STRATEGY RESEARCH PROJECT

The views expressed in this paper are those of the author and do not necessarily reflect the views of the Department of Defense or any of its agencies. This document may not be released for open publication until it has been cleared by the appropriate military service or government agency.

# THE APPLICATION OF SYSTEMS THINKING FOR 21ST CENTURY OPERATIONS (THE SENIOR SCOUT CASE STUDY)

BY

LIEUTENANT COLONEL ROBERT SLUSSER
United States Army National Guard

19990611 012

DISTRIBUTION STATEMENT A:
Approved for public release.
Distribution is unlimited.

USAWC CLASS OF 1999

U.S. ARMY WAR COLLEGE, CARLISLE BARRACKS, PA 17013-5050

USAWC STRATEGY RESEARCH PROJECT

# The Application of Systems Thinking for 21st Century Operations

## (The Senior Scout Case Study)

By

**Lt Col Robert J Slusser**

Dr. Robert Murphy
Project Advisor

The views expressed in this paper are those of the author and do not necessarily reflect the views of the Department of Defense or any of its agencies. This document may not be released for open publication until it has been cleared by the appropriate military service or government agency.

U.S. Army War College
Carlisle Barracks, Pennsylvania 17013

DISTRIBUTION STATEMENT A:
Approved for public release.
Distribution is unlimited.

DTIC QUALITY INSPECTED 4

## ABSTRACT

AUTHOR: Robert J. Slusser (Lt Col), ANG

TITLE: The Application of Systems Thinking for 21st Century Operations (The Senior Scout Case Study)

FORMAT: Strategic Research Project

DATE: 10 March 1999 PAGES: 30 CLASSIFICATION: Unclassified

An accelerated pace of change is challenging conventional management wisdom. Leaders trapped in the paradigms of the Industrial Age are finding that once successful practices are no longer appropriate. Leaders must master the conceptual skills necessary to build structures and systems suited for the demands of today's Information Age. The purpose of this paper is to assess the value of systems thinking as a conceptual process for managing the complexity of today's operational environment. Using the Senior Scout Case Study, we will examine some of the applications of systems thinking on a military model. The "case study" format is intended to focus the readers attention on the relationship or link between systems theory and practical application.

# TABLE OF CONTENTS

ABSTRACT.....iii

TABLE OF CONTENTS.....v

LIST OF ILLUSTRATIONS.....vii

ABBREVIATIONS.....ix

INTRODUCTION.....1

THE CHALLENGE.....2

SYSTEMS THINKING.....3

Open Systems and the Learning Organization.....5

The Systems and Contingency Approach.....7

THE SENIOR SCOUT CASE STUDY.....9

Service Orientation.....11
( Application of a Total Systems Perspective )

The Learning Organization.....15
( Application of an Open Systems Approach )

A Culture of Innovation.....17

Responsive Systems.....20
( Application of the Contingency Theory )

Senior Scout Program Summary.....23

CONCLUSIONS.....25

ENDNOTES.....27

BIBLIOGRAPHY.....29

# LIST OF ILLUSTRATIONS

Figure 1. The Systems Model....4

Figure 2. The Learning Organization....6

Figure 3. Service Orientation....13

Exhibit A. The Enhanced Scenario Training System....17

Figure 4. Culture of Innovation....18

Exhibit B. Modular Troupe....21

Figure 5. The Responsive Systems Approach....24

# ABBREVIATIONS

| | |
|---|---|
| ACC | Air Combat Command |
| ACS | Air Control Squadron |
| AOC | Air Operations Center |
| AWACs | Airborne Warning And Control System (airborne platform) |
| CDRFORSCOM | Commander, Forces Command |
| CENTCOM | Central Command |
| C3I | Command, Control, Communications, and Intelligence |
| C4ISR | Command, Control, Communications, Intelligence, Surveillance, and Reconnaissance |
| COMUSCENTAF | Commander, United States Central Command Air Forces |
| C2W | Command and Control Warfare |
| ESTS | Enhanced Scenario Training System |
| EUCOM | European Command |
| FSR | Field Service Representative |
| J2 | Joint Staff – Intelligence |
| JCS | Joint Chiefs of Staff |
| MOOTW | Military Operations Other Than War |
| MTW | Major Theater War |
| RC-135 | Rivet Joint (C2W airborne platform) |
| SOUTHCOM | Southern Command |
| SSC | Small Scale Contingency |
| STE | System Training Exercise |
| TADIL | Tactical Digital Information Link |
| TIBS | Tactical Information Broadcast Service |

# Introduction

Traditional management structures and systems were designed to handle the challenges of Industrial Age mass production. Hierarchical structures, a clearly defined chain-of-command, and a high degree of standardization were readily adopted by big business and the military. Today, however, an accelerated pace of change is challenging conventional management wisdom. In the private sector, the Information Age has created a dynamic market place where competition is ferocious and organizations are constantly searching for new ways to manage growing complexity. For the military, the Post Cold War Era has brought about new geopolitical circumstances and new threats. The advent of the Information Age further complicates the military equation by making available the technology, knowledge, and resources needed for even the smallest of transnational groups to gain access to devastating new weapons.

