

Driving Digital Transformation

Insights from Alexis Bonnell, Chief Information Officer and Director of the Digital Capabilities Directorate, Air Force Research Laboratory

By Michael J. Keegan



I had the pleasure of hosting Alexis Bonnell, chief information officer (CIO) and director of the Digital Capabilities Directorate at the Air Force Research Laboratory (AFRL) on *The Business of Government Hour*. She develops and executes the AFRL information technology

strategy, leading the strategic development of highly advanced next generation technologies and platforms for AFRL. This also includes catalyzing the discovery, development, and integration of warfighting technologies via digital capabilities, IT infrastructure, and technological innovation.

Bonnell's perspective is rooted in her extensive experience in both the public and private sectors, and she brings a unique and refreshing approach to digital transformation within the government. The following delves into the main themes discussed during the interview, including her strategic IT vision, the significance of understanding the relationship with knowledge, the concept of digital transformation, the five deadly sins of digital transformation, and the role of emerging technologies.

Mission of the AFRL

The Air Force Research Laboratory is the primary scientific research and development center for the U.S. Department of the Air Force and Space Force. "AFRL plays an integral role in leading the discovery, development, and integration of affordable warfighting technologies for our air, space, and cyber forces. . . . We provide a diverse portfolio of science and technology ranging from fundamental to advanced research and tech development," explains Bonnell.

The agency, headquartered at Wright-Patterson Air Force Base in Ohio, meets this mission with a workforce of more than 12,500 people in 10 states across nine different technology areas and over 40 operations around the globe. "Our goal is really to defend America by unleashing the power of innovative air, space, and cyber tech," she underscores. "While our heritage dates back to 1917, we officially launched in 1997, consolidating the four former Air Force Laboratories and the Air Force Office of Scientific Research." The laboratory and its predecessors have overseen more than 100 years of critical research efforts for the U.S. Department of the Air Force, Space Force, and the U.S. Department of Defense.

Strategic IT Vision at AFRL

Bonnell's strategic IT vision for the AFRL is not only forward-thinking but also deeply rooted in enhancing human capabilities. Rather than focusing solely on technological advancements and platforms, she emphasizes the importance of the relationship with knowledge. She advocates for a shift away from an obsession with specific



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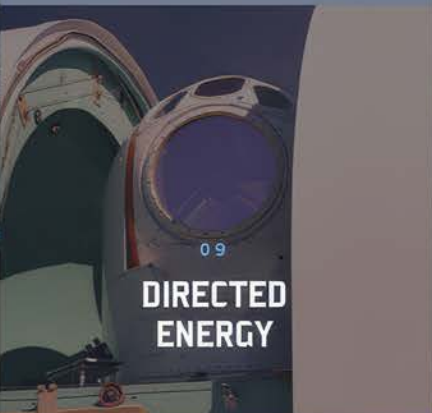
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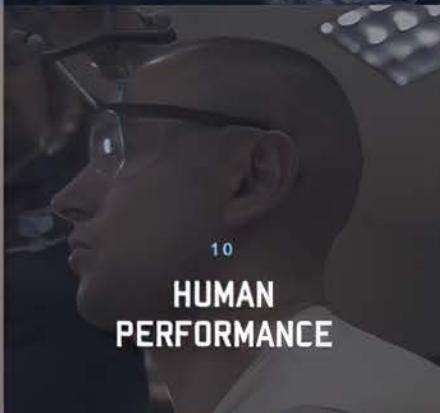
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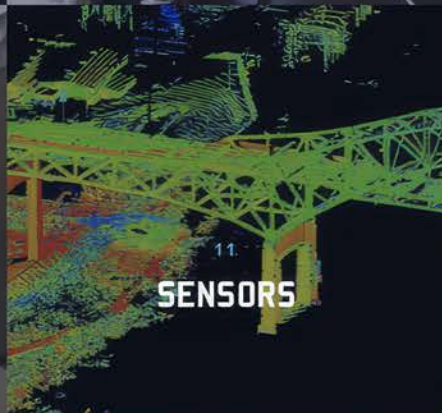
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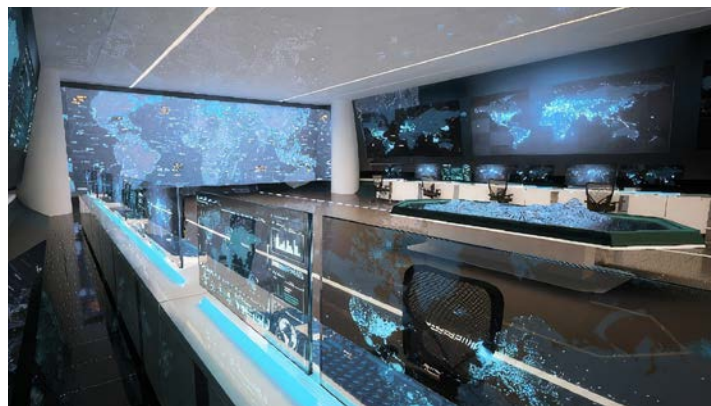
tools and platforms towards a more holistic understanding of how knowledge is created, accessed, and utilized. “Our IT vision is about transforming how we think about and use technology to accelerate our scientific research, optimize our operations, and ultimately provide advanced capabilities to our warfighters,” explains Bonnell. “We need to ensure that we’re not only keeping pace with the rapid technological changes in the world but setting the pace.”

