data Dimensions

Of note, the data domains related to acquisition inputs, stages and functions tend to have disjointed data sources, making it extremely difficult and inefficient to gain data-driven insights to improve inter- and intra-functional performance and decision-making. Table 2 shows how some of the common data sources and data-collection efforts focus on one or a few data domains but not all. Of course, it is impossible to have a single data source or data lake holding all DoD information, but efficient and relatively seamless cross-system access is necessary for improved acquisition outcomes. IDEAS seeks ways to improve such access.

Table 2. Examples of Data Sources for Key Acquisition Information Types

	Intelink	SIPRNet	Internet	KM/DS (SIPR)	Def. Innovation Marketplace	Advana	AIR	PMRT, RDAIS, DAES, SARs	CADE	Budget Exhibits	PIEE, SAM.gov, FPDS-NG	T&E databases	DCMA eTools	VAMOSC, LIMS-EV	HCI, DMDC, FedScope
Strategy, policy	X	X	X												
Threats, intelligence	X														
Requirements, priorities				X				X							
International cooperation, FMS										X	X				
Mission engineering, portfolios						?	X								
Risks, uncertainties								X							
Acquisition strategy, program information, business case							X	X							
S&T, R&D, IR&D			X		X										
System engineering, models															
Environmental factors, full cost of energy									?						
Industrial base, market research			X		X										
Source selection, contracts, audits, payments											X				
Budgetary, FM, obligations, expenditures						X				X					
Cost, schedule, and performance against baselines						?		X							
Architecture, interoperability, spectrum							X	X							
Test and evaluation, reliability, maintainability			X					X				X			
Security															
LRIP, EVM, production, quality, manufacturing (PQM)													X		
Actual costs								X	X	X	X				
Life-cycle operating and sustainment							X	X		X	X			X	
Disposal										X					
Workforce															X

NOTE: This is a preliminary list that illustrates general relationships. Further work would be necessary to verify specific entries.

Other approaches, examples and implementation options are discussed in the sections below.

STRATEGIC THEMATIC AREAS AND OBJECTIVES

Recommendation 2: *The Deputy Assistant Secretary of Defense for Acquisition Enablers (DASD(AE)) should pursue innovative information collection and access to address the four IDEAS facets.*

IDEAS identifies specific efforts to address these *key strategic thematic areas* and their related *objectives*:

- **Information.** Improve secure data, knowledge, and insight flows across DoD, industry and academia to inform, improve and accelerate acquisition functions, decisions and outcomes.
- **Acquisition Functions and Tools.** Support and improve acquisition tradecraft to improve functions and decisions for PM, functional analysts and leadership by leveraging information, models and commercial innovation.
- **Decision and Policy Tools.** Assess ideas and inform decisions to improve policies and processes through models, test ranges and analytics.
- **People and Culture:** Incentivize and train agile, innovative, and outcome-focused acquisition communities.

Table 3 maps the relationship between these thematic areas and objectives to the larger strategic role in meeting the goal of improving acquisition outcomes.

Figure 3: How Strategic Facets Drive Innovation into Defense Acquisition

These strategic facets have interdependencies and supporting relationships. Information and the related data are key elements in executing acquisition functions, and provide support for decision-making and tool development. Also, people and culture are at the center of information and data management, acquisition functions and decision-making. Figure 4 illustrates these relationships.

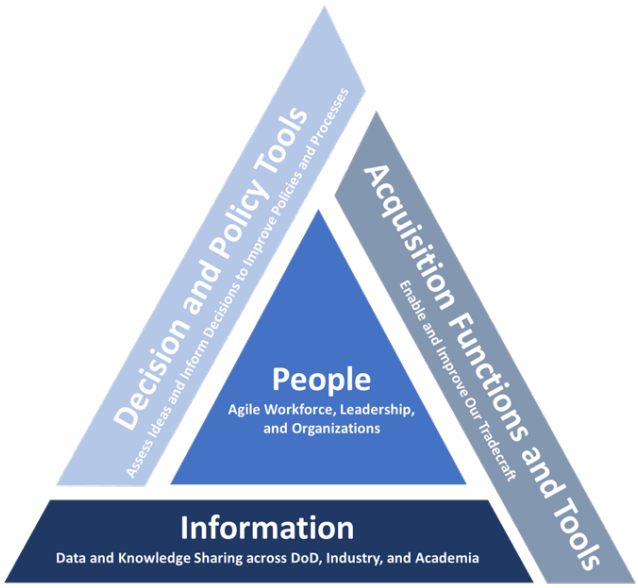

Figure 4: Relationships between the Strategic Facets

Figure 5 offers an example of how the information and data area involve data governance and flows that support functions such as business intelligence and data analytics to inform decision-making and acquisition function execution.

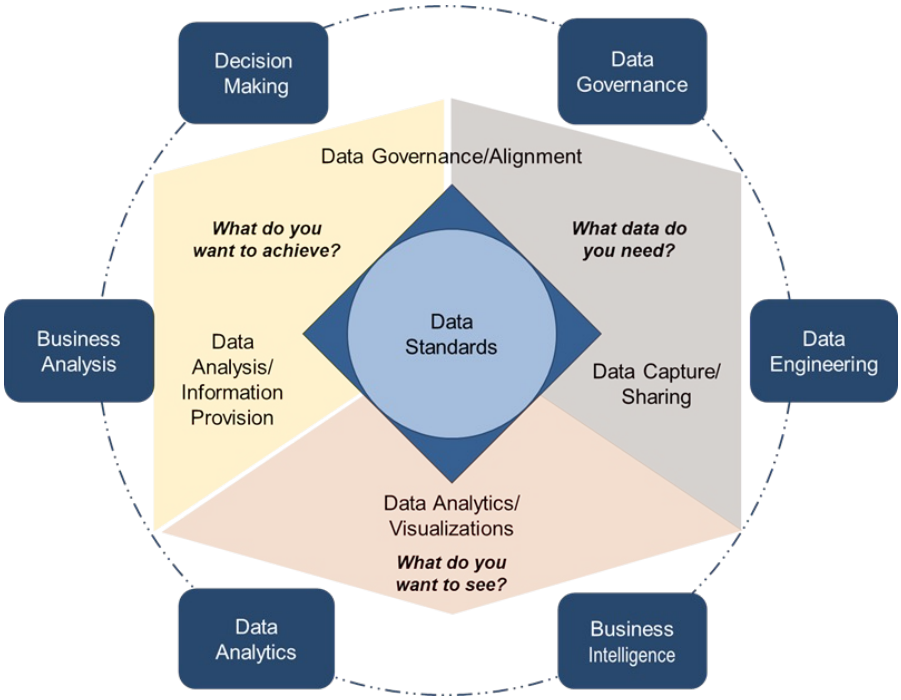

Figure 5: DoD System Elements that Deliver Acquisition Insights from Data

Table 3. Stratetic Facets, Objectives, and Contributions to Improved Acquisition Outcomes

Pillar	Objective	Contribution to Improving Acquisition Outcomes
Information	Improve secure data, knowledge, and insight flows across DoD, industry and academia to inform, improve and accelerate acquisition functions, decisions and outcomes.	DoD acquisition is largely an information-driven process. Acquisition functions consume, assess and process information to generate knowledge to support acquisition decisions. Improving information availability and flow, while preserving protections for proprietary and access-controlled data, will improve acquisition processes and decisions.
Acquisition Functions and Tools	Support and improve acquisition tradecraft to improve functions and decisions for PM, functional analysts and leadership by leveraging information, models and commercial innovation.	DoD acquisition consists of many functions that address specific aspects of acquisition. Improvements in the efficiency, quality and timeliness of individual functions and their interactions will improve the overall defense acquisition system —including functions executed by contractors and others outside DoD.
Decision and Policy Tools	Assess ideas and inform decisions to improve policies and processes through models, test ranges and analytics.	As a knowledge-driven process, decisions are made throughout the defense acquisition system — at all levels and functions, by managers, oversight, leaders and policymakers. Tools and approaches to improve decisions will improve the efficiency, quality, affordability and timeliness of acquisition functions and processes.
People and Culture	Incentivize and train agile, innovative and outcome-focused acquisition communities.	People are key to an effective acquisition system. Improving workforce culture, incentives, education and training, and leadership have a direct impact on acquisition outcomes. Workforce impediments must also be addressed, such as incentives that discourage agility and speed for DoD employees as well as support contractors.

These strategic facets should be supported not only by technical domains, such as data science and engineering, but by the broader disciplines of management, business, law, public policy, human factors and education (see Figure 3).

STRATEGIC APPROACHES

To make progress and achieve real effects in the four strategic facets discussed above, the DoD should pursue specific actions in the following strategic approaches to motivate and implement change. These actions are ordered with the more fundamental, and challenging, approaches first:

I. Incentives and Empowerment
II. Innovation and Agility
III. Trust and Security
IV. Improved Access
V. Leveraging Communities Inside and Outside Acquisition
VI. Metrics
VII. Incremental Progress and Iteration

I. INCENTIVES AND EMPOWERMENT

Legacy sectors are structured to resist or block innovations that radically change or disrupt their model. Without a forcing function, the DoD functions as a legacy sector, innovating in ways that align existing incentives which drive conservative behavior and hamper transformation, sharing and agility. Compliance with laws, regulations, and policies—coupled with significant disincentives including oversight, auditing, blame and risk-intolerant promotion criteria—reinforce these behaviors. Staff are justifiably concerned that security and dissemination restrictions will not be addressed if they share information broadly. As a result, programs and functions historically experienced more hindrance rather than help when sharing problems.