Leaders trapped in the paradigms of the Industrial Age are finding that once successful practices are no longer appropriate. For the first time in over a century, military leaders cannot look to the past for validation - there is no historic benchmark. Our rapidly changing world requires creative new solutions.

The purpose of this paper is to assess the value of systems thinking as a conceptual process for managing the complexity of our Information Age. We shall begin with a brief overview of the new challenges facing leaders in the 21st Century. Next, we will review the basic tenants of *systems thinking* as well as several of the management approaches derived from it. Finally, using the Senior Scout Case Study, we will examine the application of these concepts in a military model. The Senior Scout airborne

command and control warfare (C2W) system, scheduled to be cut by the Air Force in 1994, will provide insights into the value of *systems thinking* in adapting to the management challenges of a changing world.

## The Challenges

In the past twenty years we have witnessed amazing developments in information processing and telecommunications capabilities. Access to valuable information and the ability to transmit and receive that information has brought about a dramatic acceleration in the pace of change throughout the world. In his nationwide bestseller, Megatrends, author John Naisbitt described how "the introduction of increasingly sophisticated information technology has revolutionized" the communication process.[1] "The net effect is a faster flow of information through the information channel, bringing the sender and receiver closer together...any changes that are occurring will occur much faster.[2]

Noted author and business consultant Tom Peters examined ways in which mangers and leaders could adapt to our "high speed" operational environment in his book Thriving on Chaos. The reality of today is that "everywhere and everyday managers confront shattering and accelerating change, change paced by constant innovation in computers and telecommunications technologies." Peters believes that effective organizations are "organizations that are able not only to respond quickly to shifting circumstances but to proactively take advantage of them...developing such flexibility will require a revolution in both management theory and day-to-day management practice."[3]

For the Department of Defense (DoD), Peter's "chaotic new world" involves an ever increasing spectrum of conflict and correspondingly, greater diversity in military capabilities. The Chairman of the Joint Chiefs of Staff stated "the US military will be

called upon to respond to crises across the full range of military operations, from humanitarian assistance to fighting and winning major theater wars (MTW), and conducting concurrent smaller scale contingencies."[4]

The Marine Corps echoed this assessment in an article entitled "Building a Corps for the 21st Century."

> Today there is a temptation to cling steadfastly to traditional, but outdated, Cold War models of "industrial age" warfare. The United States Marine Corps has no intention of doing this. To meet future challenges, we must turn away from the familiar and comforting glow of a Desert Storm analogy and face the brutish realities of what Rudyard Kipling called the "savage wars of peace."[5]

The wide range of requirements found in "military operations-other-than-war" (MOOTW) present challenging new problem situations for today's leaders, and will continue to do so for the foreseeable future.

## Systems Thinking

Systems theory or systems thinking presents a way of stepping back from a complex problem situation and examining the interactions of subsystems, patterns of behavior, and the manner in which the *total system* interacts with it's environment. In his book, The Fifth Discipline, Peter Senge describes systems thinking as "a conceptual framework, a body of knowledge and tools that has been developed over the past fifty years, to make the full patterns clearer, and to help see how to change them effectively. Seeing the major interrelationships underlying a problem leads to new insights into what might be done."[6] According to Senge, "for most people systems thinking means fighting

