

# BUILDING KNOWLEDGE ECOSYSTEMS FOR ENABLING ARMY TRANSFORMATION

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*“... Transformation encompasses every aspect of our Army. It is more than just an Interim Armored Vehicle, a beret, or Future Combat Systems. Every aspect of the Army—doctrine, organization, training, leadership, materiel and equipment, recruiting and advertising, acquisition, infrastructure, and much more—must all change together in a holistic manner.”*

—Thomas E. White  
Secretary of the Army  
Senate confirmation hearing  
May 2001

## Introduction

Setting forth his major objectives at his confirmation hearing before the Senate Armed Services Committee, Secretary of the Army Thomas E. White emphasized the paramount importance of implementing the Army's transformation as a total system whose separate parts must work in concert to achieve the essential whole.

Knowledge management (KM) can play a critical role in meeting this goal. KM is the emerging discipline aimed at understanding and implementing complex distributed systems made up of people, technologies, policies, and processes so that the factors are interwoven to form a holistic solution. KM is about knowing, about putting information to

work. It's about sifting through a glut of data and finding the relevant, trusted, valuable information people need in dynamic, complex situations where devising options, let alone answers, is hard to do. It's about using information to formulate the right problem in the first place, a tremendous and often unrecognized challenge in itself. Knowing the state of business at various levels of the Army enterprise, or knowing the state of the force in an active battle situation, demands that relevant information about all kinds of things, people, and the connectedness among them be quickly and accurately found. The information and its context must be clearly presented in a way that enables people to synthesize it into appropriate action.

## AMC KM Initiative

The Army Materiel Command (AMC) launched a major KM initiative in July 2000 to invest in a focused effort to build KM capabilities and solutions to meet AMC's immediate and future challenges. The Army Research Laboratory (ARL) was designated AMC Knowledge Management Executive Agent, tasked to provide leadership throughout the command from early research and concept formulation stages through solution implementation. Key

aspects of this initiative are the AMC KM Council, the ARL Rainbow Ecosystems Model, and alignment with Army knowledge management directions.

The vision for this initiative is an AMC Knowledge Enterprise characterized by three elements:

- *Efficiency.* Using knowledge to improve productivity, increase speed, and reduce cost—getting it right.
- *Innovation.* In new service processes, creating new knowledge and enhancing old knowledge.
- *Effectiveness.* Increasing application of high-quality, relevant knowledge.

To achieve the vision, we have established six strategic goals:

- Focus KM initiatives to achieve AMC business goals,
- Apply KM principals to develop a world-class KM improvement process,
- Apply the KM improvement process to implement a world-class knowledge enterprise model at AMC,
- Build active AMC knowledge communities of practice,
- Implement the KM improvement process and the knowledge enterprise model to build knowledge organizations throughout AMC, and
- Leverage the KM improvement process for AMC executive agents to use for other focus areas.

The AMC KM Council, a knowledge community of practice with representatives from all AMC subordinate commands and HQ AMC, is a critical part of this initiative. The KM Council is an active “network of champions,” linked to command chief information officers (CIOs) and functionals, which meets regularly to build KM awareness, share experience and tools, and develop tactics for implementing strategic goals within their own sphere of influence. The council has a controlled-access Web site that allows members and AMC CIOs to interact through online

discussions and share documents, briefings, lessons learned, and proven KM tools.

### Rainbow Ecosystems Model

ARL is considering KM complexities from a systems perspective, focusing on the whole as part of its larger environment and examining the interdependencies of the parts, rather than taking the whole and analyzing each part separately. Exciting new research approaches, from artificial intelligence to small-world phenomenon to immune systems theory research, are being used to analyze the dynamics of complex, decentralized systems' behavior. ARL and other organizations find that conventional approaches to design and build static structures like bridges and buildings are ineffective when applied to dynamic and complex KM problems. ARL is, therefore, conceptually drawing from these newer, bolder approaches; exploring the analogies; and seeking ways to adapt these findings to build robust KM systems. We are considering a range of emerging technologies. These include social technologies that address organizational attitudes, values, and behavior, as well as information technologies that address automated networking, applications, and data.

The ARL Rainbow Ecosystems Model is a knowledge-based systems architecture that includes an integrated automated system of intelligent portals, military business transaction applications, knowledge discovery tools, and a foundational enterprise knowledge warehouse. This architectural model is viewed as a living system for meeting the dynamic computing, people, and process needs of KM. The model also forms the basis for both horizontal (supplier-customer) and vertical (superior-subordinate) relationships.

The conceptual inspiration for the Rainbow Ecosystems Model is a biological, social whole whose parts work together and adapt to change in

a way that makes the system robust. ARL calls it an ecosystem model because it is being used to learn about the behavior of knowledge in the context of its environment, the culture in which the knowledge exists and is used. The Rainbow Model does not assume that we know what we are trying to build ahead of time or what information we will be looking for later because our experience has revealed that most often the system and the needs become intertwined. Starting with some perceived needs, a system is built which, when demonstrated, typically opens up new ideas and new ways to handle the initial problem. This in turn changes the perceived needs. A good example of this phenomenon is the way perceived needs of consumers change as they became familiar with buying goods over the Internet.

The Rainbow architecture encourages an iterative design process with frequent interaction between problem formulators and problem solvers. This perspective is especially valuable when the solution involves a system using commercial-off-the-shelf components that embody practices that are new to the enterprise. For these new practices to be effective, new ways of thinking about the way knowledge is applied to human work must be internalized and cemented through policy. The Rainbow Model can help people learn, through iteration, how to adapt new work processes as part of a total business system.

The ARL Knowledge Management System (AKMS) implements the Rainbow Ecosystems Model to provide a foundation for business innovation and knowledge sharing throughout ARL. AKMS is an ecosystem of software that adapts and changes to the composition of its clients and the changing technological landscape. ARL has an equally important second KM system, the Knowledge Management Research System (KMRS), which is a distorted mirror of the AKMS. KMRS is a sys-

tem where innovative ideas and software are researched and tested. Those that prove successful are nurtured until they have evolved to a level of maturity where they can be migrated from KMRS to AKMS for regular use by the ARL community.

### Conclusion

Knowledge management promotes the importance of focusing on knowledge as the sum of what the enterprise has learned, and applying that knowledge to the right solution to achieve success for the enterprise as a whole. The challenge of this new discipline is that it requires a profound paradigm shift, from thinking about problems analytically to thinking about problems holistically. The ARL Rainbow Ecosystems Model, which is at the center of the AMC KM initiative, is helping us meet that challenge. It is designed to help AMC design system solutions to context-specific complex problems. The AMC KM Council is a vital dimension of the Rainbow architecture. KM Council members influence and contribute to the evolution of the Rainbow system and have a high stake in its success. Our journey is demonstrating that knowledge is enhanced when it is shared, and that innovative use of knowledge requires holistic, innovative thinking together with disciplined hard work.

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