A key IDEAS recommendation is to incentivize and empower ingenuity and innovation throughout the organizations:

Recommendation 3: *The DoD should directly study, pilot and institutionalize new incentives and empowerment structures to motivate and enable the Defense Acquisition Workforce to pursue innovative improvements in their local environments and functions.*

Recommend that DoD develop pilot projects in coordination with the Services to promote data sharing in high impact areas for the warfighter. Pilot projects could be incentivized via cost sharing from DASD(AE). These pilots would support IDEAS recommendations PC1 – Short-term wins, PC3 – Workforce incentives, and AFT1 – Improved acquisition outcomes. These efforts should focus on:

- **Contributions vital to address warfighter problems.** Make explicit connections between transformational efforts and real value for our warfighters on critical matters to motivate people across the DoD.
- **Modifying personal incentives to address larger operational warfighter outcomes.** Drive desired behaviors by mitigating disincentives, such as excessive audits and casting blame, and focusing personnel performance and promotion criteria with measures of agility, facilitation and warfighter outcomes.
    - » Desired behaviors include increased information sharing; seeking help addressing problems early; managing rather than avoiding risks; finding innovative ways to facilitate acquisition within existing policies; informing tradeoffs; seeking timely and useful rather than perfect solutions; avoiding negative side effects outside one's area of responsibility.

Also, recommend that DoD develop new tools and technology solutions to be disseminated to the Services and across OSD to promote data sharing. Tools should include novel methods of data privatization, new analysis modules to leverage data as well as access to secure environments. These tool and technology efforts support IDEAS recommendation AFT3 – Data and analysis tools, and IN3 – Data sharing pilots.

- **Clear barriers and provide tooling.** Transformation efforts must help clear the path of barriers to change and encourage the adoption of new approaches, including provision of IT and other tools for using new approaches.

II. LEVERAGED COMMUNITIES

Because the broad definition of *acquisition* involves more than just the DoD acquisition community and workforce, DoD should leverage, involve, engage and inform the following range of stakeholders and players to collaboratively improve acquisition outcomes. These efforts support IDEAS recommendations PC4 – Community, PC1 – Short-term wins, IN1 – Policy, and AFT1 – Improve acquisition outcomes:

- **DoD communities:** Engage the military, civilian and support contractors in all the DoD communities that inform and affect acquisition to:
  - ***Requirements.*** Understand priorities and requirements (time and capabilities) to address operational missions and threats while providing information on acquisition realities (timelines, technical maturity, costs).
  - ***Intelligence.*** Inform requirements through threat analysis and provide data streams for acquired systems.
  - ***Budgetary.*** Provide financial resources while establishing resource priorities.
  - ***Science and Technology.*** Inform research efforts while providing insight into technical maturity.
  - ***Research and Development.*** Develop systems to address operational mission requirements.
  - ***Test and Evaluation.*** Verify and validate that systems meet operational and technical requirements.
  - ***Acquisition.*** Engage all the functional disciplines across the acquisition community to inform the partner communities and execute the acquisitions.
  - ***Sustainment.*** Ensure adequate sustainment, logistics, training and disposal, driving needs into research and acquisition while informing requirements and budgetary implications of sustaining capabilities.

- **Congress.** Jointly involve and inform decisions and oversight through the request, Authorize, Appropriate, and inform processes.
- **Industry.** Engage not only the immediate defense industry primes and major subcontractors but the full commercial innovation and production sectors as well as appropriate allied foreign capabilities.
- **DoD Labs, FFRDCs, & UARCs.** Play to the strengths and roles of these supporting organizations to improving and executing acquisition.
- **Academia.** Engage and apply existing and evolving theories and best practice across not only technical disciplines (data science and analytics; engineering; statistics) but also non-technical disciplines (e.g., public policy; law; management; economics; organizational theory; operations research).

Recommendation 4: *DoD convene a cross-functional team or working group to establish pilot programs in digital transformation that engage stakeholders from across relevant defense communities.*

III. IMPROVED ACCESS

Streamlined Access. Barriers to information access across DoD functional domains lead to inefficient operations. Table 2 illustrates how data sources are focused on specific functional domains, but access to these sources is difficult to personnel outside those domains. Access requires a multitude of individual requests and sign-ons, even for DoD employees. These efforts support IDEAS recommendations IN1 – Policy, IN2 – Data availability and secure use pilots, and IN3 – Data sharing pilots.

Recommendation 5: *The DoD should grant access by default to the largest population allowed by law and regulation rather than restricting it to specific functional groups.* For example, all proprietary information, e.g., contracts, designs, earned value and other cost data, is legally sharable to any government employee or official, so all such information should be routinely shared across the military departments.

Recommendation 6: *DoD should pursue common commercial practices and automatically enable streamlined accounts and access across multiple systems.* This effort could be facilitated through single sign-on and CAC-enabled account requests rather than continuing to use manual requests and approval processes for major categories of individuals, e.g., DoD employees, support contractors, prime contractors, FFRDCs and UARCs. Combined with broad default access in Recommendation 6, automatic access and single sign-on across DoD systems could greatly improve operational efficiency by ensuring quick access to information and data as needed.

Expanded CUI Access for Supporting Contractors. The DoD also has several types of organizations that support internal government operations, including systems engineering and technical assistance (SETA) and other support contractors, non-governmental employees at DoD labs, FFRDCs and UARCs. The effectiveness of this DoD staffing model of mixed organic and outsourced support hinges on assured access to proprietary and other sensitive information; however, access is often restricted. Recommend that DoD continue to explore mechanisms, such as the prior pilot established by Section 235 of the fiscal year (FY) 2017 National Defense Authorization Act (Public Law 114-328), that legally expanded access while ensuring confidentiality and protection of the information. Additionally, different organizations across the DoD use different types of non-disclosure agreements for access to CUI information, creating some inefficiencies in granting access.

Recommendation 7: *The DoD should improve access by standardizing NDAs for access to CUI information.*

IV. ESTABLISHING TRUST AND ENSURING SECURITY

Transformation is ultimately a *trust problem*—not a data or technical problem. Without trust, organizations and individuals are likely to resist change when they have low confidence that others will use their information in a helpful and appropriate way and/or a belief that new approaches may not sufficiently address their functional objectives.

Trust must address at least seven dimensions:

- Missions and functions
- Technical
- Security
- Financial
- Regulatory
- Liability
- Contractual

Trust is often harder to address in the last four dimensions. Regardless of difficulty, each dimension has the potential to hamper or stall efforts to cooperate, share information and innovate. These efforts address IDEAS recommendations IN3 – Data sharing pilots, and IN2 – Data availability and secure use pilots.

Trust Platforms. Trust platforms are designed to address trust concerns and enable transformation.[5] Trust platforms enable data sharing across systems and organizations by providing security, provenance, accountability and auditability from an objective, trusted provider. Trust platforms are designed to meet larger objectives across functional domains and organizations by providing an efficient, common technical solution that addresses regulatory, liability, contractual and security concerns. Governance and assurance are key, and users must be protected from liability for participating in the trust platform. Moreover, the actionable insights generated from a trust platform also must be trustworthy to achieve the larger objective.

Efficient Security. The DoD should seek to ensure that information is protected appropriately while providing more efficient means for sharing and ensuring proper protection.

Recommend that DoD pursue ways to provide a common CUI environment for external researchers to achieve efficiencies and facilitate cross-organizational sharing and engagement rather than having each organization, company and university spend resources designing and implementing their own environments.

Recommendation 8: *The DoD should increase trust through establishment and use of trust platforms and secure environments.* The DoD has implemented a range of acquisition trust platforms within functional domains;[6] these and other trust platforms should be expanded to enable broader cross-functional sharing to improve defense acquisition outcomes.

[5] Karney, 2020 – C4MI Healthcare Trust Platform (medicalinteroperability.org)

[6] Examples include: Advancing Analytics (Advana), the Defense Acquisition Visibility Environment (DAVE) (osd.mil), the Acquisition Information Repository (AIR), the Cost Assessment Data Enterprise (CADE), the Federal Procurement Data System - Next Generation (fpds.gov), theand Logistics, Installations and Mission Support - Enterprise View (LIMS-EV), and others..

V. INNOVATION AND AGILITY

Incentives and empowerment are tools to enable innovation and agility within acquisition, its customers, and its enabling communities. While basic acquisition principles from decades past still hold true, the DoD should seek further innovation and techniques to improve tradecraft and enable the workforce to be more agile in its response to provide capabilities for warfighter needs. As discussed earlier, the use of models to improve the speed and quality of AoAs and cost estimates are examples. Digital acquisition could unleash the creativity of the acquisition workforce, enable out-of-the-box thinking, and create a "can-do" attitude for more rapid and agile acquisition.

Innovation and agility are promoted through digital models. Both business/cost models as well as platform behavioral models are critical. Digital models enable parametric estimating and data driven negotiations that can accelerate the acquisition cycle, through all tiers of a product lifecycle. This recommendation supports IDEAS recommendation ATF2 – Digital acquisition.

Recommendation 9: *Recommend that DoD investigate the benefits of modeling to improve innovation and agility.* Recommend that DoD conduct a pilot program leveraging digital engineering by sponsoring the development of digital business models in addition to platform behavioral models to demonstrate the value of modeling to support innovation and agility.

VI. OUTCOME METRICS

The DoD seeks improvements in acquiring capabilities "at the speed of relevance." However, without measures of progress towards this goal, it is difficult to understand how effective this objective is in practice and the degree to which the strategy and its implementation are making progress. This effort supports IDEAS recommendation ATF1 – Improved acquisition outcomes.

Recommendation 10: *The DoD should develop metrics to measure the short- and long-term success in achieving the goal of improving acquisition outcomes to address rapidly evolving threats.*

Short-Term Progress Metrics

Given the time involved in acquisition, many of the long-term outcome improvements will take years before the DoD sees results in the long-term metrics. Thus, individual efforts could define relevant measures of effectiveness for the activities they are addressing. Examples of such metrics may include the following:

- Length of time to execute a rigorous AoA.
- Average cycle time to award major contracts for Acquisition Category (ACAT) I programs.
- Time to initial minimum viable capability release (MVCR) for a software program relative to historical norms.