# The Systems Model

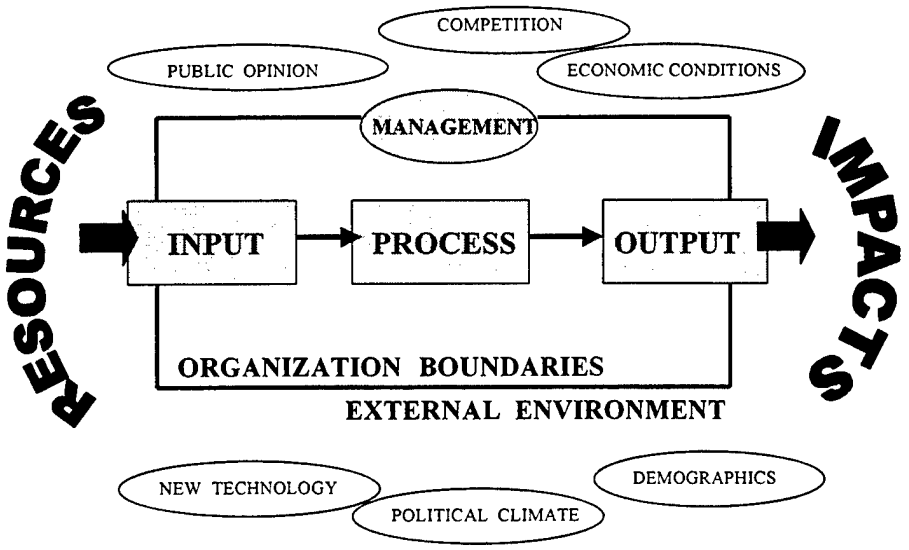



**Figure 1**

complexity with complexity, devising increasingly complex solutions to increasingly complex problems. In fact, this is the antithesis of real systems thinking."[7] Systems thinking should, instead, provide leadership with a simple, conceptual model capable of reducing complex situations to manageable components. This *total systems approach* clarifies the major forces acting in the process and enables leadership to manipulate the major subsystems under their control. The goal is to adjust organizational systems to meet environmental conditions in order to achieve a desired end-state or *impact.* Complex details are then worked as subsystems in support of the conceptual plan or model. In simple terms, systems thinking enables strategic leaders to *look over the forest without getting lost in the trees.* (See figure 1.)

According to futurist William Knoke, this *total systems perspective* is having a

noticeable impact on the way businesses establish a competitive advantage in an increasingly complex market environment. By going beyond "the product," to providing complete services, organizations are satisfying the needs of their customers, not merely providing them with tools. William Knoke dedicates a significant portion of his book, Bold New World, to a discussion on the growing importance of a *total system perspective*, or as he refers to it, a "holistic package of goods and services."

> Ideas and technology flow at such a rapid pace that manufacturers can no longer differentiate themselves on product features alone...The successful manufacturers of tomorrow will understand that things alone don't fully satisfy the needs of the customer. They will look at what they are offering the customer as a holistic package of goods and services, providing the appropriate mix of things, information, training, customer service, and personal attention to fully answer the customers' real needs. Over the next two decades, the distinction between "service" and "product" will become blurred – everything will be a "service-prod"... *We have risen above an economy driven by things to an economy driven more and more by actions.*[8]

## Open Systems Approach and The Learning Organization

While Director of Pennsylvania State University's Department of Public Administration, Dr. Robert J. Mowitz lectured on the critical importance of an "*open systems approach to management.*"[9] Dr. Mowitz, believed that one of management's chief roles was monitoring the organization's operational environment. Only through constant vigilance would an organization be able to adjust to changing environmental conditions. Systems theory recognizes that all systems are subject to entropy, or a gradual decay. The availability of critical resources, changing economic conditions, shifts in government policy, new technology, or new competition may present threats to an organization's health. By monitoring the one's operational environment and

developing adaptive capabilities in the various subsystems, leaders are able to head-off potentially damaging changes. (See figure 2.)

