



Government  
Business  
Council

# Advancing ISR at the Edge

A Survey on Networks and Processing Technologies in the Digital Battlespace

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Underwritten by

Booz | Allen | Hamilton®

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July 2020

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# Overview

## Purpose

The warfighter depends on effective access and analysis of data to help facilitate rapid and accurate decisions when in battle. But what is the current state of military intelligence, surveillance, and reconnaissance (ISR) data and its dissemination at the tactical edge in the digital battlespace?

To better understand the landscape of military ISR, Government Business Council (GBC) conducted an in-depth research study of defense employees.

## Methodology

In February and March of 2020, GBC issued a survey on ISR in defense organizations. 317 employees responded, with 55% of respondents holding positions at the GS/GM-13 level or above. 15% of respondents are in active duty and 85% in civilian positions in DoD agencies, including the Central Intelligence Agency, Coast Guard, Air Force, Army, Combatant Commands, Joint Chiefs of Staff, Marine Corps, Navy, Office of the Secretary of Defense, and other independent agencies.

For more information on respondents, please see the Respondent Profile.

# Executive Summary

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## **The DoD data system is potentially frayed**

Although data is foundational to DoD missions, there exist gaps in data dissemination and access. 1 in 4 DoD respondents say that their agencies are slightly or not at all effective at using data to reach the needs of those in the field. Moreover, only 29% of respondents across both active duty and civilian positions say that over 75% of their data reaches the appropriate actors.

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## **Data remains most out of reach for the warfighter**

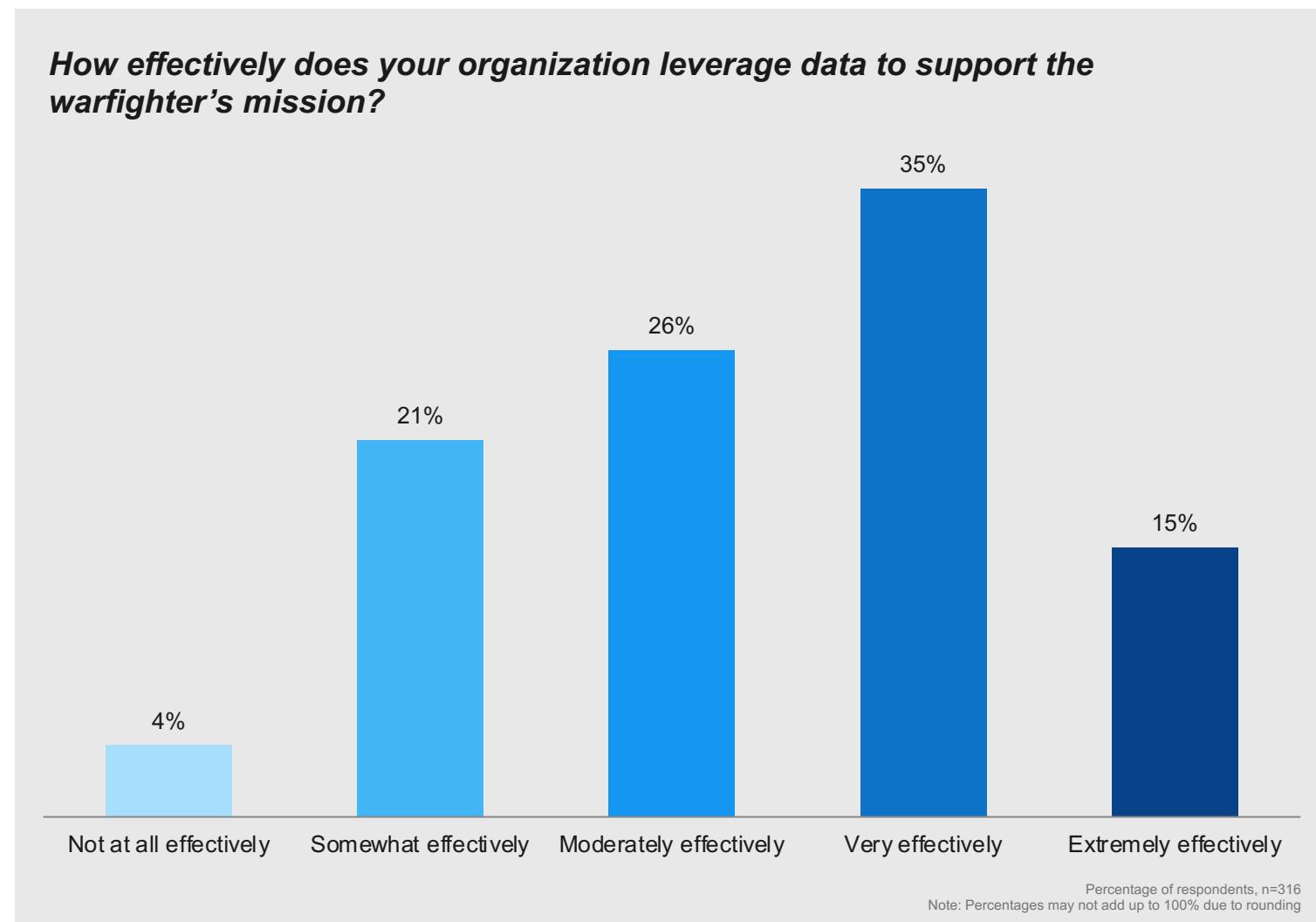
While DoD agencies face issues with ISR data across the board, active duty personnel experience greater challenges with processing, exploitation, and dissemination (PED) than DoD civilians. 33% of DoD civilians say that their agencies possess a warfighter-focused data environment, versus 24% of active duty respondents who feel the same. Furthermore, only 11% of active duty personnel agree that information reaches the appropriate analysts more than 75% of the time. Warfighters require rapid decision-making processes, and faulty data PED may be putting their lives on the line.

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## **Data management and interoperability require attention**

As warfighters need accurate information fast, data management ranks as a major factor in their mission success. Respondents, however, note potential interoperability issues for warfighters. 45% of DoD respondents attribute challenges of leveraging information to siloed data, resulting in long, time-consuming hunts for pertinent information. 43% of respondents, for example, spend more time looking for data than using the right data. And 22% of respondents say that PED capabilities fall short of providing warfighters with context they need to make decisions.

Only half of active duty and DoD respondents believe their data is being leveraged very or extremely effectively to support mission-critical objectives

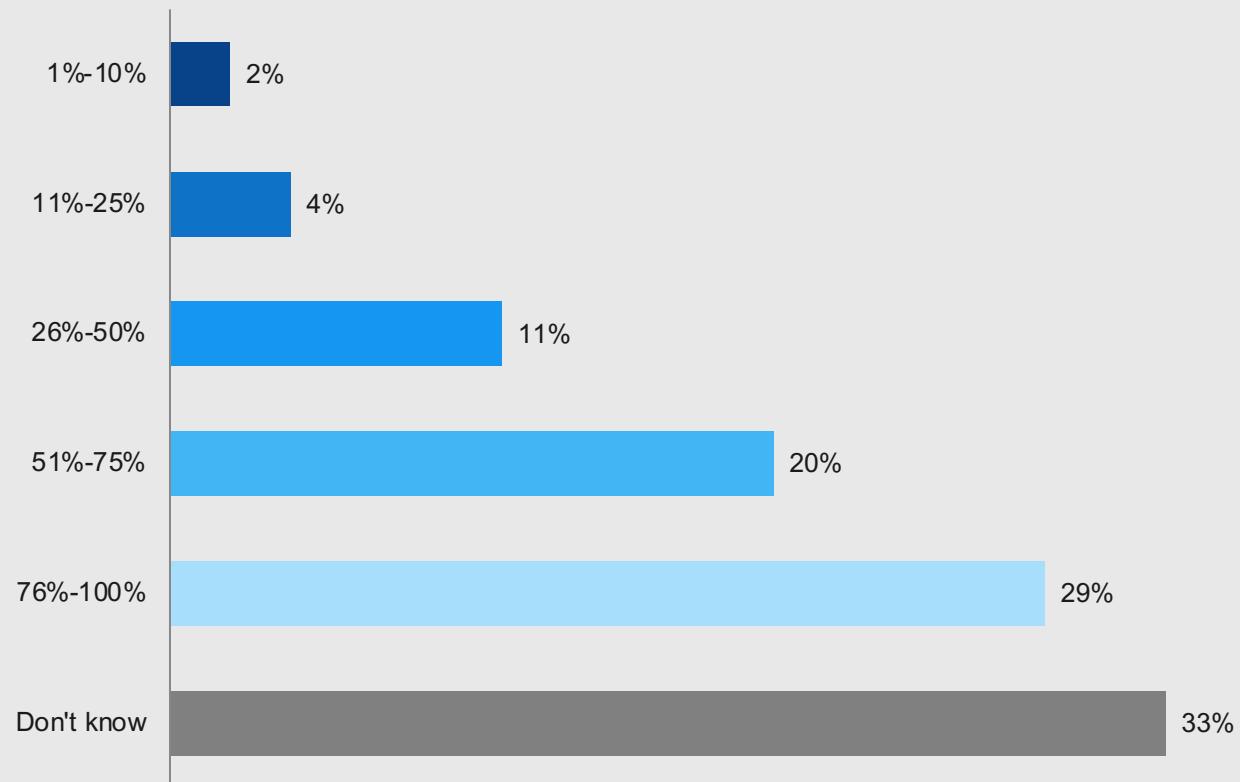


25%

of respondents say that their organization is not at all or only somewhat effective at leveraging data to support the warfighter's mission. While half of respondents say that their agency is very or extremely effective, there is substantial improvement needed in other respondents' organizations.