Short-term progress metrics are situation-specific and could be identified within individual initiatives.

Long-Term Outcome Metrics

Ultimately, the DoD must measure whether the quality and cost-effective capabilities are delivered "at the speed of relevance." The long-term outcome metrics generally consist of traditionally available cost/schedule/performance metrics for programs, but here we define their use to specifically address the goal of this strategy. The following metrics should be used to assess the combined progress of initiatives across acquisition functions and interfaces.

Threat-Relevant Acquisition Speeds. When assessing whether acquisition delivers capabilities on timelines *relevant to* mission operators, the DoD could track whether the capabilities meet the Initial Operational Capability (IOC) and Full Operational Capability (FOC) dates specified from the Requirements community, and how large any delays in schedule growth relative to IOC and FOC are realized.[7]

Performance Relevance. Speed is one thing; relevance of acquired capabilities is another. The DoD should measure relevance through the readily available data on whether acquired capabilities meet defined requirements—especially key performance parameters (KPPs) but also key system attributes (KSAs). While requirement objectives are stretch goals, the requirement thresholds must be met as a minimum to be relevant, especially for KPPs.

Also, to be relevant, acquisition must deliver the needed quantity of capabilities as designated by the Requirements community. Without sufficient quantity, the net effect on mission may be marginal, at best.

Execution. The third basic acquisition criteria in the cost/schedule/technical performance triad is *cost*. DoD should continue to measure cost growth for RDT&E, production, and operations and support (O&S) as a measure of execution performance. Best practices should continue to be employed, including (i) controlling for quantity when measuring growth in procurement, and (ii) adjusting for other changes in requirements, such as response to threats, or unforeseeable technical issues when measuring growth RDT&E, procurement, and O&S cost growth.

Value of Innovative Capabilities. When it comes to delivering innovative capabilities to the operational community, the value of such innovation and the associated mechanisms for bringing innovation from the defense and commercial sectors can be measured by how much and how many innovative concepts and systems are prioritized enough in the budgetary and requirements processes to obtain full funding. The DoD should develop novel new metrics to capture the value of innovative capabilities. Implementing such as metric, however, will require better tracking of early innovation funding, the quality of the results, and transition funding amounts.

Cumulative Flow. Digital transformation coupled with continuous integration and continuous delivery should increase the throughput of the DoD Acquisition process. The DoD should develop historical baseline values for cumulative flow and track improvements due to digital transformation.

[7] While these are logical metrics, they are not necessarily pure representations of threats and operational requirements and the degree to which acquisition could be accelerated (somehow) to improve the timeliness of the acquisition.

First, IOC and FOC dates should reflect the Requirements community's understanding not only of threat and operational realities, but realistic expectations based on factors such as technical maturity, budgetary priorities, and the speed at which acquisition and other related processes currently operate. This feedback to the Requirements community is a critical interface function.

Second, initial IOC and FOC dates may change because of unforeseen realities (e.g., technical maturity) or changes in the performance requirements from the Requirements community. In this case, not meeting the original IOC/FOC dates may not reflect failure to meet the larger goal.

Third, the goal for digital acquisition is to improve (in part) the timeliness of acquisition functions and processes. Thus, improvements in timeliness would (ideally) be reflected in meeting aggressive IOC and FOC dates that are closely align with operational needs or in beating those dates due to improvements.

VII. INCREMENTAL PROGRESS AND ITERATION

This strategy is a beginning—a step forward. Transformation of a major activity such as acquisition, with entrenched culture and incentives, takes time and endurance; therefore, a commitment to the challenge. DoD should tackle transforming acquisition a few steps at a time, building on and learning from prior steps. Also, digital acquisition and its implementation should be updated periodically to reflect lessons learned and new ideas. The current version of this strategy could tackle initial opportunities and could expand and evolve as finding emerge and resources allow.

Recommendation 11: *The DoD should implement pilot programs as identified in this strategy, capturing best iterative practices and lessons learned to determine which pilot efforts should be deployed broadly, and to update future DoD strategies for improving defense acquisition.*

SUMMARY OF IMPLEMENTATION PLAN VS. RECOMMENDATIONS

The table below lays out the recommended action from the strategy, in order of importance, against the actions of the implementation plan, which are sorted by progress against the high priority recommendations.

Table 4. Implementation Efforts vs. Recommendations

Highest Impact
Most Feasible (low-hanging fruit)
Continuing, ongoing efforts

	IN1. Policy	IN2. Data Availability/Secure Use Pilots	IN3. Data Sharing Pilots	PC1. Short-term Wins	PC2. Training	PC3. Incentives	PC4. Community	AFT1. Improved Acquisition	AFT2. Digital Acquisition	AFT3. Data and Analysis Tools	AFT4. Agile Development & Delivery	DPT1. Digital Engineering Tools	DPT2. Streamline Requirements Process	DPT3. Intellectual Property	DPT4. Policy Test Laboratories	DPT5. Selected Acquisition Report	PC5. Research
Incentives & Empowerment			X	X		X		X		X							
Leveraged Communities	X			X			X	X									
Improved Access	X	X	X														
Establishing Trust & Ensuring Security		X	X														
Innovation & Agility									X								
Outcome Metrics								X									
Incremental Progress & Iteration	--- Potentially Relevant to all Efforts ---																

VISION OF POTENTIAL DIRECTIONS

To provide concrete examples of how the strategic approaches can come together within the defense acquisition system, the following illustrates two concepts: document-based acquisition and model-based acquisition.

DOCUMENT-BASED ACQUISITION: CREATING DIGITAL VERSIONS OF CURRENT PRACTICES

Currently, the DoD is pursuing multiple efforts to improve storage, sharing, and access to digital artifacts within acquisition functions. These artifacts include a mix of structured and unstructured data along with electronic versions of acquisition documents. Databases are either being merged into Advana or are adding APIs to enable machine-to-machine direct access and extraction of data, such as contract management, rather than across domains.

Figure 6 illustrates the currently evolving document-driven acquisition system. The system involves both structured and unstructured data. Sharing and access are mixed and often labor intensive as information is collated into new formats. APIs and access controls are in mixed statuses, so reporting, processing, and analysis are a mix of automated and manual communications—often with fixed documents or reporting fields serving to communicate information or directives. For example, requirements are provided within approved documents rather than through direct communication between databases. Proposals are solicited through formal documents, and designs are mostly document-based. Cost estimates are produced using mixed access to individual data elements. Earned-value management (EVM) data are provided in fixed data formats. There have been advances in data storage and access, such as the EVM Central Repository of EVM data for larger acquisition programs, but report generation still remains labor intensive for PMs.

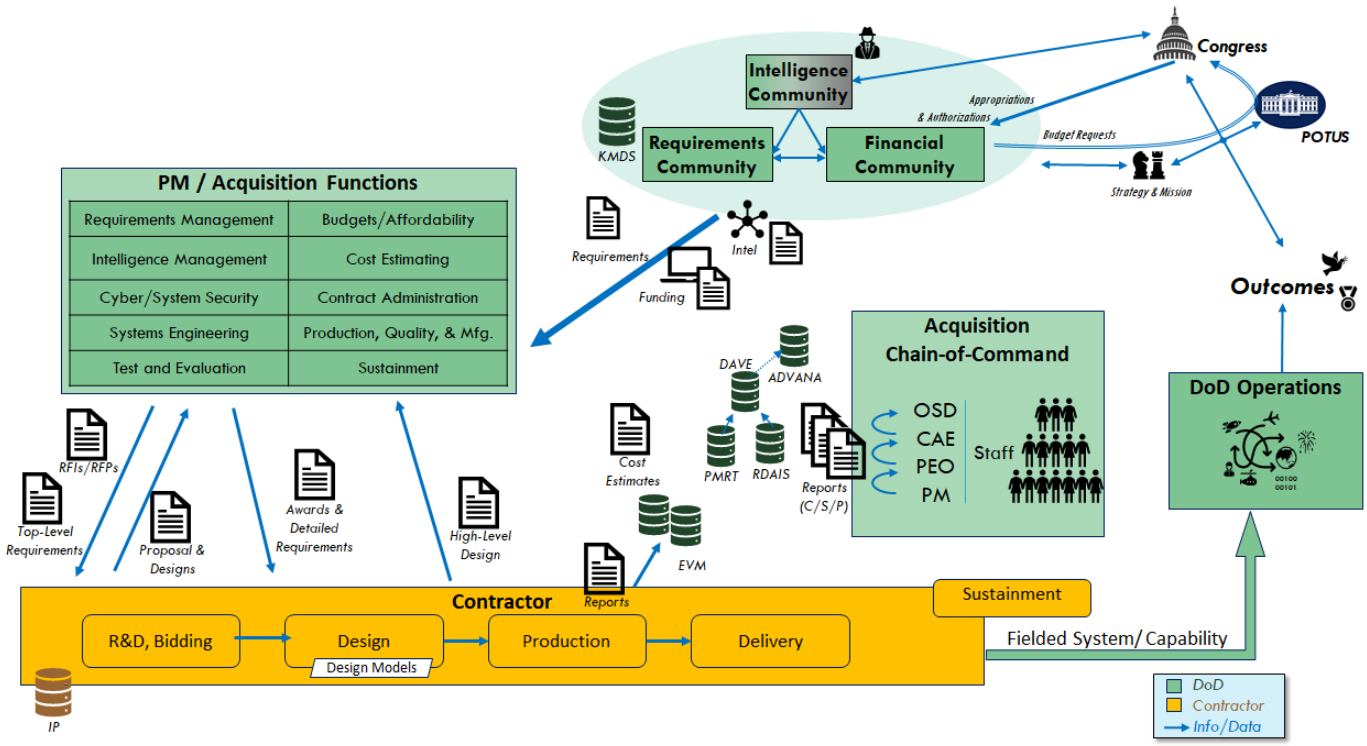

Figure 6: Document-Driven Acquisition

Efforts are underway to improve data sharing and analysis of these information elements, including the centralized collection of enterprise information into Advana and the trend to adding APIs and access permissions to databases. Challenges remain, however, including accesses across organizational information networks, security and insider threat concerns, and extramural analysts in DoD laboratories, FFRDCs, UARCs and other extramural analysts and support entities in academia and industry inability to access critical data.