The *open systems approach* supports Peter Senge concept of *"the learning*

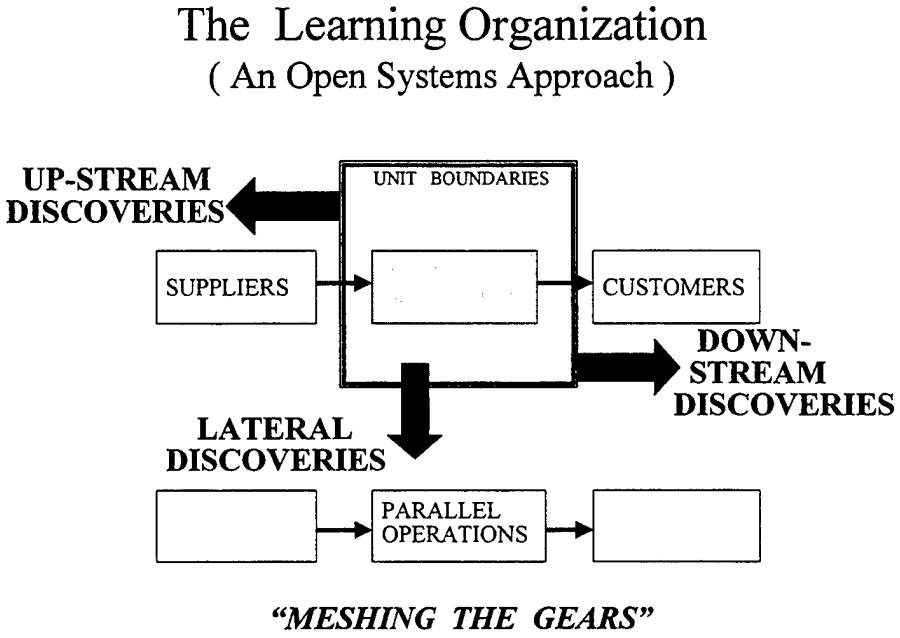



**Figure 2**

*organization*" which stresses the need for organizations to maintain open exchange of knowledge and information. Senge states that "systems thinking is the cornerstone of how *learning organizations* think about their world.""[10] He believes that organizations must develop a learning imperative in order to adapt effectively to the demands of an Information Age. New challenges bring about new knowledge and the development of new skills. An *open system* allows for the free flow of this knowledge and information throughout the organization thereby facilitating the learning process. This exchange also aides in the timely implementation of adaptive measures. Fundamental to Senge's *learning organization* is the need for a high degree of autonomy and empowerment at all

levels of the organization.

> As the world becomes more interconnected and business becomes more complex and dynamic, work must become more "learningful." It is no longer sufficient to have one person learning for the organization, a Ford, or a Sloan or a Watson. It's just not possible any longer to "figure it out" from the top, and have everyone else following the orders of the "grand strategist." The organization that will truly excel in the future will be the organizations that discover how to tap people's commitment and capacity to learn at all levels in an organization.[11]

## Systems and Contingency Approach

In the past, history and doctrine were necessary building blocks in preparing military forces for war against a known opposing force, but operational strategy in our changing world faces new situations, new demands. In preparing for the future, the Marine Corp has concluded "in this environment, conventional doctrine and organizations may mean very little. It is an environment born of change and adaptability. It will also be an age born of advanced technology and weapons that are readily available to friend and foe alike."[12] They suggest that planners should be driven by the unique nature of the conflict situation and fully prepare to deal with gaps in our doctrine or force structure an enemy may attempt to exploit.

In a book entitled Organization and Management, Fremont E. Kast and James E. Rosenzweig offer "a systems and contingency approach" to making an organization responsive to a future filled with uncertainty.

> "The systems view suggests that management faces situations that are dynamic, inherently uncertain, and frequently ambiguous. Management is not in full control as suggested by traditional theory. One of the functions of management is to develop congruence between the organization and its environment and to design internal subsystems that meet the objectives. Contingency views are ultimately directed toward suggesting organizational designs and managerial actions most *appropriate for specific situations.*"[13]

The implication of the "*systems and contingency approach*" for military leaders may be significant. According to Kast and Rosenzweig, action plans should be designed to be "congruent" with the operational environment and seek to optimize the resources and capabilities available to the organization. The use of US Navy carriers is a case in point. In a paper entitled "Military and Naval Forces in Isolationist America," Captain Robert C. Ehrhart found the Fast Carrier Task Force Strategy used in the Pacific Campaign during World War II did not result from the traditional doctrine- strategy process. US Navy doctrine at the time revolved around the battleship. Following the Japanese attack on Pearl Harbor and the heavy toll inflicted on the battleships of the fleet, Navy strategists were forced to develop a new strategy around existing resources (the aircraft carriers), and suited for war in the Pacific. The Fast Carrier Task Force Strategy was a response to the specific conflict situation rather than the product of history and doctrine. "It would take Pearl Harbor and 2 years of war, however, to overcome the inertia holding back the full realization of the Fast Carrier Task Force."[14]

A systems analyst would insist on an unbiased assessment of existing resources and capabilities effectively resisting the temptation to "force-fit" standard practices on a unique situation. In this way leadership can locate an organization's true strength in a particular problem situation making optimum use of available resources.

# The Senior Scout Program (Case Study 1994 – 1998)

Systems thinking played a vital role in the revitalization of the Air National Guard's Senior Scout program. Senior Scout is an airborne command and control warfare (C2W) package carried aboard a modified C-130 transport aircraft. The budget cuts following Desert Storm forced the Air Force staff to eliminate a number of C2W programs. In 1994 the three existing Senior Scout systems in the Air Force inventory were transferred to the Air National Guard to provide the gaining Air Guard squadron an airborne package for training. The initial intent of the Air Force was to provide a single Scout system, without funding for upgrades, for a 3 year period. The guardsmen, training aboard the Senior Scout would then be wartime tasked aboard other Air Force C2W platforms. This would help reduce the AF budget burden while developing reserve component manpower for the critically undermanned C2W career field. The plan later called for the two remaining "Scout" systems to be transferred to the same Guard squadron for use as spares.