37% of respondents believe that data reaches the appropriate analysts less than 75% of the time

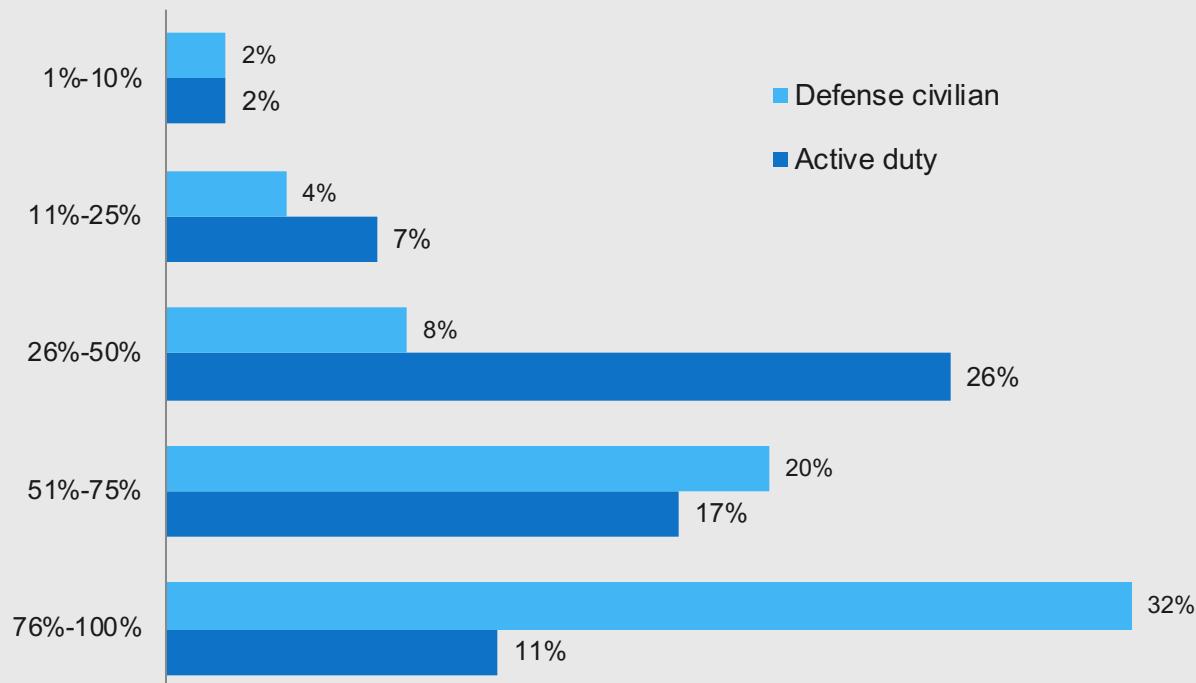
***Approximately what percentage of the information your organization collects reaches the appropriate analysts?***



Percentage of respondents, n=316  
Note: Percentages may not add up to 100% due to rounding

Defense civilians are nearly two times more likely than active duty respondents to say that a majority of agency information reaches those who need it most

*Approximately what percentage of the information your organization collects reaches the appropriate analysts?*



Percentage of respondents, n=315

Active duty n=46, Defense civilian n=269

Note: Percentages may not add up to 100% due to rounding

Defense officials are aware that data precision presents a continuing obstacle for the Department. This isn't a problem of insufficient data, but making sure data reaches the right people when the situation calls for it.

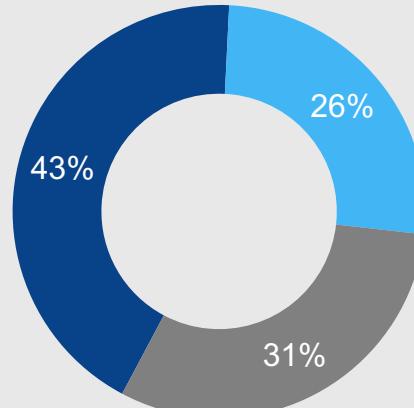
**35%**

of active duty respondents say information reaches the right analysts only half the time or less often.

According to respondents, warfighters tend to spend more time looking for pertinent data than using data

***Within your organization, do you believe the warfighter spends more time...***

- Looking for the right data
- Using the right data
- Don't know



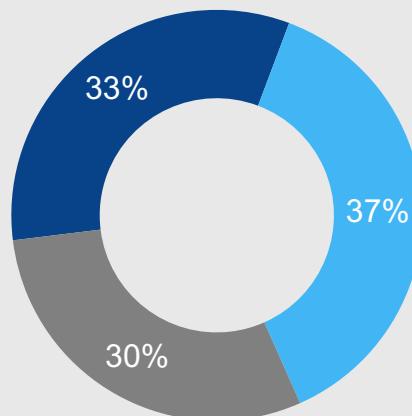
**65%**

of active duty respondents say that the warfighter spends more time looking for the right data in comparison to just 40% of defense civilians.

Percentage of respondents, n=316

Note: Percentages may not add up to 100% due to rounding

***Which of the following descriptions best captures your organization's data environment?***



**51%**

of active duty personnel say that their agency's data environment is producer-focused compared to just 35% of defense civilians.

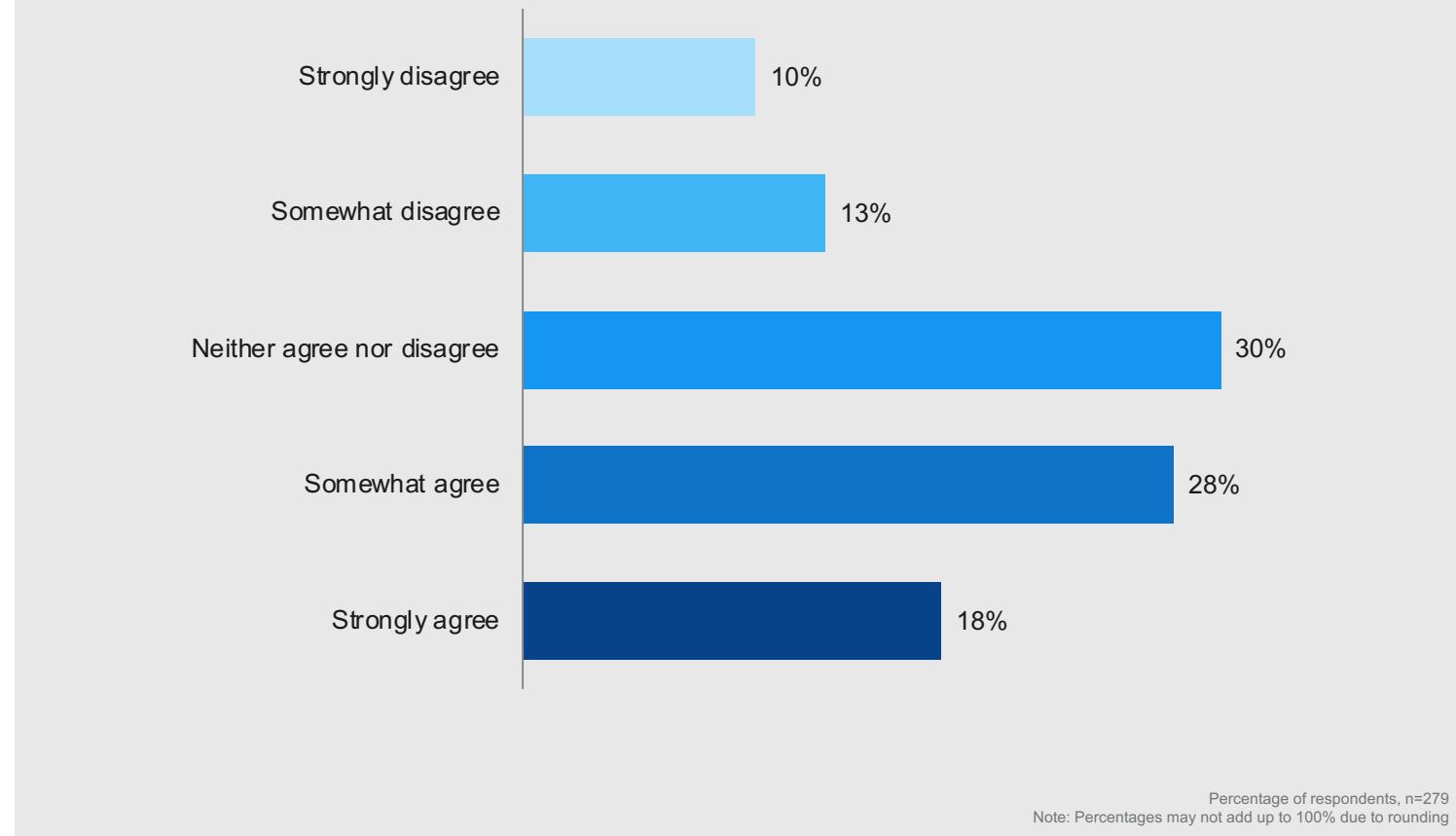
Additionally, respondents in the Air Force are more likely to have a warfighter-focused environment than those in the Coast Guard, Army, Marine Corps, and Navy.