In accordance with this strategy, the DoD should continue to pursue innovative improvements in data sharing and analysis. For example, the department could explore improved program management tool suites that streamline information to the PM, e.g., improved market research tools; direct access to DCMA insights on contractor production; direct access to the EVM Central Repository for EVM status reports. Such suites could also automate reports up the acquisition chain-of-command and reduce the burden of report generation (see the illustration in Figure 7).

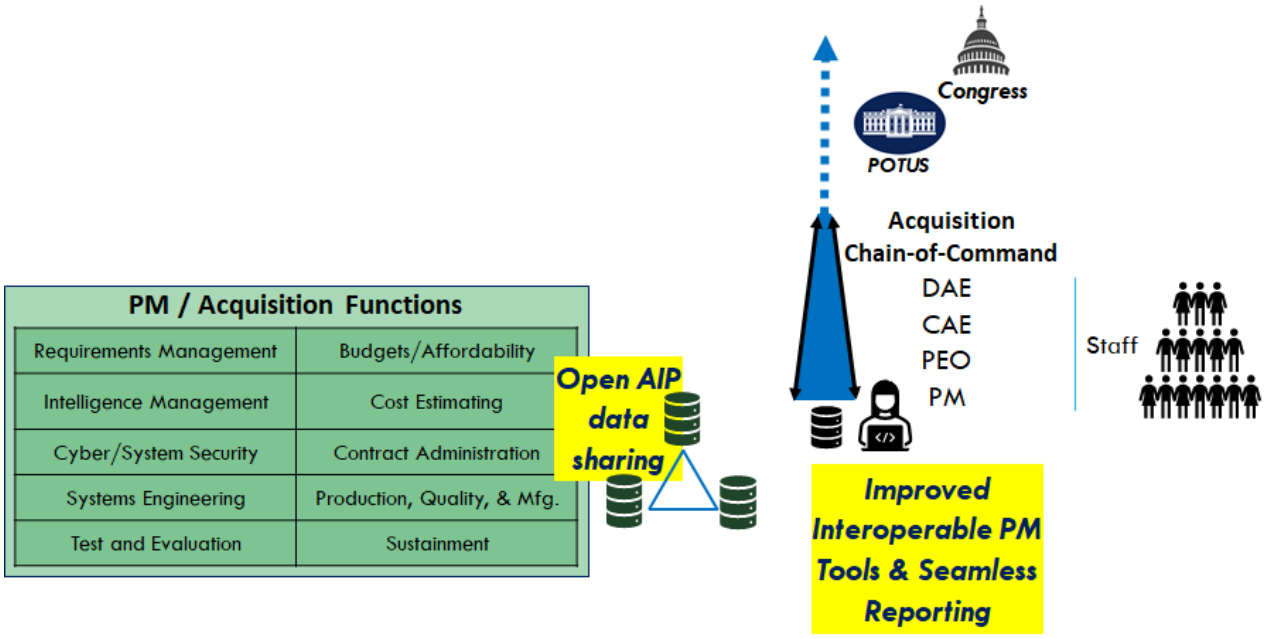

Figure 7: Improved, Seamless Data Sharing and Reporting

MODEL-BASED ACQUISITION: INTEGRATING AND IMPROVING ACQUISITION PRACTICES

Beyond the near-term efforts to further improve data sharing and analysis to better inform program management and oversight decisions, the DoD is also pursuing approaches to move beyond document and data-elements based practices to one based on models. Such models move beyond *descriptive* information, e.g., what the acquired capabilities can do, to a *functional* representation. These functional representations provide richer information for what the capabilities should be, i.e., requirements, to better inform source solicitations, contracts, and subsequent engineering designs. They should improve the communication back to the requirements community on issues and costs to better inform configuration steering board management and tradeoffs of requirements. Such models could facilitate a better understanding of the interactions between acquired systems from mission, portfolio and kill-chain/web perspectives. From an acquisition practices point of view, models can also provide richer information for cost estimating, budgeting, and resource tradeoffs.

Figure 8 illustrates how a model-based acquisition system might inform acquisition functions and processes as well as improved communication with the requirements and budgeting communities. Here the models of the systems to be acquired constitute "digital twins" that can more directly inform acquisition, sustainment, requirements, and budgeting practices and decision making. Models would also constitute improved information between the DoD and contracts to facilitate solicitation and contract requirements.

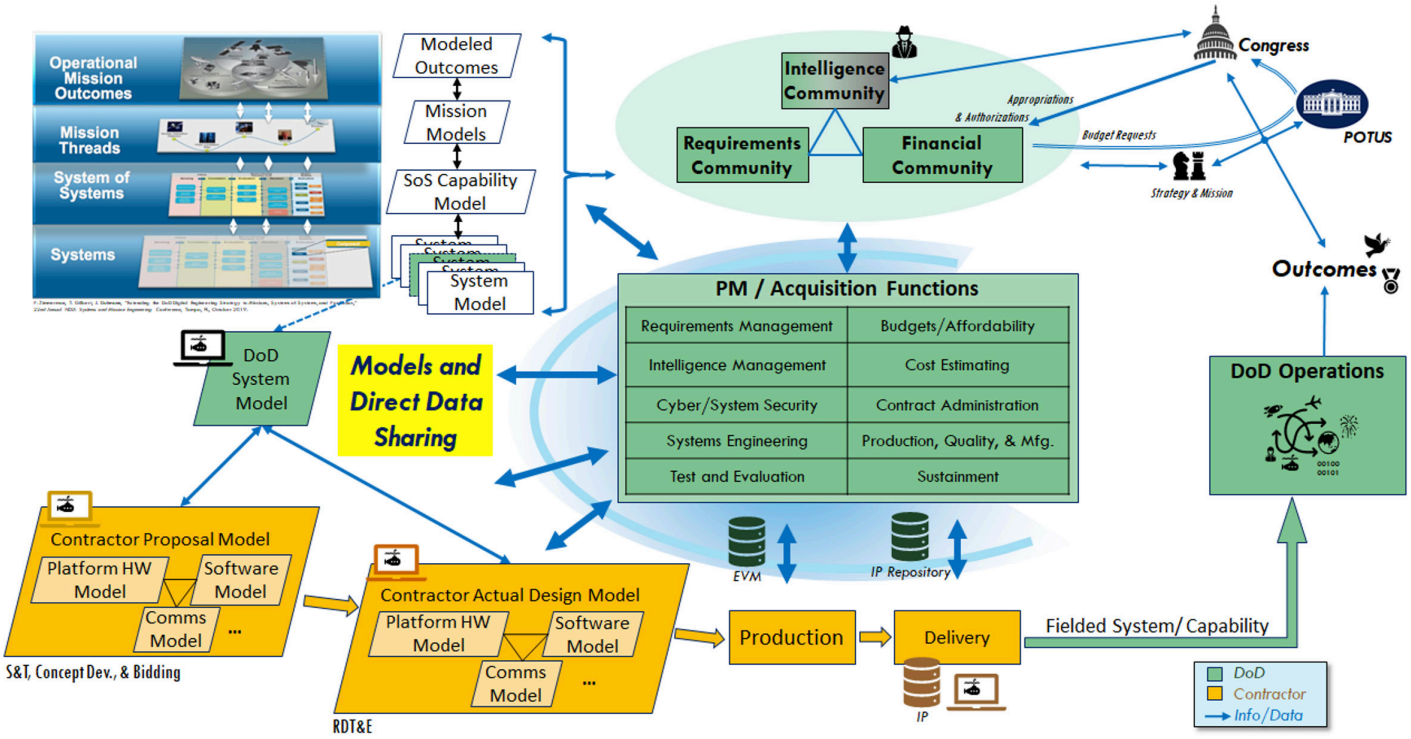

Figure 8: Model-Based Acquisition

IMPLEMENTATION LEADERSHIP: ROLES, RESPONSIBILITIES, AND ACTIONS

Table 5 outlines the key leadership elements to guide and implement the IDEAS recommendations including roles, responsibilities, and related actions.

Table 5. Leadership Elements of Digital Acquisition

Entity	Roles and Responsibilities	Actions
DASD(AE)*	• Provides leadership and guidance across acquisition functions and DoD components for the implementation of the strategy. • Develops a plan to implement the strategy.	• Issue implementation plan with a Plan of Action & Milestones (POA&M) by June 2022. • Report quarterly on the overall status of the strategy's implementation to USD(A&S), ASD(A), ASD(S), and the SAEs. • Host quarterly AVSG meetings to coordinate activities and raise issues related to data enablement and management. • Lead an update of the strategy in FY 2024.
OSD Chief Digital and Artificial Intelligence Office (CDAO)	• Issues policy, guidance, and support for data sharing/access, data architectures and standards, data lifecycle management, and a data ready workforce (ref. DSD Data Advantage memo, 2021)	• DASD(AE) should coordinate the IDEAS data activities with the OSD CDAO, leveraging the CDAO's broader activities, directions, and participation in the DoD Data Council.
Service Acquisition Executives and Senior Leaders	• Pilot, and implement transformations that they select based on their Service's needs and opportunities. • Ensure that transformations and advances in digital acquisition within their Services reflect their needs and issues.	• DASD(AE) should work with Service leadership to engage relevant functional and user communities with digital acquisition planning advisory boards, pilots, and experiments. • Based on their needs and decisions to engage, Service leadership issue policy, guidance, and support within their Service(s) for data sharing/access, data architectures and standards, data lifecycle management, and a data ready workforce.