The "Scout" squadron was the only one of it's kind in the Air National Guard. Created in 1987, the squadron was fighting a long uphill battle for survival. The active duty Air Force intelligence community had never gained a stand-alone C2W unit in the Guard - and the National Guard Bureau had never managed a C2W program. In other words, this unique arrangement was new to both of the principle program sponsors. Survival of the Senior Scout program was in the hands of the squadron and its relatively small group of supporters. With the help AF Materials Command's "Big Safari" program, which provided both logistical support and C2W corporate knowledge, the squadron had to demonstrate the true value of the Scout program.

In addition to the Senior Scout, the Guard staff wanted the squadron to explore the capabilities of a ground system called Senior Troupe. The "Troupe" is a ground C2W system with a robust communications suite mounted on a pair of trucks. In 1994, two of the three existing "Troupe" systems were transferred from the Air Force Air Intelligence Command to the 609th and 612th Intelligence Squadrons for use in direct support of Air Combat Command's (ACC) Air Operations Centers (AOC). The third Senior Troupe, never tasked by the Air Force, was turned over to the Scout squadron in the hopes that the system could prove useful when matched with the "airborne" Senior Scout.

The Scout, having arrived just days before, was proving to be a major challenge to the Guard squadron, which at the time numbered only 17 full time employees. The prospect of engaging a second squadron-size mission area, Senior Troupe, was unthinkable. The unit was overwhelmed by airborne training requirements and many felt there was little value in the ground system. Things turned around, however, when the unit staff approached the 366th Composite Wing in an effort to establish a training relationship. The Scout squadron's first official involvement with the 366th was a Senior Troupe deployment and demonstration at Mt. Home AFB, Idaho, during Green Flag 94-2. The ability to access the airborne command and control picture from the E-3 AWACs, and tactical reports from the RC-135 Rivet Joint, not only impressed the Wing, but the Scout personnel as well. They had stepped outside their "official" airborne role and were now exploring the world of ground operations and intelligence applications.

# Service Orientation
# (Application of a Total Systems Perspective)

Since the Air National Guard assumed responsibility for the Scout program, they were constantly threatened by budget cuts. The Scout squadron recognized the need to move quickly if they were to secure their future. They had to carefully examine the operational environment, determine the direction of the C2W business, and locate a possible niche the Scout program could fill. The young squadron's *business approach* focused on establishing itself as a reliable player in the C2W arena. A *service orientation* evolved out of their efforts not only to identify potential customers, but ensure their needs were met. The program was to become completely "customer driven."

The squadron got its foot-in-the-door by supporting ACC in both Air Force and JCS exercises. It was understood that a bad performance, or the perception of a bad performance, could potentially quicken the demise of the program through the early termination of its budget. In the spring of 1994 the Guard's Senior Scout was scheduled to participate in Green Flag, the USAF electronic warfare exercise held at Nellis AFB in Nevada. This was the squadron's first major composite force exercise and the complexities of the event took time to sort through. Initially Scout took its' hits in the debriefings. While in support of the 366 Composite Wing during Phase III, however, the *service orientation* began to take shape. The change was nothing short of dramatic. The unit engaged in a *total systems approach* to supporting their customers. Beyond their traditional airborne duties, it was necessary to proactively engage both customers and suppliers in the mission planning process to ensure their C2W product was effectively communicated. Unit members held face-to-face discussions with contractors, pilots,

aircrews and ground operators to refine the *direct tactical support* process.

Early on it was discovered the only way to provide critical data direct to the "shooters" (Fighter or electronic jamming aircraft) was on secure voice radio. The Scout, designed for the "system high" (satellite networks) operations of the Cold War, lacked the simple, secure communications needed to talk with other tactical aircraft. The crew improvised a secure communications line from the Senior Scout shelter to the flight deck of the Dyess AFB C-130 transport (equipped with the necessary secure radio) used as a carrier for Senior Scout package. The work-around proved successful. The data was passed, the shooters were excited, and the Scout reaped much needed praise at the mission debriefs.

