

## **16.0 IT and Air Force Organization and Education**

### **16.1 Introduction**

The revolution in information and IT will profoundly affect the organization and education of the Air Force. As the industrial revolution created entirely new organizations of mass production and public education, the information revolution will lead to new forms of organization and education. Today's Internet provides an intriguing example of how unusual this new type of organization will appear. The embodiment of complexity, the Internet does not appear to be organized in any traditional hierarchical sense. But this system is organized very economically, and adaptively. A number of large organizations are beginning to learn about these new forms of organization, and the Air Force will inevitably, and appropriately, follow their lead. At this point these nascent ideas provide only azimuth, not destination. A final solution for a new Air Force organization can not now be known. What is known is that it is better for organizations to begin to become adaptive, rather than wait until more is known. As General Gordon Sullivan said,

“In this environment, the payoff will go to organizations which are versatile, flexible, and strategically agile, and to leaders who are bold, creative, innovative and inventive. Conversely, there is enormous risk in hesitation, undue precision, and a quest for certainty.”

Three general observations underlie our observations. First, IT affects all organizations, not just those in the computer industry. As air power once significantly changed army and navy doctrine and organization, IT changes every organization. It will change the Air Force even if the primary responsibility for the Information War mission is consigned to another agency. Second, IT will not win wars. Innovation of new technology and tactics give advantage only if well integrated to the organization's culture, policies, and doctrine. IT is just one system of an organization's "system of systems" to borrow the phrase from Admiral Owens. Third, organization and education will be vital differentiators for the Air Force in a copy-cat world of bits and bytes, but what are the characteristics of effective organization and education 30 years from now?

### **16.2 Organization**

The beginnings of an answer can be found in organizations that are now successfully riding the IT bow wave. One of the most common observations about these enterprises is that they are relatively flat. Multiple levels of middle managers are not needed when IT is appropriately employed.

Prior to networked computing, one role of middle management was overseeing highly defined, discrete functions within a division and reporting on those findings. Responsibility for oversight had to be limited to specific domains as most information was not readily available. The information was known by the manager's people, down the hall on another desk, or in last year's folder. The IT revolution changes that. Middle management's span of oversight greatly expands as most of the important data is abstracted to information that can be quickly amassed and analyzed. Fewer middle managers are needed.

Another factor contributing to flatter organizations is the power of IT to support the coordinating, synchronizing function of managers. This too will change. Many scholars and practitioners see IT as a revolution in coordination not production or computation. Networked

computers are able substitutes for the coordination role as email, architecture, and other programming techniques dutifully convey top management vision to lower levels and relentlessly scan data for exceptions worthy of a coordinated response by management.

To effectively adapt the Air Force must move beyond its current monolithic, highly structured, chains of command. Designed to overcome attrition and the fog of war, redundant levels of command are increasingly inappropriate in an age of sensors that peer through the fog and create volumes of abstract data patterns ripe for accumulation and processing by high-level managers. Existing functional chains of command can be replaced by *networks* of command to reduce time and improve coordination of large numbers of forces. If we are to win at coordination, in a “Wal-Mart War” as General Marshall calls the next conflict, it will be due to using IT as Wal-Mart does to coordinate consumer demands and supplier production without delays.

The Air Force has already flattened by removing the Air Division level from most commands. The resistance to that change indicates how difficult continuing this process will be. A first step in a series of actions should be to develop an on-going industry education and touring program for flag officers to see how Wal-Mart and others are winning their IT wars. That group will produce an ongoing stream of necessary improvements. A second step will be to increase reward structures for organizations within the Air Force that demonstrate appropriate IT uses in this area.

Another quality of successful organizations is that they have learned how to produce hundreds of niche targeted products and services. IT permits adaptive, flexible manufacturing and delivery technology that permits organizations to offer hundreds of related products to more precisely satisfy increasingly specific demands from the marketplace for custom tailor-made products. Using database technology and consumer demand data, ever finer details of market niches are created for companies to pursue. As a result, companies like USAA offer hundreds of insurance and financial products to their specific customer base, and plan on delivering tailor-made products for every consumer in the future.

Analogously, the Air Force must adapt and learn how to strike and defend with hundreds of varied lethal and non-lethal weapons from physical ordinance to abstract bits and bytes. In a CNN communications world, hostile action with lethal weaponry is becoming unacceptable. The Air Force must continue to reorganize away from one major product—the delivery of lethal ordinance—to Global Presence, where presence is satisfied on a more “niche” basis. We must organize to deliver a vast array of coordinated products into the day-to-day, undeclared-war marketplace of today, as well as preserving the ability to strike an opposing force in the field.