Entity	Roles and Responsibilities	Actions
Acquisition functional leads[8]	• Pilot, and implement transformations that they select based on their functional domain's needs and opportunities. • Ensure that transformations and advances in digital acquisition reflect the needs and issues of their acquisition functional communities.	• DASD(AE) should work with relevant functional and user communities to reveal opportunities for pilots and experiments. • Based on their level of engagement, leads could issue policy, guidance, and support as they deem warranted based on the success of pilots and experiments.

*DASD(AE) = Deputy Assistant Secretary of Defense for Acquisition Enablers

[8] Deputy Director for Engineering, OUSD(R&E);
Director, Human Capital Initiative (HCI);
Director, Developmental Test, Evaluation, and Assessments (DTE&A), OUSD(R&E);
Director, Test Resource Management Center;
Director, Operational Test and Evaluation;
PDASD(Industrial Policy);
Principal Director, Defense Pricing and Contracting, OUSD(R&E);
Defense Contract Management Agency;
Defense Contract Audit Agency;
Executive Director, International Cooperation;
ASD(Sustainment);
Requirements community interfacing; and
Financial Management community interfacing.

IMPLEMENTATION OPTIONS

DASD(AE) is pursuing the following initiatives outlined in Figure 9 as initial applied steps in each of the key strategic thrust areas of Digital Acquisition Strategy. DASD(AE)'s strategic approach for implementation includes engaging Academia via the DoD's new Acquisition Innovation Research Center (AIRC) through its director within the Office of the DASD(AE).[9] DASD(AE) is also engaging relevant FFRDCs such as MITRE, IDA and RAND, as appropriate.

Future steps could be taken as the strategy evolves, findings emerge, and resources allow.

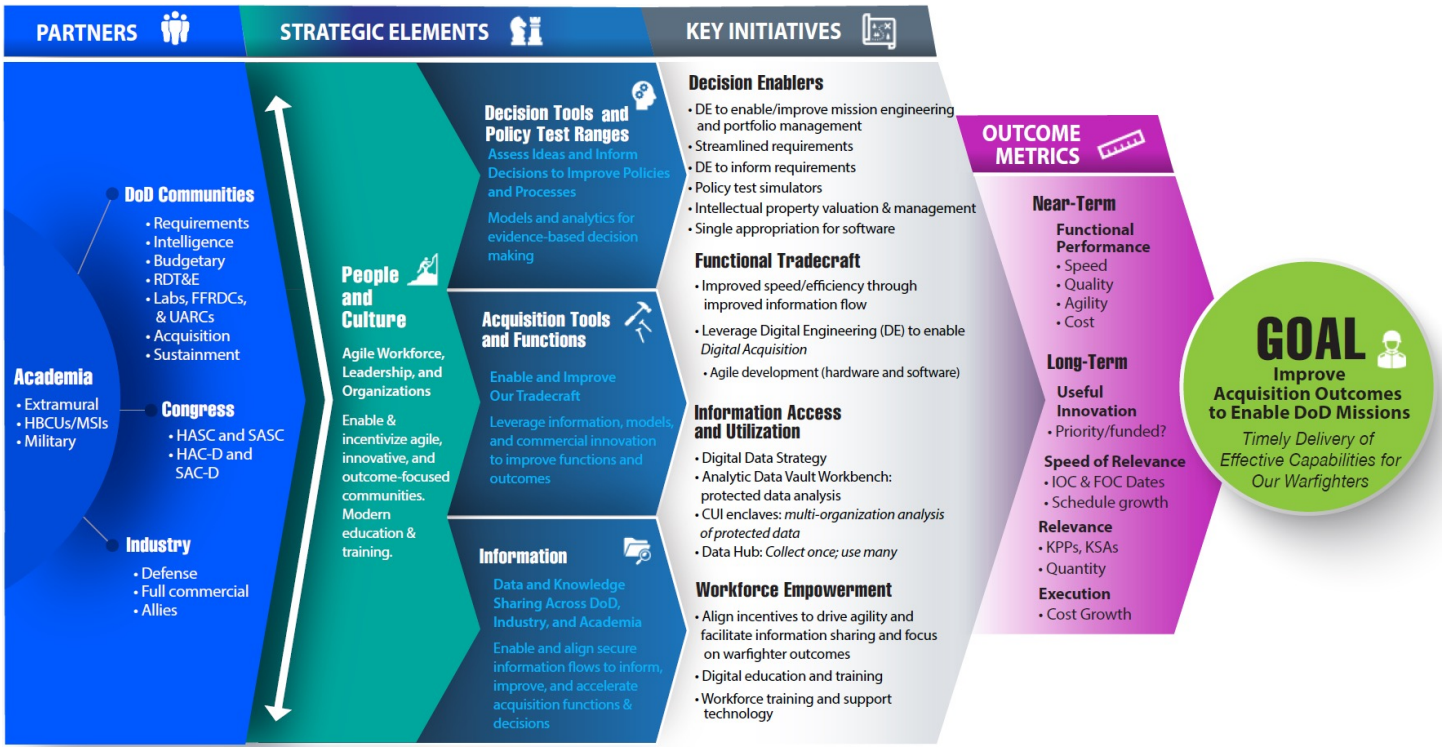

Figure 9: Overview of the Digital Acquisition Strategy Initiatives Led by DASD(AE)

[9] AIRC resides in the Systems Engineering Research Center (SERC) DoD University-Affiliated Research Center (UARC).

INFORMATION, DATA, AND KNOWLEDGE COLLECTION, GOVERNANCE, AND SHARING

The following activities could improve data, information and knowledge collection, governance, and sharing across DoD, industry and academia by facilitating secure information flows to inform, improve and accelerate acquisition functions and decisions.

CROSS-FUNCTIONAL KNOWLEDGE, INFORMATION, AND DATA COLLECT, MANAGEMENT, AND SHARE

Advances have been made within acquisition functional areas to manage and assess information; however, the knowledge, information, and data remain relatively stovepiped and inaccessible outside their functional areas.

As directed by the Deputy Secretary of Defense (DSD, 2021) and DoD Data Strategy (2020), DASD(AE) could seek to eliminate these barriers through open account access, open APIs to every database system, and open download capabilities for any government account.

- **Open Account Access with Single Sign-On.** Under this approach, any acquisition official (civilian or military) from anywhere in the DoD (within or across Services, agencies, or departments) would be granted an account with full access (no prior approval for individual databases) on any acquisition database immediately and automatically upon request. The request itself would constitute the need to know. If possible, such access would be established by fiscal year (FY) 2023.
  (Suggested Leads: DASD(AE), Acquisition Data & Analytics, OASD(A)/AE; Policy and Guidance: OSD and Service CIOs and CDAOs)

- **Expanded Legal Basis for CUI Access for Labs, FFRDCs, UARCs, and Other Supporting Contractors.** The DoD has several entities established to support internal government operations, including SETA and other support contractors, non-governmental employees at DoD labs, FFRDCs, and UARCs. The effectiveness of the staffing model of mixed organic and outsourced support within the DoD hinges on access for these entities to proprietary and other sensitive information on DoD approval and need-to-know. Currently, however, this access is generally prohibited for contractors and extramural researchers. The DoD could continue to explore mechanisms, such as the prior pilot established by Section 235 of the FY 2017 National Defense Authorization Act (Public Law 114-328), that legally expand access while ensuring confidentiality and protection of the information.
  (Suggested Leads: DASD(AE) in support of USD(A&S) and USD(R&E))

- **Open APIs.** Under this approach, every database would be accessible through an open API from any .mil user account with a CAC, including from IT systems outside the managing organization's firewall. Resources to add the APIs would be obtained from current IT budgets whenever possible. If possible, budgets could be established in the FY 2024 budget request for execution of API Initial Operational Capability (IOC) in FY24.
  (Suggested Leads: DASD(AE), Acquisition Data & Analytics, OASD(A)/AE; Policy and Guidance: OSD and Service CIOs and CDAOs with DASD(AE))

- **Open Download Capabilities.** Under this approach, any database or system user could bulk download data from the database from their user accounts in Excel, Access, or other formats, as appropriate. This capability could be sought within FY 2022 (objective) or FY 2023. This capability would be important to supplement the open API capabilities for those needing to assess across the data in these repositories.
  (Suggested Leads: DASD(AE), Acquisition Data & Analytics, OASD(A)/AE; Policy and Guidance: OSD and Service CIOs and CDAOs with DASD(AE))

- **Govern Data Standards and Definitions.** Critical, commonly used data, information, and models that are formally managed in databases should be governed by data standards and definitions. Examples include the Acquisition Visibility Data Framework (AVDF) for information available through OSD's DAVE, the Project Management Resource Tools (PMRT), and Research, Development, and Acquisition Information System (RDAIS). This effort could continue to expand these efforts to begin including the broader types of information and models envisioned in the digital transformation activities and opportunities (e.g., managing and sharing the models with digital engineering for use in Integrated Acquisition Portfolio Reviews [IAPRs] and acquisition functions such as cost estimating).
(Suggested Leads: DASD(AE), Acquisition Data & Analytics, OASD(A)/AE; Policy and Guidance: OSD and Service CIOs and CDAOs with DASD(AE))

- **Maximize Access through Broadest Security Policy Interpretations.** Within the availabilities and accesses defined above, security restrictions based on user status should remain active as per statute, regulation, and policy, but access should be granted to the maximum extent possible to facilitate DoD operational effectiveness. For example, proprietary information (PROPIN) is generally restricted to government officials unless appropriate non-disclosure agreements (NDAs) are in place; nevertheless, accesses to such information should be made available broadly to any government official.
(Suggested Leads: DASD(AE), Acquisition Data & Analytics, OASD(A)/AE; Each data system manager; OSD and Service CIOs and CDAOs with DASD(AE))

- **Increase trust through trust platforms and secure environments.** The DoD has implemented a range of acquisition trust platforms within functional domains. These and other trust platforms should be expanded to enable broader cross-functional sharing to improve defense acquisition outcomes.
(Suggested Leads: DASD(AE), Acquisition Data & Analytics, OASD(A)/AE; Each data system manager; OSD and Service CIOs and CDAOs with DASD(AE))