The 366 Composite Wing commander described the Scout squadron's support as "superb." He went on to write the Guard unit "went above and beyond to help us prepare for Green Flag exercises at Nellis. They familiarized my staff with Senior Troupe (ground system) and increased our appreciation for airborne C3I support/architecture. The reliability of the Senior Scout system, combined with the operators' focus on quality information rather than quantity, contributed directly to Blue Forces success."[15] (Fig 3)

# Service Orientation

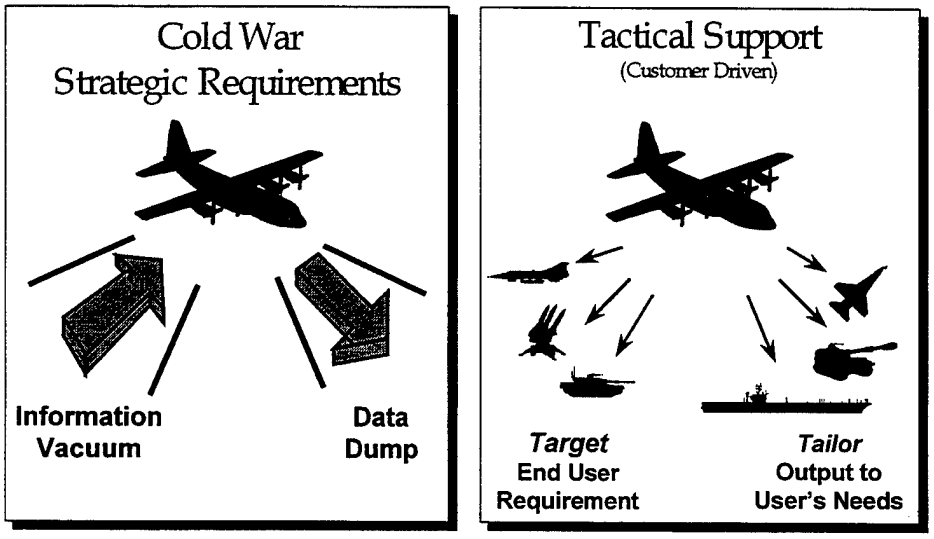



**Figure 3**

The unit carried this success into their next exercise deploying both the Senior Scout and Senior Troupe in support of the JCS Roving Sands air defense exercise later that summer. Having both Scout and Troupe co-located at Ft. Bliss, the *service orientation* was expanded. Unit members provided support to the Air Operations Center and Patriot batteries. This unique arrangement - having a single unit with access to an extensive communications networks both in the air and on the ground - enabled the Blue forces to fuse multiple sources of intelligence and effectively disseminate the resulting products via Troupe's Tactical Information Broadcast Service (TIBS). The results were impressive. Much of the intelligence success was the result of unplanned, informal information exchanges that took place between the Army customers and Scout crews. An after action message from CDRFORSCOM made the following assessment:

> This dedicated group of Guardsmen operated Senior Scout and Senior Troupe for the first time in an exercise environment. After briefing the AOC and Army intelligence personnel on system capabilities, [Scout] personnel helped refine exercise tasking requirements and reporting procedures. During mission execution, they responded aggressively and skillfully to all needs, demonstrating ***an unusual span of expertise*** as well as great cooperative spirit...The Senior Scout/Senior Troupe package provided the best [intelligence] support ever received at Roving Sands. [The Senior Scout squadron] has a single team joint package that should be considered for broader application.[16]

The Scout program, in its first year, had established a reputation as leaders in the art of *direct tactical support*. By reorienting the squadron to serving the specific needs of their tactical customers, rather than following traditional Cold War procedures, the unit was able to make a noticeable impact in both the Green Flag and Roving Sands exercises. They began to think beyond "the product" and assess the *total operational system.* It became standard practice for the unit to "get to know" and understand the specific requirements of the task, as well as the situational demands. The C2W architecture was then tailored to make the best use of the personnel and systems available to the squadron.

Praise for their *service orientation* in after-action reports from CDRFORSCOM and the 366 CW had a profound impact on the culture of the organization. The lessons learned served as a benchmark for future deployments. The most important aspects of the unit's change from a product to a service orientation were (1) an external focus on the customer and operational environment, (2) a sense of ownership and responsibility for end-game results, and (3) the critical need for total systems integration.

# The Learning Organization
## (The Application of an Open Systems Approach)

In 1996, Eighth Air Force scheduled a System Training Exercise (STE) involving an Air National Guard Air Control Squadron (ACS) co-located with the Scout unit. Scout had an on-going relationship with its ACS neighbors taking every opportunity to get Tactical Digital Information Link (TADIL) training for its airborne data link operators. TADIL was a capability both units possessed. Eighth AF requested the Scout squadron, using Senior Troupe, provide the intelligence input into the TADIL network. Approximately 6 units would be linked around the country with the Scout operators "feeding" the scenario inputs.