Percentage of respondents, n=280

Note: Percentages may not add up to 100% due to rounding

### Less than half of respondents agree their organization integrates multiple data sources to serve the warfighter

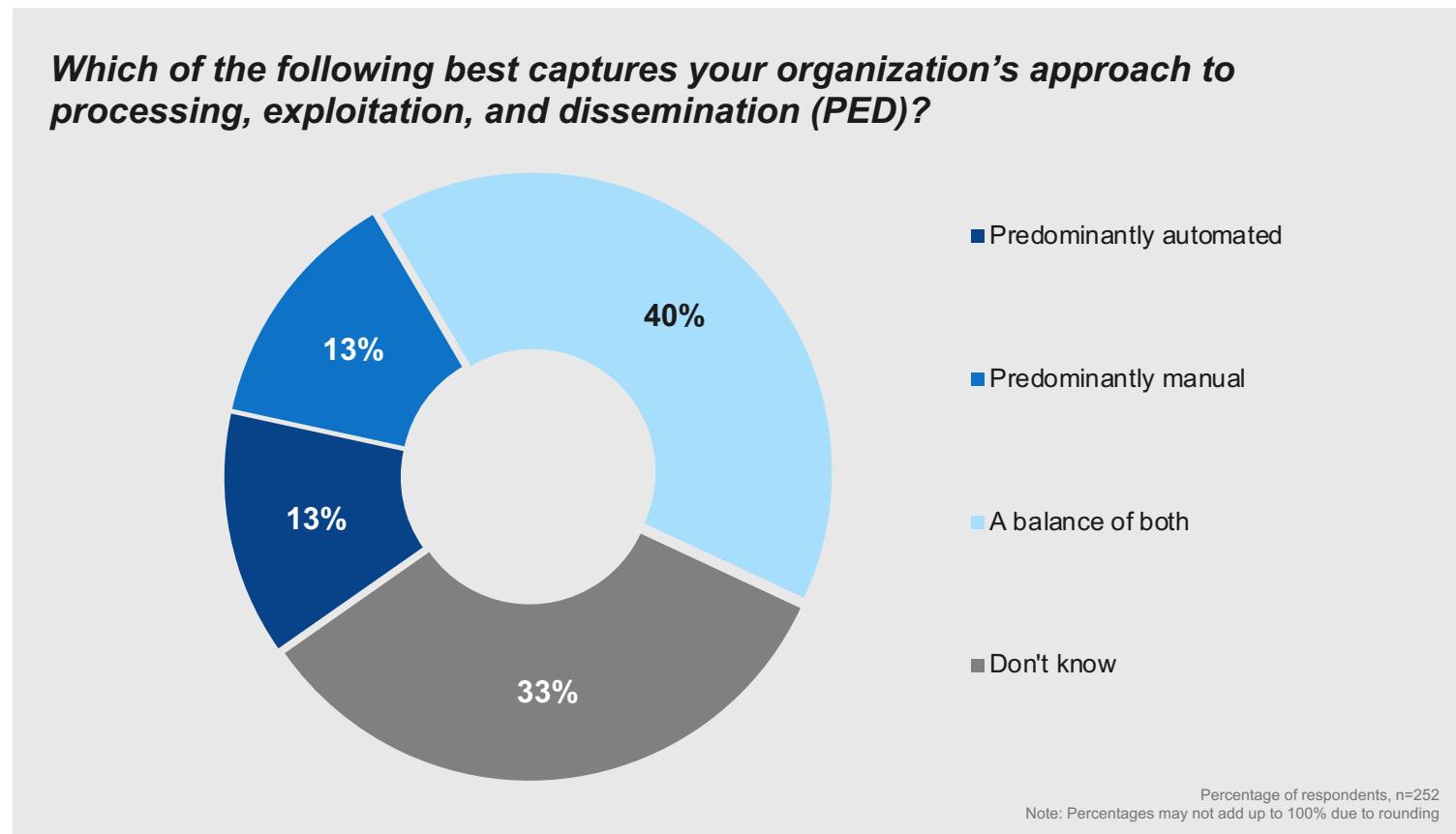
***“My organization effectively integrates disparate data sources to support decision-making in the field.”***



An influx of digital technologies and mobile platforms have created a vast web of data sources and endpoints, each streaming vital lines of information to the warfighter. However, according to the findings, 23% of respondents disagree that such sources are integrated in a way to support the warfighter's decision process.

The [DoD Digital Modernization Strategy](#) released in 2019 outlines a vision for such integration, moving away from component-centric data infrastructure and towards an enterprise-wide operations model.<sup>1</sup>

**4 in 10 respondents believe that collection and delivery of battlefield data relies on a mix of manual and automated methods**



The full variety and volume of data being generated for modern ISR is relentless: human intelligence, geospatial data, video data, radio and satellite data, open source, and signals carry a wealth of information that is impossible for human analysts to process and extract insights in timely fashion.

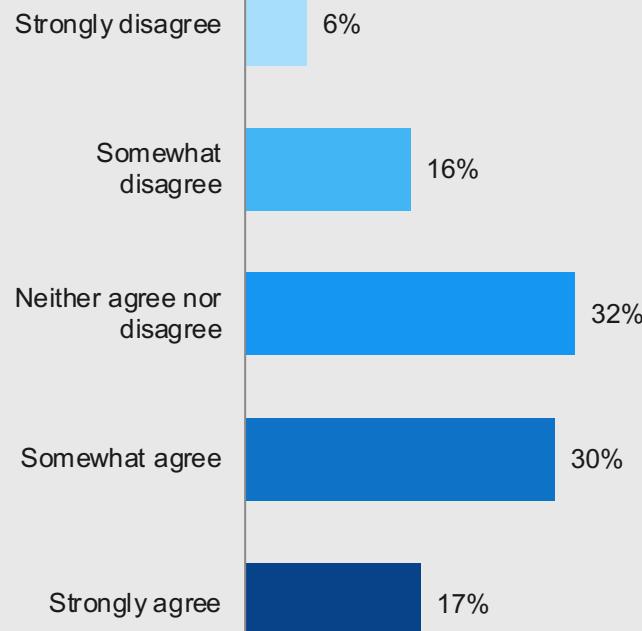
The establishment of the Algorithmic Warfare Cross-Functional Team (AWCFT) in 2017 signaled that DoD was ready to dedicate machine learning and artificial intelligence tools to alleviate the analytics burden on human operators.<sup>2</sup>

**35%**

of active duty respondents say information reaches the right analysts only half the time or less often.