- **Extramural Data Hub.** AIRC could continue to seek improved access to date for extramural and intramural researchers and analysts by developing readily available references and collections of data. The objectives are to reduce data access barriers and redundancy of effort.
(Lead: DASD(AE), Acquisition Data & Analytics, supported by Dir, AIRC with Virginia Tech and the Stevens Institute of Technology)

- **Common CUI Enclave for External Analysts.** External analysts (e.g., from academia) that can legally access certain categories of CUI (e.g., U.S. Persons) without CACs and .mil computer accounts necessary to access CUI within DoD firewalls and data systems face barriers to conducting research for DoD sponsors. The DoD could pursue existing CUI enclaves (e.g., the Army Research Lab's CUI enclave and the University of Maryland's Applied Research Laboratory for Intelligence and Security (ARLIS) UARC CUI enclave) for scaling to provide a secure, partitionable access to, and shared processing of, CUI by external and internal analysts in support of analysis relevant to the DoD. Potential applications could include controlled access to selected CUI information for external oversight entities such as Congressional staffers and the U.S. Government Accountability Office (GAO).
(Leads: DASD(AE), Acquisition Data & Analytics, supported by Dir, AIRC with Virginia Tech and the Stevens Institute of Technology)

DASD(AE) could continue to pursue data science and analytics to improve decision making through the following strategic initiatives:

- **Common Access to Authoritative Programmatic Data.** Programmatic acquisition data feeds into DAVE and the Comptroller's Advana data and analysis environment could continue to be refined and managed.
  (Suggested Leads: DASD(AE), supported by the Principal Deputy Director, Acquisition Data & Analytics)

- **Utilize Analytic Tools and Prototypes from Academia and Industry.** As analytic layers in Advana are improved, DASD(AE) and others could leverage these commercial tools and best practices. Also, analysis modules could be prototyped for integrating information from disparate data sources (e.g., digital systems models and live, virtual, constructive environments) to inform acquisition outcomes.
  (Suggested Leads: DASD(AE), supported by the Principal Deputy Director, Acquisition Data & Analytics, and Dir, AIRC with Virginia Tech, the Stevens Institute of Technology, and the University of Maryland)

- **Analytic Tradecraft Collaboration.** The DoD Acquisition Analytics Forum, a community of acquisition analysts across the department, could continue to facilitate analysis and share approaches, lessons, metrics, and data literacy.
  (Suggested Leads: DASD(AE), supported by the Deputy Director for Data Analytics)

PROTOTYPES FOR FACILITATING DATA MANAGEMENT AND ACCESS

The following are initial prototypes to develop new approaches for facilitating data management, access, and analysis.

- **Analytic Data Vault Workbench: Pilot Methods for Protected Data Analysis.** This effort could prototype and apply technologies to existing and emerging DoD databases that analyze sensitive data in a secure environment to reveal non-sensitive insights without revealing sensitive details to analysts. Candidate approaches include differential privacy, federated learning, and "black box" analysis methods (using analysis tools to generate non-sensitive analytic insights without revealing sensitive details; see Figure 10). Potential applications could include (a) controlled access to selected CUI information for external oversight entities such as Congressional staffers and the GAO, and (b) expanded utilization of extramural data science capabilities using sensitive data.
  (Leads: DASD(AE), Acquisition Data & Analytics, supported by Dir, AIRC with Virginia Tech and the Stevens Institute of Technology)

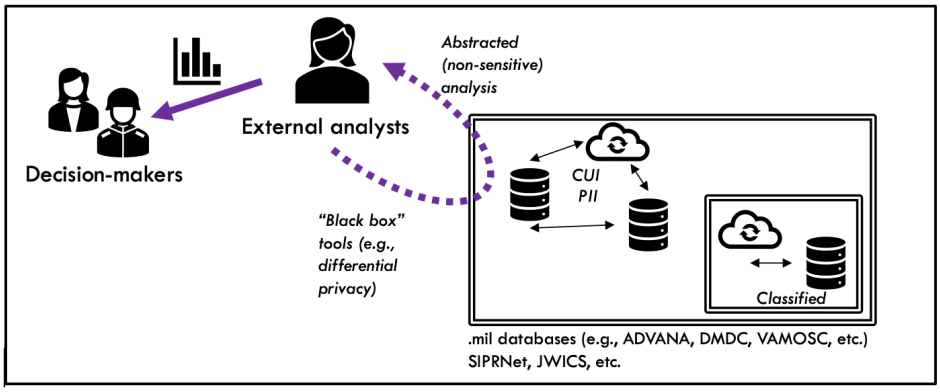

Figure 10: "Black Box" Analytic Engines

IMPLEMENTATION LEADERS, ROLES, RESPONSIBILITIES, AND ACTIONS

The success, implementation, and scaling of these pilots, experiments, and other applied efforts must involve the relevant functional communities and their leadership to ensure that the efforts are relevant, informed, and helpful. Table 6 outlines current key leadership engagements (including related roles, responsibilities, and actions) to continue transforming information, data, and knowledge collection, governance, and sharing. This is an initial list to illustrate the importance of involvement across the DoD. Other options for leadership entities and actions will emerge as the transformational activities continue.

Table 6. Leadership Elements: Information, Data, and Knowledge (Thrust Area 1)

Entity	Roles and Responsibilities	Actions
DASD(AE)	Provides leadership and guidance across acquisition functions and DoD components for DoD information and data governance and access.	• In coordination with the OSD CIO, seek the identification and publication of single authoritative sources (organizations and information systems) of all DoD acquisition-related data. • Manage and facilitate key programmatic information feeds through and to DAVE, Advana, AIR, EVM-CR, and other systems. • Lead efforts on behalf of USD(A&S) and USD(R&E) for statutory access to sensitive (e.g., PROPIN) data for support contractors, FFRDCs, and UARCs. • Work with the Office of General Counsel (OGC) on behalf of USD(A&S) to ensure that sensitive data restrictions (e.g., PROPIN; source-selection sensitive) are narrowly and appropriately applied to major data types (e.g., Level 1 EV data; CPARS). • Facilitate increased trust across organizations and acquisition functional domains through new or augmented trust platforms. • Host quarterly AVSG meetings to coordinate activities and raise issues. • DASD(AE) should coordinate the IDEAS data activities with the OSD CDAO, seeking updated reviews of current and developing acquisition DoD data management and data analytic platforms to identify opportunities for greater integration, consolidation, and replacement of those not comporting to an open standard architecture consistent with DSD Data Advantage memo (2021). • DASD(AE) should report progress and issues to the OSD CDAO for consideration and potential sharing with the DoD Data Council.

Entity	Roles and Responsibilities	Actions
OSD CDAO	Provides direction, guidance, and support related to data and information governance, management, access, and sharing.	• Consider DASD(AE) strategic concepts and inputs for potential action and sharing with the DoD Data Council.
OUSD(C)	Provides direction, guidance, and support related to financial management and resources for acquisition.	DASD(AE) should work with key representatives of the USD(C) to seek the following objectives: • Provide data and analytic capabilities in the common Advana environment. • Ensure easy access to Advana for all DoD employees. • Provide data downloads and access for DoD lab, FFRDCs, and UARCs. • Provide quarterly status updates and issues through the AVSG.
Service Acquisition Executives	Provide direction, guidance, and support related to Service needs, challenges, problems, and related activities.	DASD(AE) should work with key Service representatives to seek the following objectives: • Ensure adherence to the CIO and CDAO's open data standard architecture and approaches (ref. DSD Data Advantage memo, 2021). • Maximize data sharing and access rights for data use for all DoD employees. • Provide quarterly status updates and issues through the AVSG. • Participate in quarterly AIRC Acquisition Innovation Advisory board meetings

ACQUISITION FUNCTION TOOLS AND TRADECRAFT

DASD(AE) should seek to enable and improve our tradecraft by leveraging information models, and commercial innovation to improve functions and outcomes through the following activities.

- **Improved Acquisition Speed and Efficiency through Improved Information Flows.** Improved access and utilization of acquisition information is an underlying enabler of improved acquisition functions. The activities discussed in the prior section could result in improved individual and cross-functional acquisition.
  (Suggested Leads: DASD(AE) and partners)

- **Leverage Digital Engineering (DE) to enable Digital Acquisition.** A major opportunity for improving acquisition functions is to leverage the models generated in model-based systems engineering as fundamentally improved descriptions of the capabilities being developed or acquired. Using such models have the potential to fundamentally transform acquisition tradecraft. The following functional areas constitute the initial application target areas:

  - Systems Engineering; re-thinking Design Reviews
  - Sustainment and Product Support
  - Training and education for operating acquired systems
  - Model-based cost estimating and budgeting

  (Leads: DASD(AE) supported by the Strategic Advisor for Mission Engineering & Integration and the Dir, AIRC—with Purdue University, Georgia Tech, Virginia Tech, and the Stevens Institute of Technology—in coordination with OUSD(R&E) and CAPE)

- **Agile Development and Delivery—Software and Hardware.** DASD(AE) could continue to pursue Agile and DevSecOps paradigms and practices adapted from the commercial sector while exploring the extent to which Agile management and acquisition practices can be applied to non-software (hardware) acquisitions. Among other things, this effort would likely satisfy the JES (p. 311), accompanying the FY2021 NDAA.
  (Leads: DASD(AE) supported by the Senior Advisor for Agile Acquisitions and the Dir, AIRC with the Stevens Institute of Technology and University of Southern California)

- **Single Appropriation Pilot (BA-8).** DASD(AE) could continue to pursue and expand the Single Appropriation for Software and Digital Technology Pilot for software and information technology developments. This pilot employs a single Budget Activity 8 (BA-8) for all Research, Development, Test, and Evaluation (RDT&E), Procurement, and O&M efforts on pilot software programs to streamline acquisition program performance and management through more flexible budgetary resources for programs. This section executes the new authorities contained in the FY 2021 Consolidated Appropriations Act.
  (Leads: DASD(AE) and USD(C), supported by the Senior Advisor for Agile Acquisitions and the Dir, AIRC with the Stevens Institute of Technology and University of Southern California)