The small Scout team of operators and field service representatives were disappointed in the initial stages of the STE. None of the intelligence inputs were showing up on the net. It was discovered locally that the data tables necessary to receive the input were not properly loaded in the command and control system. A contractor from the Scout team corrected the problem and the system was linked - at least locally! The ACS personnel were amazed by the information available to them through the link admitting they had never used that option before. (This included a recent deployment to EUCOM in support of operations in Bosnia.) In a message to the Scout squadron, Eighth AF wrote "your participation in STE 96-03 was a significant milestone in the integration of intelligence into the TADIL network."[17] Eighth AF admitted that none of the other units participating received the intelligence data or were aware of the procedures for loading the data tables.

The same *discovery* was made when a similar Scout team deployed to Fort Drum, New York to provide inputs into the TADIL network in the National Guard's Global

Yankee exercise. In just a few short weeks, the Scout team had assisted in the programming of more than 10 ground command and control vans for units that have never before used the "INTEL" button on their keyboard. Quietly, the request came from Air Combat Commands' Theater Battle Management staff to the Guard Air Control Squadron for the procedures necessary to load the data tables. Now everyone is learning.

The willingness to explore activities outside unit boundaries coupled with a cross-functional exchange of information and knowledge are basic to the *learning organization* described by Senge. In this way supervisors can ensure the proper integration of all system components. In the case of the STE, the TADIL network was designed, from the beginning, to utilize the valuable intelligence data. However, bureaucratic "stovepipes" created at the operational level *prevented proper integration for over a decade!*

With the growing demand for Scout and Troupe support, the unit found itself in a constant "learning mode." A campaign was initiated by the staff to encourage "learning-through-experimentation" on behalf of the customer. In unit monthly commanders call, members were taught that the secret to success was personal initiative, increasing an individual's value and leverage in the unit by constantly learning, improving and contributing to the success of the organization. In "business report fashion," meetings highlighted return from investment - investment being the time, energy, manpower, or resources committed to a new initiative or project. The culture was one of empowerment. Regardless of rank, unit members demonstrating the potential of a new development were provided resources to pursue their project. Often the staff would not only ensure time for project development, but arrange for field service representative's (FSR)support as well. (See Exhibit A)

# The Enhanced Scenario Training System (ESTS)

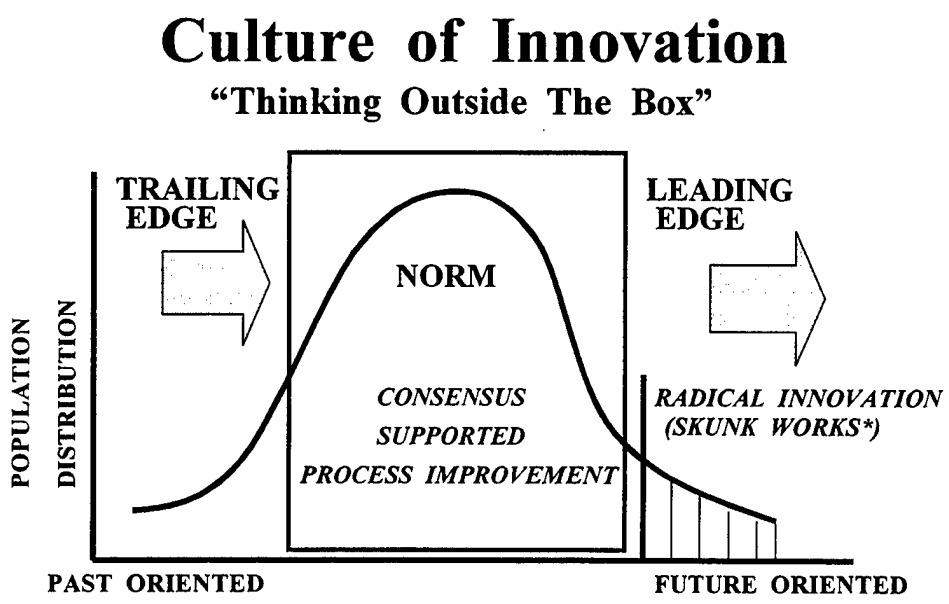
**The ESTS was one of the most useful innovations for the Scout squadron. The prototype system was built entirely of old equipment and $12.95 from the unit coffee fund for a pair of switches. The ESTS is capable of converting the Scout shelter into a partial task trainer while in the maintenance bay. Six separate training sessions could now be integrated into a single 2.5 hour simulation event. Operators could train as a crew fostering crew coordination in a fast paced, combat-like situation. The realism in the "weekend" unit training assembly actually boosted morale and had a direct impact on retention. In time, requests came in for ESTS training opportunities from active duty aircrews. In fact, the AF C2W schoolhouse at Goodfellow AFB tried in vain to acquire one of the Scout systems and an ESTS for use with new trainees.**