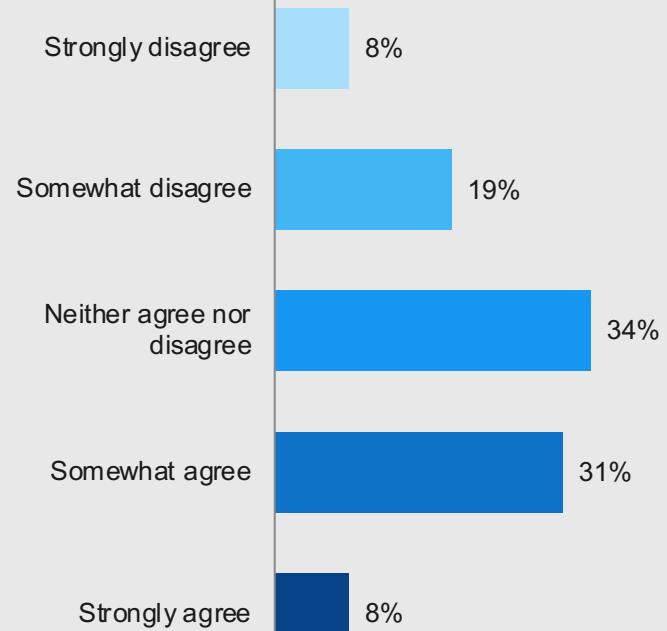
**Agencies have room to improve PED capabilities that provide context for warfighter decision-making**

***"My organization's current PED capabilities provide warfighters with comprehensive context for accurate decision-making."***



Percentage of respondents, n=218  
Note: Percentages may not add up to 100% due to rounding

***"My organization's current PED capabilities effectively compress decision loops (i.e., the time it takes to find, fix, track, target, engage, and assess)."***



Percentage of respondents, n=218  
Note: Percentages may not add up to 100% due to rounding

**Just 3%**

of active duty respondents strongly agree in comparison to 19% of defense civilians.

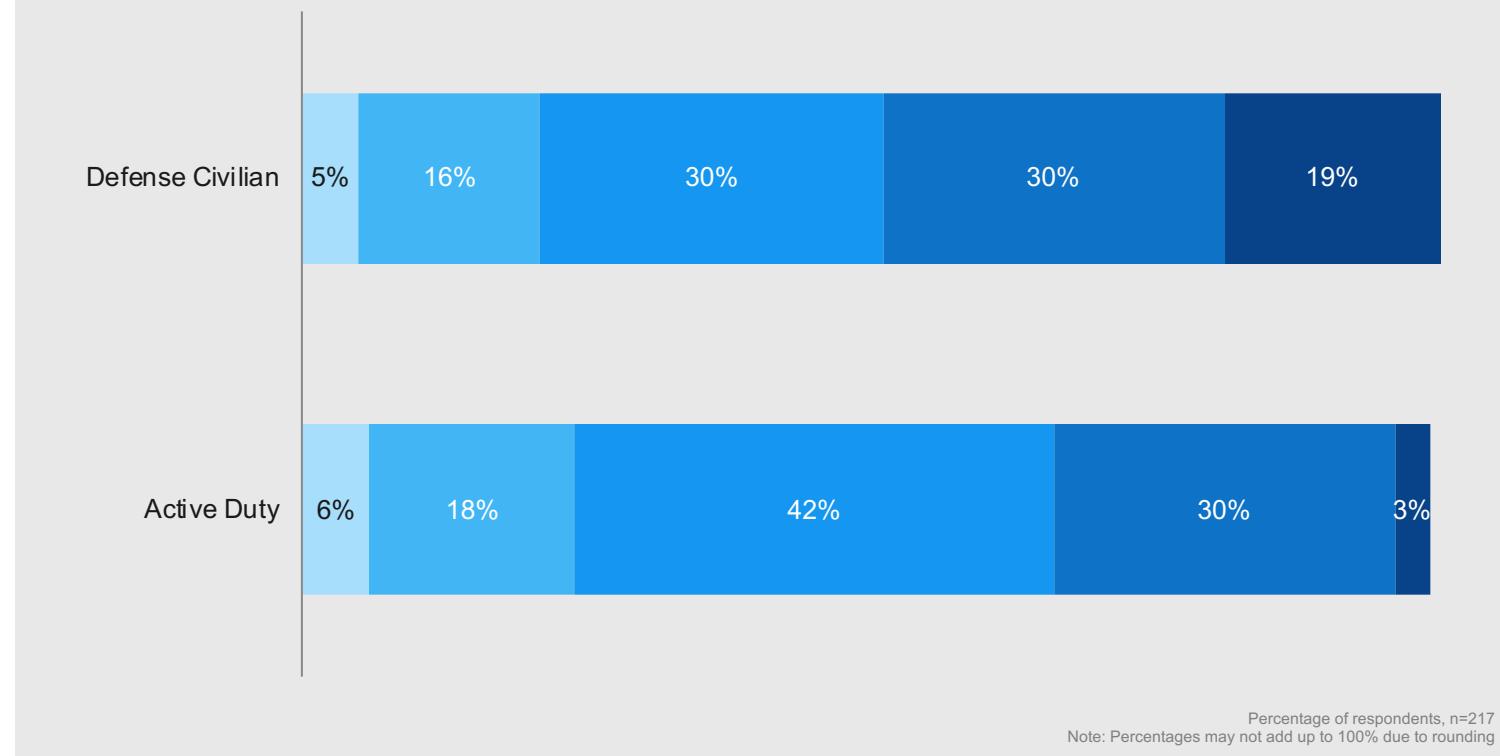
**Only 8%**

strongly agree that their organization's current PED capabilities provide warfighters with comprehensive context.

### Defense civilians have substantially higher faith in their agency's PED capabilities than active duty personnel

***"My organization's current PED capabilities provide warfighters with comprehensive context for accurate decision-making."***

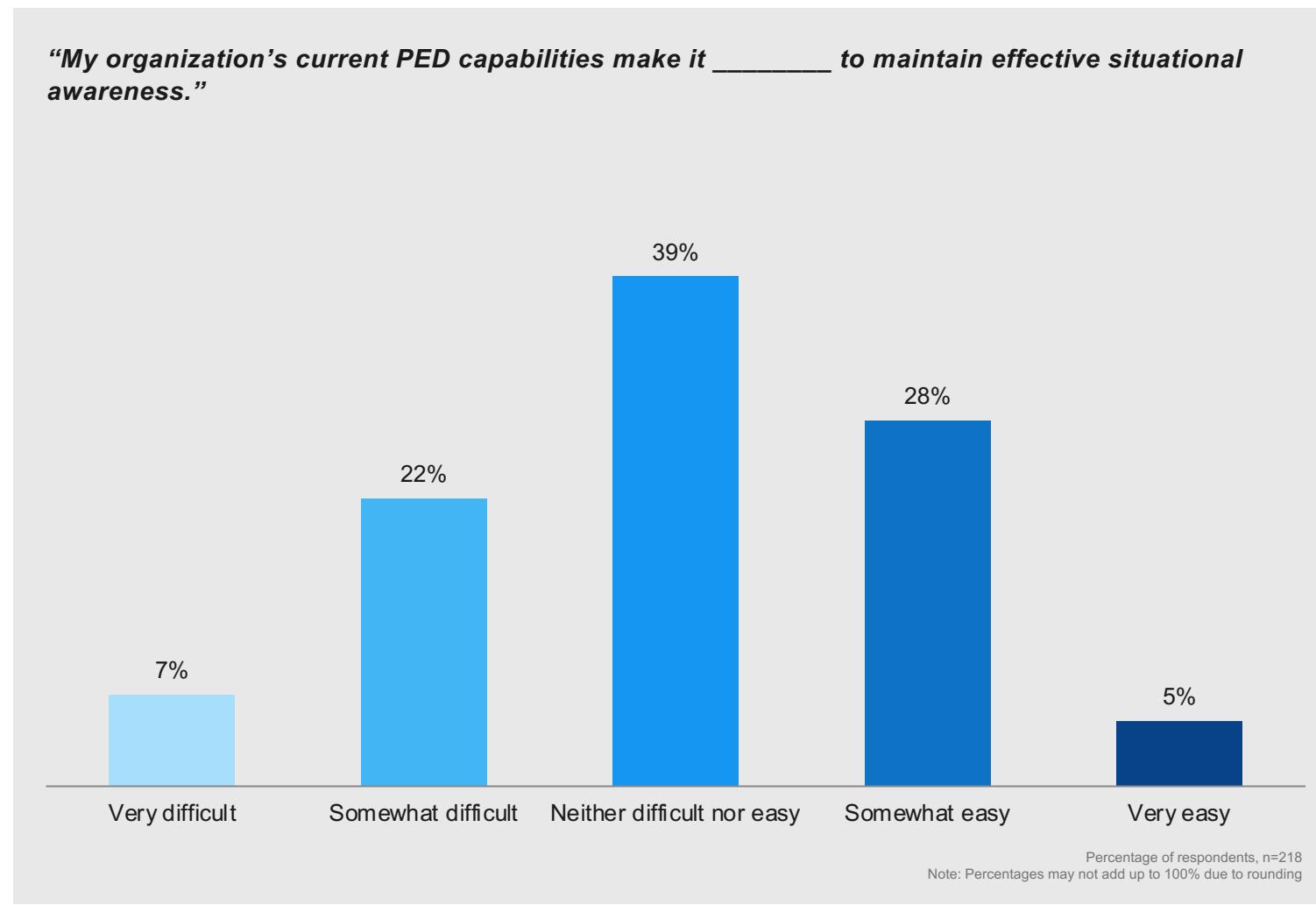
■ Strongly disagree ■ Somewhat disagree ■ Neither agree nor disagree ■ Somewhat agree ■ Strongly agree



“

In logistics, we are not using ISR very much at all and it prevents proactive actions to limit supply chain impacts on operations...or potentially informing decision-makers before decisions are made.”  
**Survey Respondent**

### Respondents are split regarding their current PED ability to provide situational awareness



**41%**

of respondents in leadership positions say that their agency’s PED capabilities make maintaining situational awareness somewhat difficult compared to just 19% of those in non-managerial positions.