- **Mitigating the Effects of Bid Protest.** Bid protests can delay acquisitions and impose additional activities. DoD is sponsoring a university study to assess concerns, measure various bid-protest rates and effects, and identify mitigation approaches. This effort fulfils the JES (pp. 243–244), accompanying the FY2021 NDAA.
  (Lead: Principal Director, Defense Pricing and Contracts, supported by Dir, AIRC with the Stevens Institute of Technology and George Washington University Law School faculty)

- **Debarment and the Fair Labor Standards Act.** AIRC is assessing whether persons with willful or repeated violations of the Fair Labor Standards Act of 1938 should be debarred from DoD contracts. Advise on suspension and debarment mechanisms. The resulting report will include recommendations on statutory and regulatory changes needed to improve the transparency, efficiency, and effectiveness of the current debarment system as it relates to labor law violations. This effort will satisfy the requirement in the Joint Explanatory Statements accompanying the FY2021 and FY2022 NDAAs.
  (Suggested Leads: Principal Director, Defense Pricing and Contracts, supported by Dir, AIRC with the Stevens Institute of Technology and George Washington University Law School faculty)

IMPLEMENTATION LEADERS, ROLES, RESPONSIBILITIES, AND ACTIONS

The success, implementation, and scaling of these pilots, experiments, and other applied efforts must involve the relevant functional communities and their leadership to ensure that the efforts are relevant, informed, and helpful. Table 7 outlines current key leadership elements (including related roles, responsibilities, and actions). This is an initial list to illustrate the importance of involvement across the DoD. Other options for leadership entities and actions likely will emerge as the transformational activities continue.

Table 7. Leadership Elements: Functional Tools and Tradecraft (Thrust Area 2)

Entity	Roles and Responsibilities	Actions
DASD(AE)	Provide leadership and guidance across acquisition functions and DoD components for transformation of acquisition functional tools and tradecraft.	• Resource and guide applied research and prototyping by AIRC and others of tradecraft and tool improvements. • Seek delivery and review of initial prototypes by December 2022.
Service Acquisition Executives; Acquisition functional leads[10]	Provide direction, guidance, and support related to Service and functional needs, challenges, problems, and related activities.	DASD(AE) should work with key Service representatives to seek the following objectives: • Support implementation of model-based acquisition within the policy context of the forthcoming DoDI 5000.DE • Identify other areas where policy, guidance, and practice are needed to expand the utilization of models for improved acquisition function. • Participation in quarterly AIRC Acquisition Innovation Advisory board meetings • Connect applied research to DoD users and representative functional leads. • Resource applied research and prototyping by AIRC and others of tradecraft and tool improvements.

[10] Deputy Director for Engineering, OUSD(R&E);
Director, Human Capital Initiative (HCI);
Director, Developmental Test, Evaluation, and Assessments (DTE&A), OUSD(R&E);
Director, Test Resource Management Center;
Director, Operational Test and Evaluation;
Principal DASD(Industrial Policy);
Principal Director, Defense Pricing and Contracting, OUSD(R&E);
Defense Contract Management Agency;
Defense Contract Audit Agency;
Executive Director, International Cooperation;
ASD(Sustainment);
Requirements community interfacing; and
Financial Management community interfacing.

DECISION TOOLS AND ENABLERS

DASD(AE) should seek to improve evidence-based decision making, identify and eliminate bad ideas quickly, and inform decisions to improve policies and processes by developing decision tools, models, and analytics through the following activities.

- **Advanced DE Analytic Tools for Mission Engineering and Portfolio Management.** Use DE model-based tools to improve the speed, quality, and effectiveness of ME and PfM by providing deeper model-based understanding of the capabilities and interdependencies of existing and future systems being acquired. Transitions from a paper-based (PowerPoint) review of various portfolios (e.g., EW, NC3, ASuW) to a richer model-based review.
  (Leads: DASD(AE) supported by the Strategic Advisor for ME & Integration and the Dir, AIRC with Purdue University, Georgia Tech, Virginia Tech, and the Stevens Institute of Technology)

- **Streamline the Requirements Processes.** The DoD is assessing the processes for developing and approving capability requirements for defense acquisition programs, developing recommendations for improving these processes. This effort includes university research by AIRC to model the requirements processes and assess commercial and foreign best practices for requirements setting that could be adapted to the DoD. This effort supports the fulfilment of Section 809 of the FY2021 NDAA.
  (Leads: Joint Staff and ASD(A) supported by Dir, AIRC—with the Stevens Institute of Technology—in coordination with the Joint Staff and Service representatives)

- **DE for Requirements Decisions.** As a follow-on to the DE for ME and PfM effort, DASD(AE) could explore how DE insights can be extended to inform the requirements assessment, setting, and prioritization processes to improve speed and agility.
  (Suggested Leads: DASD(AE) supported by Dir, AIRC—with Purdue University, Georgia Tech, Virginia Tech, and the Stevens Institute of Technology—in coordination with OUSD(R&E))

- **Update the Structure of Selected Acquisition Reports (SARs) to Congress.** The DoD continues to redesign the content and structures of the SARs to improve appropriate cognizance for Congressional and DoD analysis, oversight, and decision making while minimizing the burden on the DoD.
  (Lead: CAPE and the DASD(AE) supported by the Director for Acquisition Approaches and Management)

- **Intellectual Property Negotiations, Valuation, and Management.** The DoD could continue to develop better ways to negotiate, evaluate, price, manage, store, and track IP and associated data/information, assessing and understanding commercial equities and best practices and challenges to improve the DoD's decisions and management of IP across the lifecycle of defense systems and to increase access to innovative commercial technologies and capabilities.
  (Suggested Leads: DASD(AE) supported by the Director of the Intellectual Property Cadre and the Dir, AIRC with George Washington University, George Mason University, and Virginia Tech)

- **Policy Test Laboratories.** AIRC is in the process of prototyping simulation environments that allow stakeholders to perform what-if policy analyses; uncover non-obvious questions, issues, and results; and provide actionable insights to decision makers.
  (Leads: Dir, AIRC with Georgetown University, Virginia Tech, the Stevens Institute of Technology, and other universities)

IMPLEMENTATION LEADERS, ROLES, RESPONSIBILITIES, AND ACTIONS

The success, implementation, and scaling of these pilots, experiments, and other applied efforts must involve the relevant functional communities and their leadership to ensure that the efforts are relevant, informed, and helpful. Table 8 outlines current key leadership elements (including related roles, responsibilities, and actions). The current list illustrates the importance of involvement across the DoD. Other options for leadership entities and actions likely will emerge as the transformational activities continue.

Table 8. Leadership Elements: Decision Tools and Enablers (Thrust Area 3)

Entity	Roles and Responsibilities	Actions
DASD(AE)	Resource applied research and prototyping by AIRC and others of policy test labs and decision-support tools.	• Seek delivery and review initial prototypes by December 2022.
OUSD(R&E)	Support the modernization and transformation of systems engineering, including DE	• DASD(AE), Dir, AIRC, and university research teams should coordinate and leverage DE efforts by OUSD(R&E)
Service Acquisition Executives; Acquisition functional leads[8]	Provide direction, guidance, and support related to Service and functional needs, challenges, problems, and related activities.	DASD(AE) should work with key Service representatives to seek the following objectives: • Ensure availability of DE models to enable DoD-wide IAPRs and ME. • Provide insights on key policies for policy test simulator pilots. • Participate in quarterly AIRC Acquisition Innovation Advisory board meetings • Connect applied research to DoD users and representative functional leads. • Resource applied research and prototyping by AIRC and others of tradecraft and tool improvements.

WORKFORCE CULTURE, INCENTIVES, AND TRAINING

The following activities could facilitate agile workforce, leadership, and organizations to enable and incentivize agile, innovative, and outcome-focused communities and employ modern education and training best practices.

- **Align Incentives to Drive Agility and Facilitate Information Sharing.** DASD(AE) is funding a university assessment of the systemic factors influencing risk aversion, with the initial focus on incentives for contracting officers at the Air Force Installation Contracting Center, Air Force Material Command. This assessment seeks to uncover the underlying, largely invisible systemic pressures on the acquisition workforce that impede innovative behaviors, then design interventions that address these systemic contributors. This effort will design and prototype incentive structures that focus the workforce on the systemic goals of timely delivery of capabilities to warfighters rather than more narrow, functional performance objectives.
  (Suggested Leads: DASD(AE) supported by Dir, AIRC and The Ohio State University in partnership with the Department of the Air Force)

- **Digital DNA Courses.** These courses train and empower the acquisition workforce to leverage digital technology and data science to transform acquisition tools, processes, and practices. This includes empowering the workforce to:

  » Reevaluate standard workflows with alternative and/or modern approaches

  » Apply strategies and processes utilized in agile, DevSecOps, and modern software development to their workflow,

  » Continue to learn beyond content covered in lessons,

  » Address data literacy for leaders that consume digital results and analysis, and

  » Recognize the vast ecosystem and communities that support and enable workforce and team success.