This will be difficult in the near term for two reasons. The Air Force is currently dominated by operations, operations that have proven recently to be very effective. A second limitation is that we have no captivating vision of a post-industrial organization. First, the Air Force can undertake doctrinal review, determining what future “weapons” and methods of employment will be needed. Second, the Air Force should continue to expand the number of weapons and objectives used at Flag warfighting exercises at Nellis.

In addition to flat and niche driven, a third quality of successful organizations is that they use front line employees in a different way. These workers are empowered with intellectual and informational skills, and the power to act on what they see and observe, that is, what they learn.

As mentioned, IT generates ever finer details and tightens the link between top management vision and front-line employees. Both factors demand smarter, much more capable front-line employees with a primary task of noticing cues in the environment and communicating them. Linked to state-of-the-art IT, Frito-Lay trains college graduate route delivery salespeople to look for consumer purchasing patterns at specific outlets and authorizes them to act to adjust delivery and promotional plans. These well trained, autonomously acting front-line employees input this ever changing data into an IT system so that patterns in the small changes can be noticed by others and production and marketing plans of specific products reprogrammed. “Constantly learning” organizations employ highly educated front-line workers and attempt to leverage their skills to out-adapt their competition. These efficient adaptations to subtle market fluctuations replace the old notion of organization as machine that scales mass production up and down.

To do this ever finer tuning, organizations need smarter front-line workers. How the organization accomplishes this education will be discussed later, but the goal is a front-line work force with new skills. New intellectual skills will enable workers to create meaning and value from the abstract cues of data and information. Abstract thinking, problem solving, inference, explicit understanding of work, modes of reasoning that are analytic, procedural, and the ability to commit attention to mental effort: these skills permit front line workers to separate truth from disinformation, recognize actual threats, and understand how their roles must adapt.

Currently, the Air Force is decentralizing the power to act on decisions, but does little *intellectual* and *informational* skill education necessary for sophisticated learning. Instead it tends to rely on training that emphasizes standardization, top down direction, on-again off-again phasing, and physical skill training.

Again, the multi-level hierarchical model must change. A better model might be a network. Smart front-line employees at the periphery, managers as routers and switches and strategic planners as network designers. The main source of this network’s adaptiveness and resilience is the smart decentralized “end of the network”.

### **16.3 Education for the IT Era**

A first step might be to alter educational objectives for undergraduate and first level training programs for our front-line members. This leads naturally to the topic of future Air Force education.

New educational processes will become commonplace in the next 30 years to satisfy the needs of these post-hierarchical organizations. From primary to higher education, the educational processes that provide our young airmen and officers will make far greater use of IT. As a result, our newest members will have increasing capability and fluency with IT skills. Once on active duty their education will become continuous, and applied. Education will grow in scope beyond its training aspect to be more broadly defined as intellectual and information skills such as pattern recognition and inference. Current skill training programs will continue, but the emphasis will shift to applied education that will become a vital daily transaction for the organization, on equal footing to sortie generation.

Continuing education will be explicitly fitted to workplace needs, a tailor-made service that the academic people will learn how to do. Work and learning will become indistinct. Learning will replace labor as the only sustainable source of advantage.

For the Air Force, education and training may be examined in three levels. For front-line workforce, one idea could be contracted mentor-nets involving hundreds of the best educators and thinkers in industry and universities they will provide the opportunity for Air Force “cyber-pilots” to hone skills using the latest technology, share insights, notice threats, exploit adversary weaknesses, and differentiate our capabilities from hostile organizations. Student tribes may be constantly engaged in mock cyber-fights simulating deployment of aircraft, hostile acts, intention masking, and disinformation passing.

For managers tasked to educate and integrate, this “education net” aspect of work would grow to include education and teamwork concepts. To extend the example, managers might be given opportunity to purchase untried technology for their tribe. Those managers that can quickly organize their unit over a network to weigh alternatives and applications might be rewarded for speed and integration of technology.

Top leaders would continue their education at a reduced pace. Once more the previous example might entail these top leaders selecting scenarios and rule structures that they feel appropriate to shifting national security climate and need. The goal of this process would not be to command, but to mold organizations to become adaptive to front-line input.

The old adage rings true. You fight the way you practice. We must be engaged in continual learning in the space in which we will need to attack and defend.

## **16.4 Conclusion**

Organization and education are not distinct, but blended facets of information power, a prerequisite of successful organization. Reinforcing each other they help create a combined system capable of fighting and defending in hundreds of niches. This is similar to how smart terminals within simple networks have replaced large central controlling computer networks. We must become a mesh of brilliant “end points” of an information network.