At the core of her strategic vision is this idea of enabling and empowering the researchers. “IT isn’t just a support function—it’s a critical enabler of mission success,” according to Bonnell. “We are heavily focused on providing the right tools, platforms, and infrastructure that allow our scientists and engineers to work faster, collaborate better, and innovate more efficiently.”

Her first priority is to encourage a change in how people think about and interact with technology. She stresses the need to move beyond the identity tied to particular tools or vendors and instead focus on the relationship with knowledge. This approach is crucial because it addresses the core purpose of technology: to facilitate the right information reaching the right source at the right time for informed decision making.

Another critical aspect of her strategy is ensuring that technological tools are useful at all levels, especially for the information originators. Bonnell points out that in many large organizations, including government entities, IT systems are often designed to improve leader confidence through dashboards and reporting tools. However, this can overlook the needs of the working-level personnel, such as scientists and researchers, who generate the initial data. By prioritizing tools that are beneficial to these information originators, the overall effectiveness and timeliness of data flow can be significantly improved.

Finally, she emphasizes that technology should reflect and reinforce organizational culture and values. She argues that technology should not only be evaluated on its technical merits but also on its ability to drive desired behaviors and relationships with knowledge within the organization. This perspective ensures that technological investments align with and support the broader mission and goals of the AFRL. “We’re investing heavily in IT modernization efforts to ensure we are agile, resilient, and secure,” Bonnell explains. “That means everything from leveraging cloud solutions, enhancing our data analytics capabilities, ensuring robust cybersecurity measures, and embracing emerging technologies like artificial intelligence and machine learning to solve problems at scale.”



The Relationship with Knowledge

One of the most profound insights from the interview is Bonnell’s emphasis on the relationship with knowledge. “At AFRL, we see knowledge as a critical enabler of innovation,” she explains. “It’s not just about having access to data or information—it’s about how we share and use that knowledge to drive meaningful advancements.” She highlights that the ultimate goal of IT is to enhance this relationship by ensuring that the right information is available to the right people at the right time. This approach moves beyond the traditional focus on data and platforms and instead centers on how knowledge is curated, accessed, and applied. “We are committed to ensuring that the knowledge we generate through research and development doesn’t stay siloed. Our goal is to create pathways where that knowledge can be shared across teams, departments, and even external partners to maximize impact,” asserts Bonnell.

Bonnell illustrates this point with a compelling example from her experience at Google. She describes a scenario where data from various sources seamlessly converges on a web page, providing a rich, decision-supportive environment without requiring extensive manual integration. This capability, powered by application programming interfaces (APIs), transforms how information is accessed and utilized. “How we capture, manage, and apply that knowledge can be the difference between being reactive and being truly innovative in the defense space,” Bonnell notes. The key takeaway is that effective digital transformation should enable similar fluidity and accessibility of information within the AFRL. This shift towards a knowledge-centric approach also involves recognizing the importance of both human and machine knowledge.

Bonnell stresses that future IT strategies must facilitate the integration of these two forms of knowledge, enabling humans to leverage the computational power of machines while retaining the critical thinking and contextual

understanding that humans provide. This balanced approach ensures that technology enhances rather than replaces human capabilities. “Going forward,” she explains, “we’re looking at new ways to enhance our relationship with knowledge—whether through AI, better data management systems, or more collaborative platforms—so that we can not only generate but also apply knowledge more efficiently across the organization.”



Defining Digital Transformation

Bonnell provides a refreshingly simple yet profound definition of digital transformation: the ability for people to be more successfully curious than they were before. In her view, digital transformation is not just about implementing new technologies but about fostering a culture of curiosity and continuous learning. “For us, digital transformation,” she explains, “isn’t just about adopting new technologies—it’s about fundamentally changing how we operate, how we innovate, and how we deliver outcomes to the warfighter. Digital transformation is more than just an IT initiative; it’s a mindset shift. It’s about rethinking processes, data, and systems to be more agile, responsive, and integrated in everything we do.”

This perspective aligns with the broader goal of enhancing the relationship with knowledge and underscores the importance of a people-centric approach to digital transformation. Bonnell posits that digital transformation should unleash and amplify curiosity within the organization, particularly in a research-focused entity like the AFRL. By making it easier for people to explore, discover, and connect information, digital transformation can drive innovation and advance the organization’s mission. “We have to enable our workforce to be comfortable with change, experimentation, and leveraging digital tools to solve problems in new ways,” she acknowledges.

The real value of digital transformation is how it enhances AFRL’s decision-making capabilities. “When you have real-time access to data, paired with AI and machine learning tools, it allows us to make faster, more informed decisions, which is critical in defense,” says Bonnell, who also sees the value of digital transformation as breaking down silos. “We can create a more collaborative environment where data flows seamlessly across teams, making it easier to innovate and deliver better solutions faster.”