  (Suggested Leads: DASD(AE) supported by the President of the Defense Acquisition University, the Senior Advisor for Agile Acquisitions, and the Dir, AIRC with the Stevens Institute of Technology and the University of Southern California)

- **Cognitive Training Assistant for Cost Estimators.** DASD(AE) is sponsoring a university study to pilot providing Cognitive Assistants (workforce advice apps) to cost estimators. It is adapting existing Daphne Cognitive Assistant software to provide trainees with interactive, hands-on opportunities to learn the concepts, methods, and best practices for estimating the lifecycle cost of a complex system.
  (Suggested Leads: DASD(AE) supported by Dir, AIRC with Texas A&M and the University of Arizona)

- **Game Simulations for Training Contracting Officers on New Approaches.** DASD(AE) is sponsoring a university study to apply workforce training and advice technology to train contracting officers on approaches to support Agile and DevSecOps. This effort includes testing gamified training materials on enlisted contracting workforce trainees at Lackland AFB, allowing the player to explore 'what-ifs' in low-risk environments.
  (Suggested Leads: DASD(AE) supported by Dir, AIRC—with the Naval Postgraduate School and North Carolina State University— in partnership with the Department of the Air Force)

IMPLEMENTATION LEADERS, ROLES, RESPONSIBILITIES, AND ACTIONS

DASD(AE) could seek the involvement of the relevant functional communities and their leadership to ensure the success, implementation, and scaling of these pilots, experiments, and other applied efforts and to ensure that these efforts are relevant, informed, and helpful. Table 9 outlines current key leadership elements (including related roles, responsibilities, and actions). This is an initial list to illustrate the importance of involvement across the DoD. Other options for leadership entities and actions likely will emerge as the transformational activities continue.

Table 9. Leadership Elements: Workforce Culture, Incentives, and Training (Thrust Area 4)

Entity	Roles and Responsibilities	Actions
DASD(AE)	Resource applied research and prototyping by AIRC and others of workforce and culture incentives.	• Seek delivery and review initial concepts by December 2022.
Service Acquisition Executives; Acquisition functional leads[8]	Provide direction, guidance, and support related to Service and functional needs, challenges, problems, and related activities.	DASD(AE) could work with key Service representatives to seek the following objectives: • Review results of applied research for potential pilot funding. • Participation in quarterly AIRC Acquisition Innovation Advisory board meetings • Connect applied research to DoD users and representative functional leads. • Resource applied research and prototyping by AIRC and others of tradecraft and tool improvements.

CONCLUDING REMARKS

Acquisition is largely an information-driven, workforce-dominated function. Improvements to keep pace with threats hinge on DoD's ability to facilitate use of that information to be more agile, sharing concerns and issues more efficiently, and informing tradeoffs and risk management, while keeping our eye on the primary objective: the timely delivery of competitive capabilities for the warfighter to meet the Department's mission.

Every member of the acquisition workforce must focus on this end objective, helping good-enough capabilities get to "yes" rather than seeking perfection and eliminating risk. To get to this point, DoD is changing incentives and culture to empower the workforce to do the right thing by our warfighters. This strategy could be a step in that direction, and DoD seeks continued inputs to evolve and refine this strategy to eliminate barriers to serving the primary missions of the department.

APPENDIX A. APPROACH AND METHODOLOGY

Below are the key steps in the research team's approach to developing a digital acquisition strategy and implementation opportunities.

LITERATURE REVIEW: DOD STRATEGIC OBJECTIVES AND RELEVANT ACADEMIC RESEARCH

The project team reviewed strategic objectives driving the need for improving and transforming defense acquisition. The review included national and defense strategies, memoranda and directives from DoD leadership on defense acquisition, data-driven analysis and transformation, data collection and sharing, strategic shifts towards portfolio management and ME, and other activities.

The review also included assessments of prototyping and concept development in areas such as data governance, data analysis, systems engineering, agile development, intellectual property, ME, test and evaluation, and sustainment.

ASSESSMENT OF DOD CHALLENGES AND EFFORTS

The project team also assessed challenges and barriers facing defense acquisition digital transformation. This included reviews of historical barriers and new barriers and lessons emerging from ongoing efforts.

REVIEW ONGOING TRANSFORMATIONAL CONCEPTS AND ACTIVITIES

The team reviewed on-going efforts within DoD and academia as applied to defense acquisition. These insights were used to develop an initial vision of what the digital transformation of defense acquisition could entail, near- and longer-term steps that could be undertaken, and remaining gaps and challenges.

TRANSFORMATION WORKSHOP

AIRC hosted an Acquisition Innovation Forum on December 8, 2021, to collect views, best practices, and recommendations from academia, industry, and DoD experts on transformation best practices, DoD acquisition challenges, and DoD efforts. The workshop consisted of the following activities:

- A keynote on Transformation Best Practices and Lessons
- An overview of preliminary concepts and approaches on a DoD digital acquisition and data strategy
- A government panel on the challenges, opportunities, and next steps for digital acquisition
- A panel on transformation lessons, principles, and feedback from external transformation experts
- A challenge keynote presenting a vision and perspectives for a future transformed defense acquisition system
- A "lightning round" to collect reactions, perspectives, issues, and ideas from domain experts from across the DoD

ASSESSMENTS, DEVELOPMENT OF RECOMMENDATIONS, AND DRAFTING A DOD STRATEGY

Finally, information from these approaches were integrated and assessed to develop approaches and strategic concepts for DoD. The team developed candidate opportunities through the following activities:

- Identify opportunities to exploit data to improve acquisition outcomes. What are the opportunities to begin integrating across functional boundaries? Possible examples are illustrated in the potential use cases below.
- Identify available data sources and their associated data restrictions, access issues, and other enterprise concerns. This includes identifying existing and evolving databases and systems can be leveraged or unlocked for new analytic uses to improve acquisition outcomes. Recommend near- and long-term improvements to data collection and management to enable improving acquisition outcomes.
- Identify existing and emerging data and analytic tools and best practices from academia and industry for potential inclusion in the strategy. This includes identifying new analytic approaches and opportunities that can address data access and security concerns while improving the ability to inform decision making. Objectives included identifying approaches that could enable cross-enterprise and external analysts and to analyze restricted data while still protecting relevant sensitivities. Promising tools are being piloted for application in DoD.

Results are documented in this report and in a draft strategy for DoD consideration.

APPENDIX B. DIGITAL ACQUISITION AND DATA STRATEGY FORUM

The Digital Acquisition and Data Strategy Forum, held virtually on December 8, 2021, was sponsored by OUSD(A&S) and hosted by AIRC. The forum engaged DoD, industry, and academia leaders in open discussion on digital transformation best practices and its opportunities for improving defense acquisition outcomes. The objective was to help shape the vision, strategy, principles, and implementation steps for the forthcoming DoD digital acquisition and data strategy that the DoD is developing for acquisition and sustainment.

BACKGROUND

AIRC hosted the forum virtually from 9:00 a.m. to 1:00 p.m. (EST) on December 8, 2021. There were two (2) Keynote Speakers who provided relevant organizational digital transformation perspectives and insights. Forum attendance was by invitation only. More than 50 people registered and attended, representing a mix of the DoD, Academia, and Industry.

Recent advances in data collection, storage, curation, and sharing—coupled with increased analytic capabilities from data science, machine learning, and artificial intelligence—have enabled organizations to rethink how they organize, execute, and deliver improved and responsive capabilities. Digital transformation of practices and processes can revolutionize DoD acquisition and sustainment to improve warfighter capabilities at lower costs and more responsive speeds.

The forum's goals were to:

- identify best practices, lessons learned, and key principles;
- discuss and improve the draft vision and strategy for transforming defense acquisition;
- coordinate and identify action officers from across the military departments and defense agencies; and
- identify next steps for implementation.

Throughout the forum, participants stressed that to move forward, the DoD Digital Acquisition and Data Strategy needs to be profound and mission-oriented yet clear and simple to ensure people understand what it is, what is being worked toward, and understand its goals and purpose.

AGENDA

The forum agenda included the following:

- a morning keynote address delivered by Mr. Michael R. Sutcliff, former Accenture Digital Group CEO, who shared his experiences and lessons in transforming complex organizations;
- an overview presentation of the draft vision and strategy;
- a government panel to discuss DoD Challenges, Opportunities, and Next Steps for Digital Acquisition;
- a panel of outside transformation experts to discuss principles, lessons, and initial strategy;
- a challenge keynote from Mr. Steve Blank, an innovative entrepreneur who shared fresh perspectives and challenges on improving defense acquisition and innovation; and
- a Digital Innovation Opportunities panel to collect viewpoints from additional government stakeholders.

KEY TAKE-AWAYS

The following are the key points raised in the forum:

- Transformation is ultimately a *trust problem*—not a data or technical problem.
  - » Trust must address six dimensions: mission (functional domain), technical, financial, regulatory, liability, and contractual.
    - ◊ The last four are harder, and each can shut down efforts to cooperate, share information, and innovate.
  - » Trust platforms are a way to address these issues; governance is key; leaders must be protected from liability for participating in the trust platform.
  - » Actionable insights generated must be trustworthy.
- Ensure that transformation is tied to the mission.
  - » Don’t get distracted by glamorous technology.
  - » Focus on outcomes, not requirements. Enable tradeoffs.

- Incentivize and empower ingenuity throughout the organization.
  - » Don't manage centrally: Leadership must align, resource, and be committed, but everyone below must own the effort.
  - » Do something important for the warfighter—this motivates people in the DoD.
  - » Clear the pathway of barriers. Provide tooling (e.g., IT tools) for using new approaches to promote adoption.
- Must share knowledge, not just data.
  - » Can share syntax but establishing a common understanding of semantics is hard.
  - » Understand what *is* knowable, what you *should* know, and what to *do* with the knowledge.
  - » Avoid seeking perfect data. Leverage tools for imperfect data.
- Transformation needs a strategic roadmap, talent, agile delivery, technology, data, and change adoption.
  - » Enable change by identifying new sources of data, models, and services.
  - » Rethink operating models (is a better way to do things?), risk factors, decision criteria, and timing of decisions.
- Use simple and clear language to convey the intent of the strategy.
  - » Be clear on objectives (e.g., what does it mean to improve acquisition?).
  - » Motivate and parse the problem so each can contribute their part.
  - » Set challenges for our colleagues to help us with.
  - » Create a demand signal (e.g., tell the engineers exactly what is needed).
  - » Don't confuse small/agile/cheap with large platform acquisition.

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