## Military personnel generally feel that ISR capabilities meet or go above expectations

***When evaluating your organization's current ISR capabilities, how do they perform against expectations with respect to the following areas?***

■ Don't know ■ Below expectations ■ Meets expectations ■ Above expectations

Interoperability (i.e. the ability to fuse multiple sources and generate a complete assessment of the operational environment)



Scalability (i.e. the ability to handle a growing number of users and apps with respect to bandwidth, network management, etc.)



Timeliness (i.e., information is delivered with enough time to allow for the planning and execution of operations)



Relevancy (i.e., information is tailored to the warfighter's requirements)



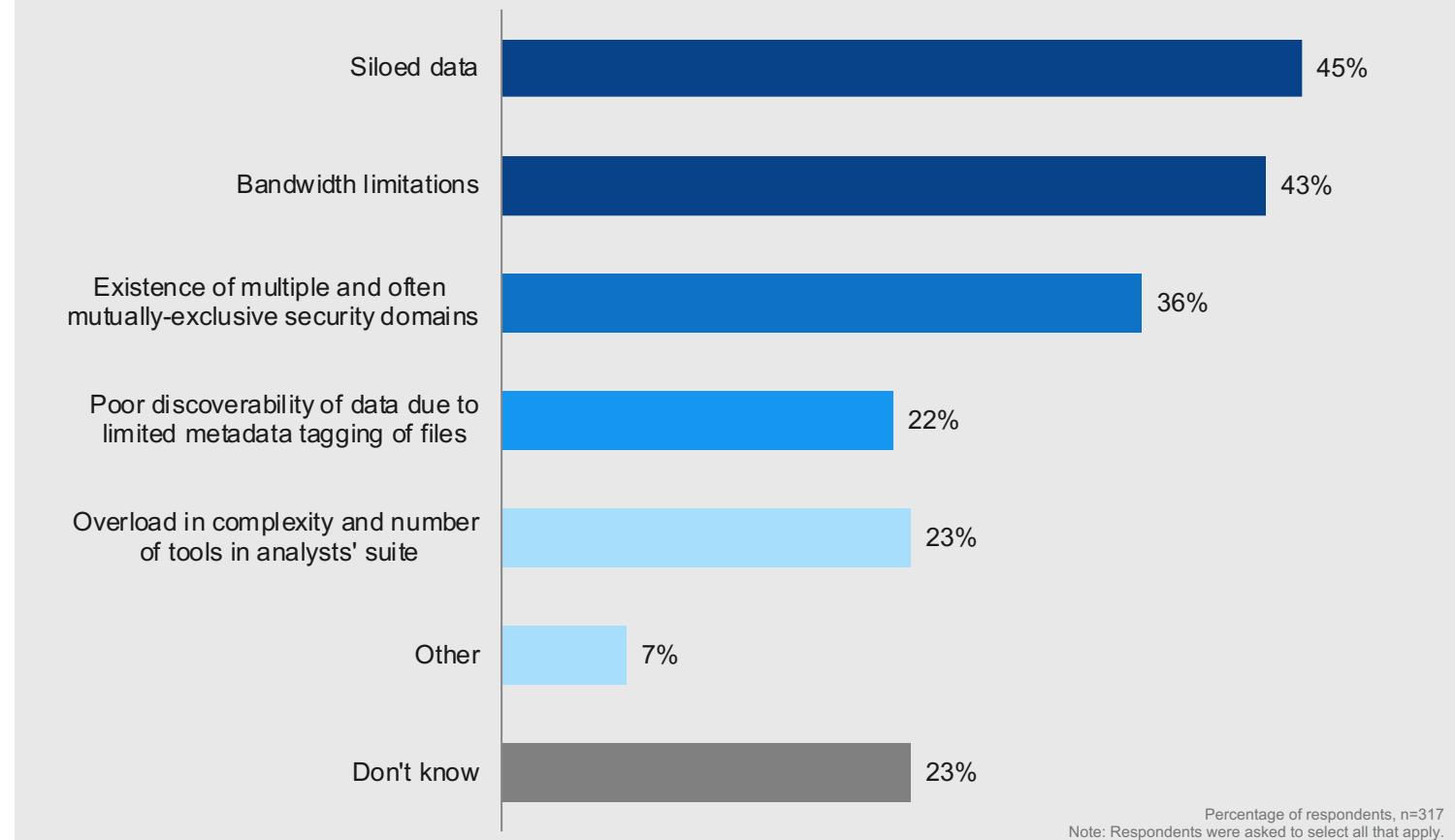
Percentage of respondents, n=206  
Note: Percentages may not add up to 100% due to rounding

**41%**

of active duty respondents, however, say ISR interoperability performs below expectations, which is similar to other ISR dimensions that are poorly perceived across-the-board by active duty personnel.

## Siloed data and bandwidth limitations lead the list of challenges to PED

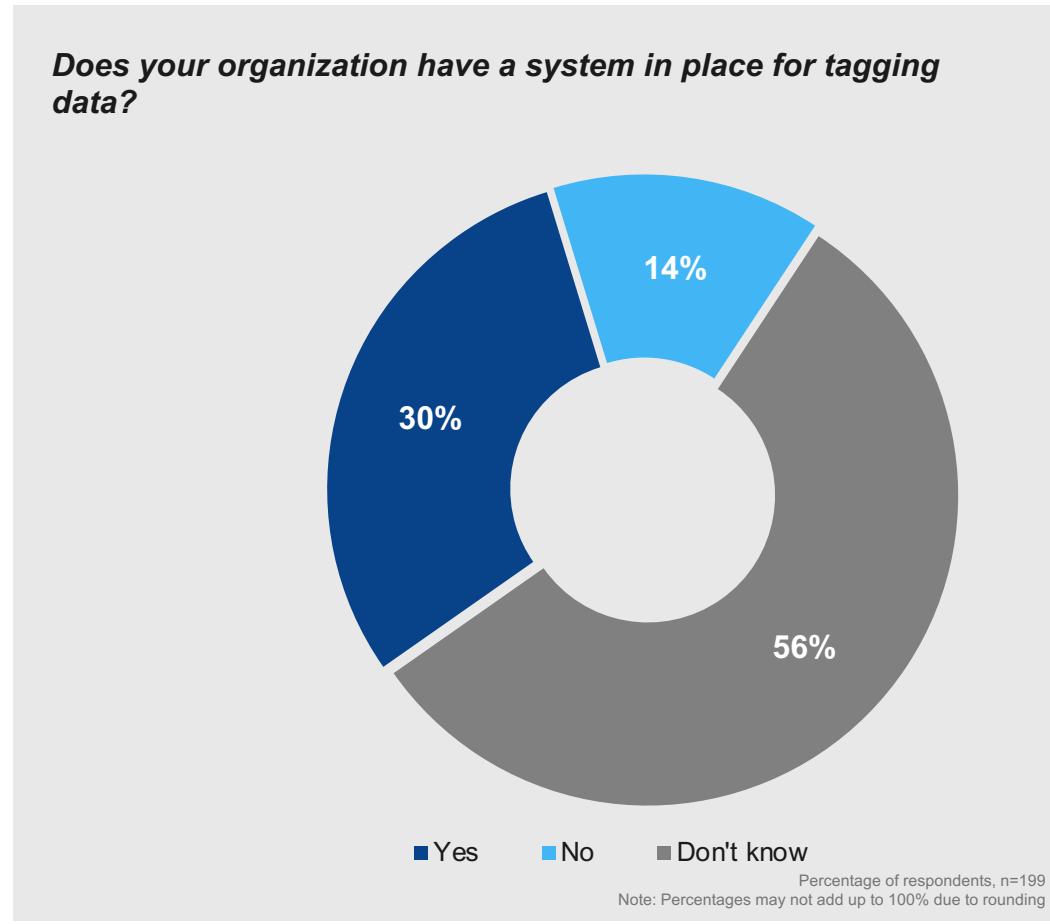
***What factors are challenging your organization's ability to effectively collect, disseminate, and analyze information?***



“

Access & collection of data for logistics is rarely prioritized highly enough to be effective.”  
Survey Respondent

### Less than a third of respondents say that their agencies have the ability to tag data



**29%**

of respondents in leadership positions say that their agencies cannot tag data compared to 12% of those in non-managerial positions.