The Five Deadly Sins of Digital Transformation

Bonnell identifies five critical pitfalls, or “deadly sins,” that organizations must avoid to achieve successful digital transformation. These insights are particularly valuable for leaders and practitioners involved in managing IT and digital initiatives.

1. **Not knowing who you’re trying to become:** Bonnell emphasizes the importance of having a clear North Star or guiding vision for digital transformation. Without a well-defined goal, organizations can become reactive, constantly shifting priorities based on the latest trends or challenges. A clear vision provides a stable reference point for making decisions and prioritizing initiatives. “One of the biggest mistakes organizations make is not being clear on what they want from digital transformation. If you don’t define the end state clearly, you end up chasing technology for technology’s sake rather than creating real value,” she explains.
2. **Assuming there is a technological destination:** Digital transformation is not a one-time project with a definitive endpoint. Bonnell underscores that it is an ongoing journey of continuous improvement and adaptation. This mindset encourages organizations to remain agile and open to new opportunities and challenges rather than becoming complacent once initial goals are achieved. “The real danger is thinking that a shiny new tool will solve all your problems. It’s about aligning technology with strategy, processes, and people,” she notes.
3. **Underestimating toil:** The complexity and effort required to implement and sustain digital transformation initiatives are often underestimated. She highlights the importance of acknowledging and addressing the toil involved, from managing legacy systems to navigating bureaucratic processes. Recognizing and planning for these challenges is crucial for maintaining momentum and achieving long-term success.
4. **Assuming doing differently is enough:** Simply changing processes or adopting new technologies is not sufficient for true transformation. Bonnell argues that organizations

must also focus on changing how people think and feel about their work. This involves cultivating a culture that embraces change, encourages curiosity, and supports continuous learning.

5. **Incentivizing the critic over the doer:** Bonnell warns against creating environments where criticism and analysis are valued over action and experimentation. While critical thinking is essential, it should not stifle innovation and progress. Organizations must strike a balance, encouraging thoughtful analysis while also empowering individuals to take risks and drive initiatives forward.

Emerging Technologies and Their Impact

Bonnell expresses excitement about a number of emerging technologies and their potential impact on the Air Force and Space Force. The future of IT at AFRL is about harnessing the power of data, artificial intelligence (AI), and advanced computing to push the boundaries of what's possible. It is about creating a digital ecosystem that's adaptable, secure, and able to leverage emerging technologies like quantum computing and AI, not just to solve today's problems, but tomorrow's as well. Her insights provide a glimpse into the future of IT and digital capabilities within the AFRL.

- **Artificial intelligence and machine learning:** She highlights the transformative potential of AI, not just in the context of generative AI but also in physics-based modeling and digital twins. These technologies can significantly enhance the AFRL's research and operational capabilities by providing advanced simulation and predictive analytics. For example, by creating digital replicas of physical assets, AFRL can run simulations, predict outcomes, and make more informed decisions before anything is physically built or changed. Digital twins offer a way to test hypotheses in a controlled, virtual environment. This means researchers can explore multiple pathways, adjust, and see the impact without having to build physical prototypes. It's a game-changer for reducing time and cost.
- **Fully homomorphic encryption:** This technology allows data to be processed in its encrypted form, enhancing security and privacy. Bonnell sees significant potential in its application within the AFRL, particularly in safeguarding sensitive information while enabling advanced data analysis.
- **Quantum computing:** Although still in its early stages, quantum computing holds promise for solving complex problems that are currently beyond the reach of classical computers. Bonnell views quantum computing as a critical area of exploration for future capabilities. The fundamental nature of quantum computing is really going to change

the way we do things, so she advises us to be prepared for that new reality. With quantum computing, we're going to have to rethink everything we know about encryption and security.

- **Result augmented generation (RAG):** One of the most intriguing technologies Bonnell discusses is RAG, which enables users to curate and interact with personalized knowledge sets. This technology represents a significant shift in how information is structured and accessed, allowing individuals to create customized knowledge environments that align with their specific needs and missions.

Bonnell's enthusiasm for these technologies is tempered by a practical understanding of their implementation challenges. She emphasizes the importance of staying informed about technological advancements while also being realistic about the time and effort required to integrate them effectively.

Conclusion

My conversation with Alexis Bonnell provides valuable insights into the strategic vision and approach to digital transformation at the Air Force Research Laboratory. Her emphasis on the relationship with knowledge, the importance of a people-centric approach, and the identification of common pitfalls in digital transformation offers a framework for understanding and navigating the complexities of IT and digital initiatives.

Bonnell's perspective is particularly relevant in the context of government and large organizations, where the challenges of bureaucracy, legacy systems, and cultural inertia can hinder progress. By focusing on clear goals, acknowledging the ongoing nature of digital transformation, and fostering a culture of curiosity and continuous learning, organizations can overcome these challenges and harness the full potential of emerging technologies.

Resources

To learn more about the Air Force Research Laboratory, go to afml.af.mil.

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