“

Enforce standardized tagging and categorization of data.”

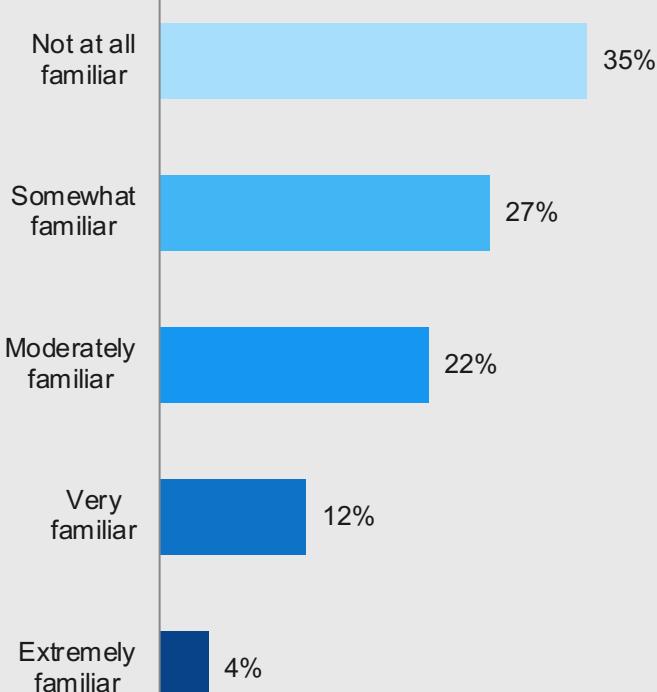
**Survey Respondent**

**32%**

of defense civilians say that their agencies have systems in place for tagging data compared to just 13% of active duty respondents.

**Of those familiar with the role of metadata, more respondents agree than disagree that their agencies leverage metadata to support actionable intelligence**

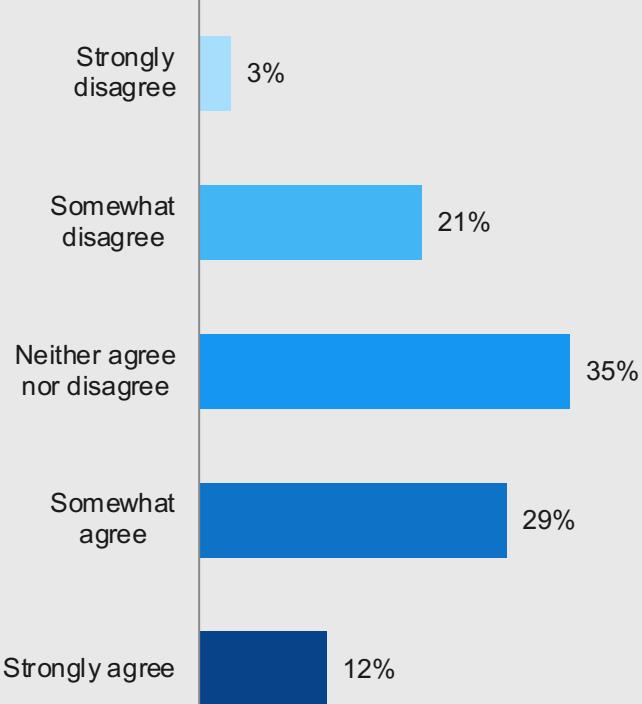
***How familiar you are with the role metadata can play in supporting actionable intelligence?***



**35%**

of respondents are not at all familiar with the role metadata can play in creating actionable intelligence.

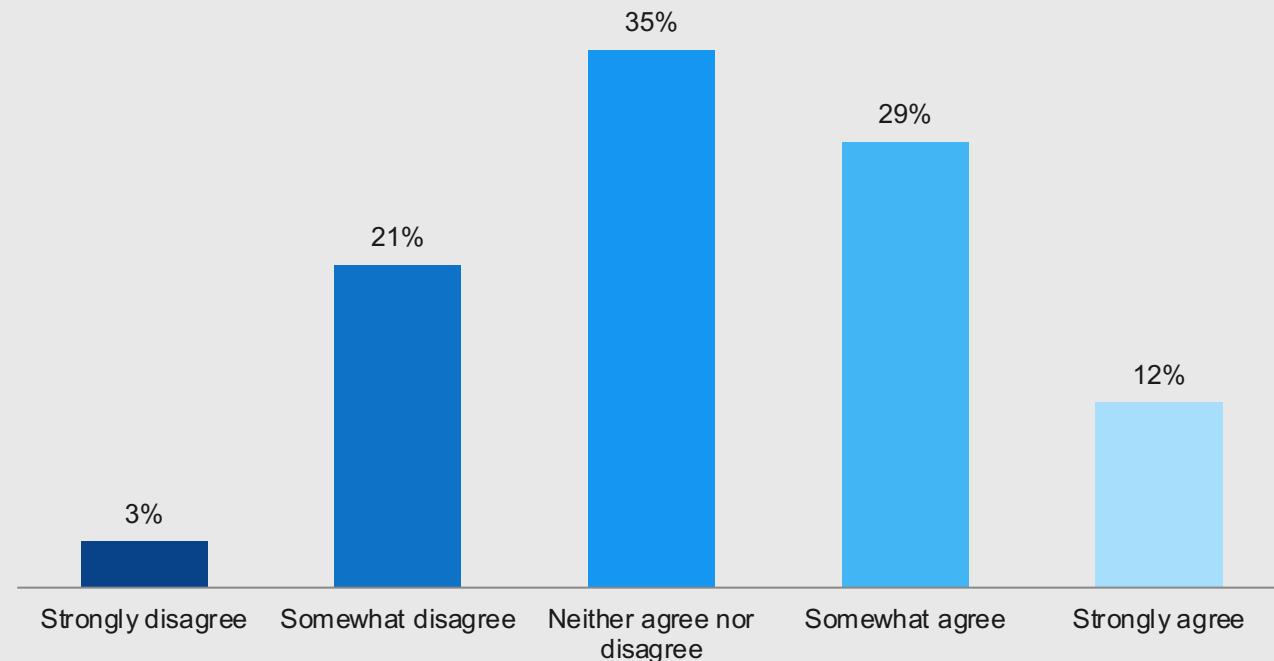
***“My organization effectively leverages metadata to support actionable intelligence.”***



**Metadata** refers to descriptive information about data that informs how data is categorized and consequently shared. The ability to capitalize on metadata makes searching and working with data more efficient.

**4 in 10 agree their organization effectively leverages metadata, highlighting necessary improvement for the remaining 60%**

*Please indicate the extent to which you agree or disagree with the following statement: "My organization effectively leverages metadata to support actionable intelligence."*



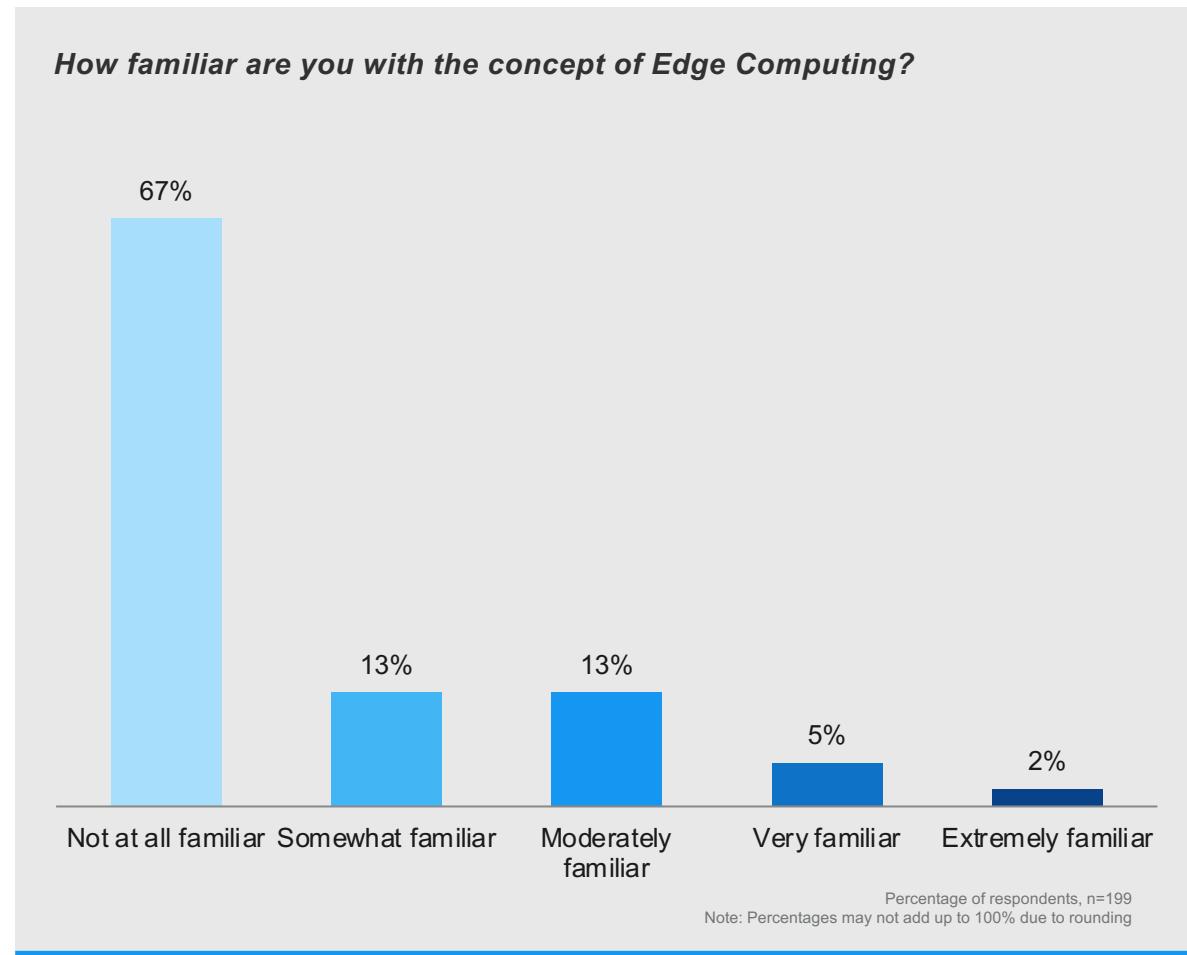
Percentage of respondents, n=129  
Note: Percentages may not add up to 100% due to rounding

“

Make IC data accessible, available & understandable to the logistics community in order to **enable rapid, proactive analyses** of courses of action and the **ability to influence planning**—and crisis-action—so that all relevant information can be assessed to make the best decisions possible.”

**Survey Respondent**

**A majority of respondents who are familiar with the role metadata plays in supporting actionable intelligence are unfamiliar with edge computing**



“

Edge computing—a computing method that pushes data processing from a central location closer to where data is collected, to the “edge” of an interconnected network of devices—could help ensure that information networks remain stable and operational during crises.”

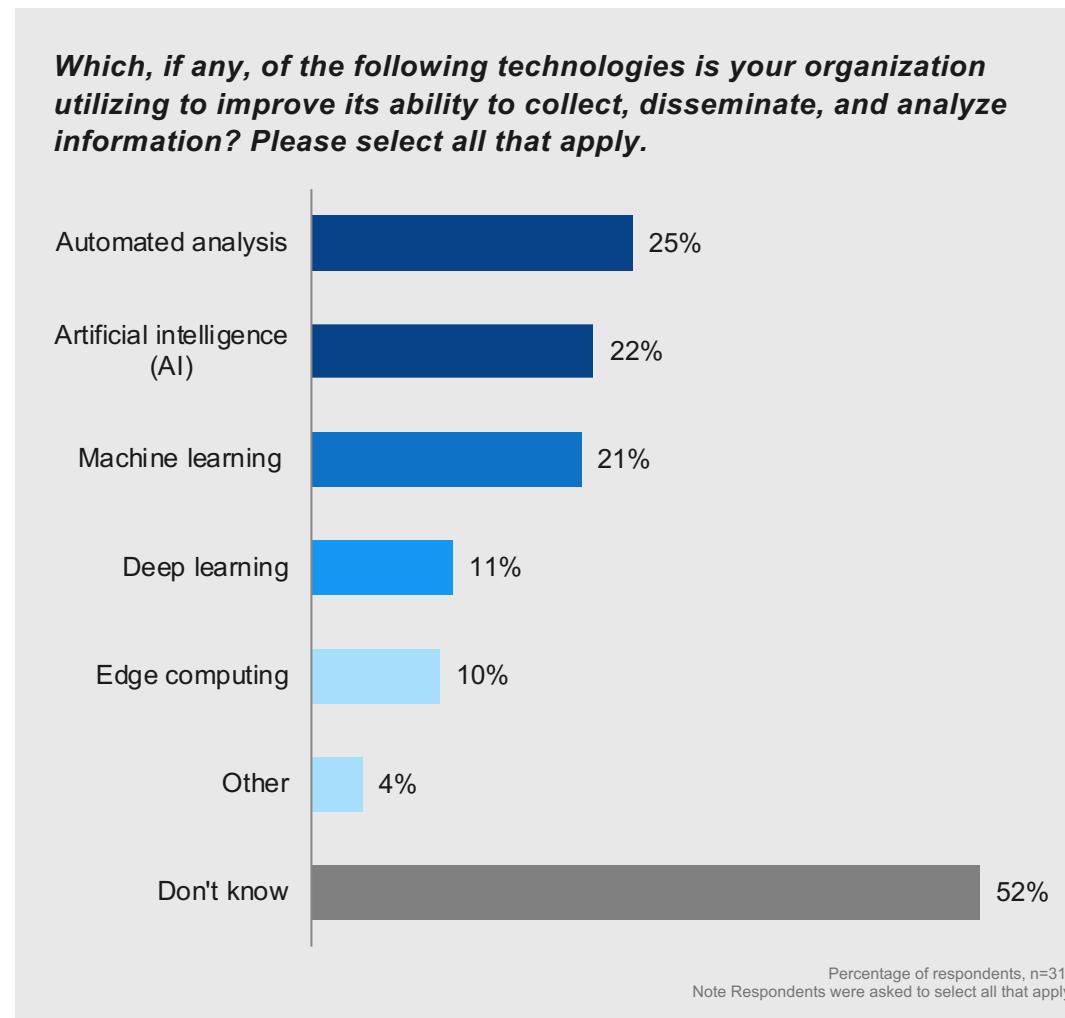
**Katie Malague, Vice President, Government Effectiveness, Partnership for Public Service<sup>1</sup>**

## What is Edge Computing?

Edge computing refers to cloud functionality operating at the network’s edge. Edge computing resides between smart end-devices and traditional cloud and data centers and is useful in environments for transporting large volumes of data generated at the edge.

1. Government Executive: “The Pandemic is Spurring Adoption of Emerging Technologies.” June 12, 2020. <https://www.govexec.com/technology/2020/06/pandemic-spurring-adoption-emerging-technologies/166116/>

**Respondents note that their agencies are utilizing modern and emerging technologies to improve their collection, dissemination, and analysis of information**



“

Be smarter in [your] approach to buying/developing new systems such that data (and data visibility) are embedded in the requirement.”

**Survey Respondent**

# Final Considerations

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**For a stronger posture in leveraging and managing ISR data, DoD agencies should consider:**

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### **Allocating substantial investments toward data analysis and management tools**

DoD agencies across-the-board could improve how data is stored, shared, and analyzed. Though active duty officers demand agility within pressing and dangerous operational environments, 65% of respondents agree that the warfighter spends more time looking for than using data. Moreover, data PED remains more predominantly manual for those in active duty and analysis falls short in supporting decision making. Automation, data tagging, and analysis tools are key components for driving data toward elevated mission success.

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### **Harnessing the warfighter experience to inform data sharing strategy**

54% of those who were able to describe their organization's data environment said that their agency's approach is producer-focused rather than warfighter-focused. While automated analysis, AI, machine learning, and other tools should be integrated to improve data processes, data architects and defense information technology experts should prioritize warfighter needs and functionality into the PED process.

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### **Adopting technologies that enable data on the tactical edge**

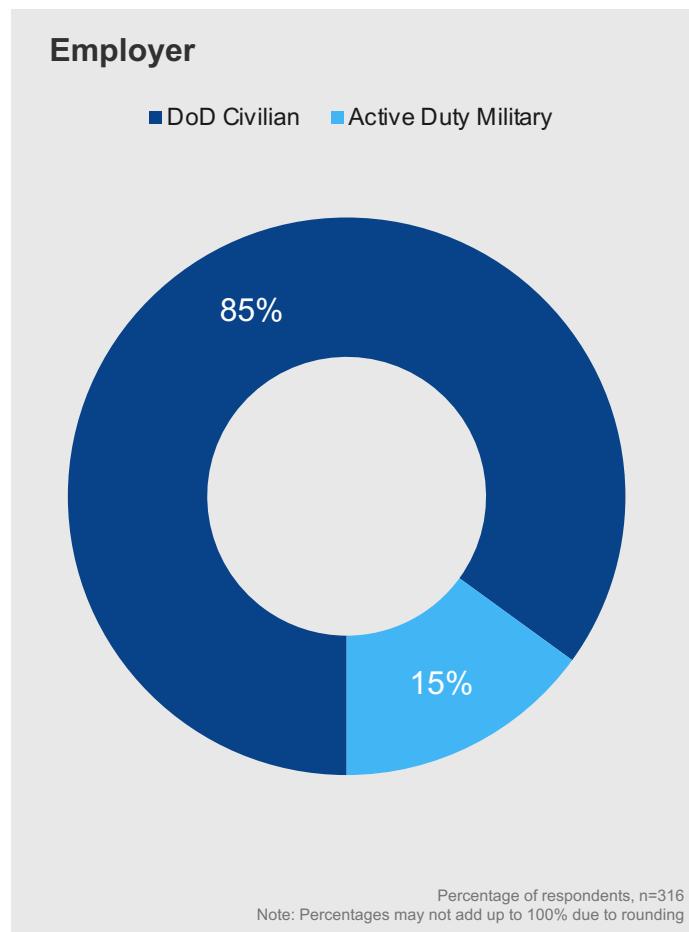
Warfighters face a greater challenge of leveraging data compared to their DoD civilian counterparts. Agencies of active duty personnel, for example, are 17 percentage points less likely to be effective at supporting the warfighter's mission with data compared to those of defense civilians. Agencies supporting active duty officers may benefit from edge computing, which enables the passage of data to the tactical edge.

## **Insights from Booz Allen Hamilton**

The Department of Defense (DoD) is at an inflection point in modernizing its intelligence, surveillance, and reconnaissance (ISR) enterprise to deal with huge volumes of ISR data, extract actionable intelligence efficiently, and maintain information dominance over our adversaries. Until recently, the DoD could afford to focus primarily on improving sensors and other hardware to get more and better ISR data. But the collection of more and better data doesn't automatically translate into more or better intelligence. And the ever-growing volume of ISR data has become so overwhelming that there is now an urgent need to find ways to access, manage and process the data. A new approach to data processing, ISR at the edge, harnesses the overwhelming volume of data, enables analysts and warfighters to more efficiently use the data to support decision-making, and generate information advantage over our adversaries.

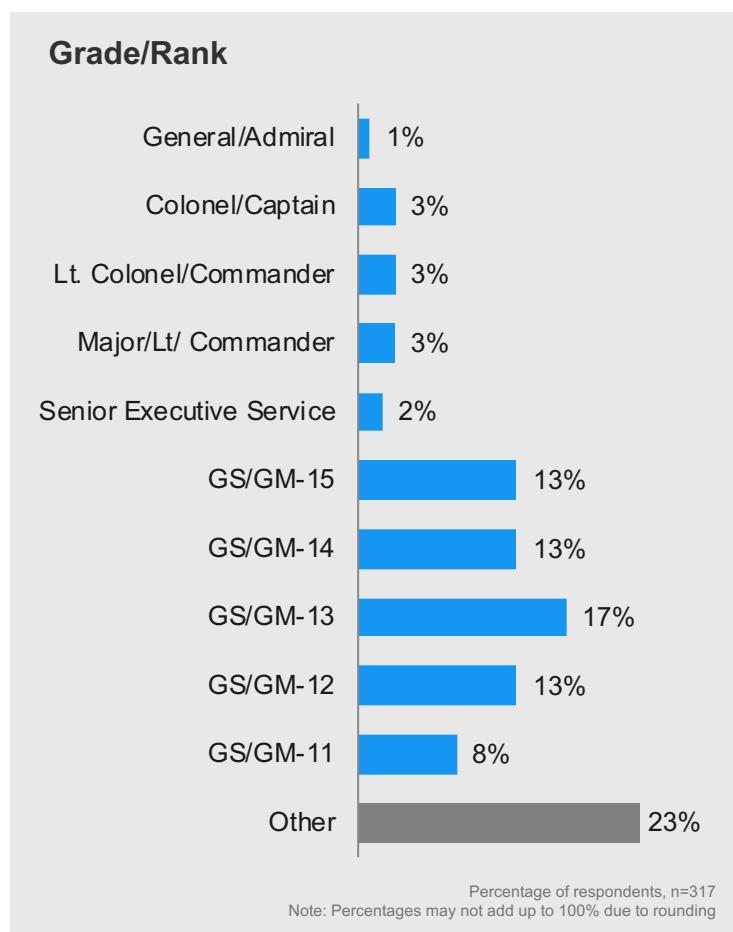
# Respondent Profile

A majority of respondents are senior decision-makers in the federal government



85%

of respondents are civilians working in the DoD.

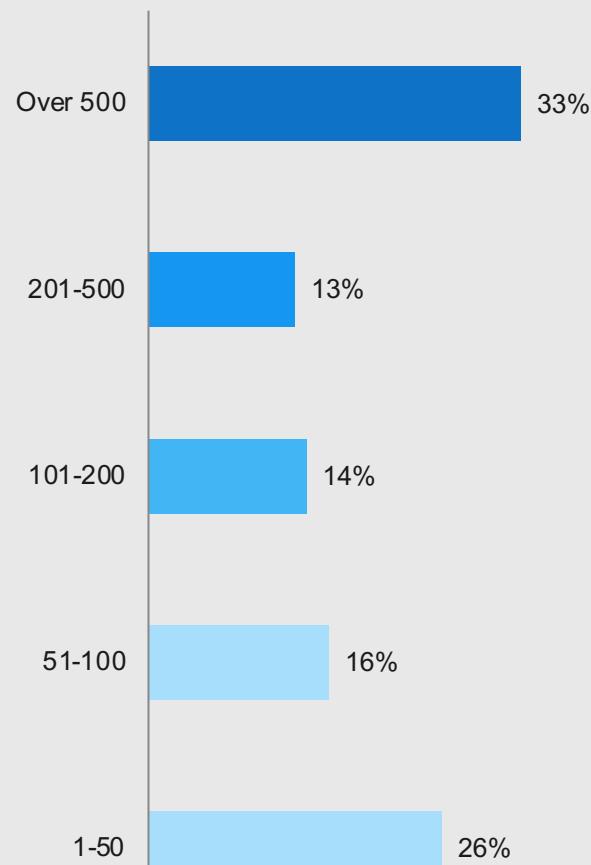


55%

of respondents identify as GS-13 or above, including members of the Senior Executive Service, General/Admiralty, and Major/Commander.

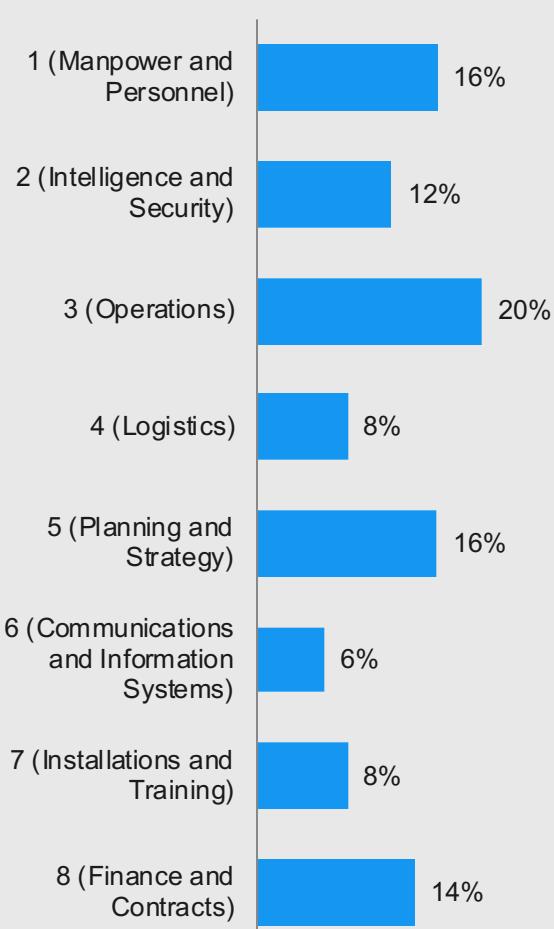
Half of respondents work in defense organizations larger than 200 people

**What is the approximate size of your direct organization?**



Percentage of respondents, n=192  
Note: Percentages may not add up to 100% due to rounding

**Which of the following organizational designators applies to you?**



Percentage of respondents, n=192  
Note: Percentages may not add up to 100% due to rounding

# About

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