**For the Guard it was spectacular. Crewmembers were achieving mission qualification in record time. One such incident involved an airman that received his initial airborne qualification aboard Rivet Joint in 10 versus the 30 sorties anticipated due to the training he received with the ESTS. Just three months later he returned to CENTCOM on a "by-name"request to fly Combat Sent missions. To top that, on his third trip he helped train a new active duty operator. This far exceeded the contribution anyone expected from a "weekend warrior."**

**Exhibit A**

## A Culture of Innovation

The secret to these innovations was the organization's culture. The Scout program was on it's way to the gallows. The unit had nothing to lose by fostering a high degree of autonomy and a healthy tolerance for taking risks. The staff concluded that it's always *easy to be bold when you have nothing to lose!* They relied less on rules and regulations and more on values and attitudes to manage the organization. It was found that "stories"




** The Lockheed SKUNK WORKS' success has a lot to do with it's unique culture. Purposely isolated from Lockheed's sprawling bureaucracy, the R&D unit specializes in a small-team approach to projects. - BUSINESS WEEK / 26 April 1993.*

**Figure 4**

do more to define the boundaries for action within an organization than a paragraph buried in a lengthy regulation. Stories, good and bad, shaped the behavior of the units members, as well as those who comprised the support network. Stories encouraged initiative, focused action on the customers, and dramatized the consequences of failure-to-comply in "zero tolerance" areas such as safety, security, or other mandated government programs. (Figure 4 is a diagram used by the Scout squadron to explain the difference between *improving existing processes* and *radical innovation.* It emphasized the need for staff to protect innovative ideas from consensus opinion.) The staff put a lot of deliberate planning into "engineering" an effective culture; a community with a clear set of values and well defined goals.

It was not the lawless or individualistic arrangement many would expect. A former

active duty Scout squadron commander had the opportunity to fly aboard the "now Guard" Senior Scout as an observer during a SOUTHCOM mission. In a message to the 24th Wing commander he described the 11hour flight.

> We got 11.0 hours of quality flying time and I just wanted to let you know these TDY guys do this mission as well as it can be done. I saw great improvements in their flight discipline as well. Their pre-mission brief was superb, their safety awareness was evident and the entire mission was run on new and improved checklists. I also spot checked their life support and they are doing better there too. New survival vests and current water wings everywhere. All in all, a great show when added to [the support] they provided.[18]

"Inside Washington" quoted an Air Force official stating "the Senior Scout Guard unit is probably one of the service's best and most highly trained crews."[19] The degree of autonomy given the unit members allowed them to explore tasks outside the norm for most government or military organizations. In the Scout squadron the systems were driven by the customers requirements, and unit personnel simply did whatever they could to get the job done. In some cases augmentees were requested to fill in special skill areas. Often they learned the job on their own or with the help of Big Safari. The unit pursued hardware to enhance the service they provided the customer. With their constantly expanding capabilities came an expanding range of knowledge and skills. It is important to note that the value of this broad experience went far beyond simply learning a new position, the real value was in the synergistic effects that made these individuals "knowledgeable" in the "*total systems architecture.*" From the airborne operation, to the tactical ground site, and on to the regional center, members were given the opportunity to see how the pieces fit together.

One impressive "side-effect" of this business-like culture was seen in the unit's

recruiting and retention figures. In contrast to many military organizations today, retention figures for the Scout unit were surprisingly high. Even more significant was the migration of many highly skilled C2W operators from the Army and Air Force to the Scout squadron. Attracted by the work environment, several new recruits contacted former colleagues separating from active duty and encouraged them to join the unit as well. The influx of skilled and experienced personnel from the other services brought even greater diversity to the workforce.

## Responsive Systems (The Application of Contingency Theory)

Constantly learning more about the world outside the "Scout box," unit members were noted for "wickering" together whatever communications, data links, or procedures necessary to accomplish an assigned task. A commonly asked question by visitors involved the echelon of employment for the Senior Troupe ground system. The first time confronted by this question the briefers were lost! They never considered a "fixed" role for the Troupe package. Troupe was employed based upon tasked requirements. Unlike it's counterparts in the active Air Force, the Guard's Troupe had no formal wartime tasking. Troupe was part of a "*responsive system*" designed to deal with any unique or changing requirement and able to adjust to *the demands of the situation.* Gifford and Elizabeth Pinchot would describe this as a "mutable architecture."

> The organizations that are smart enough to deal with the complexity and fluidity of today's world have what computer people call a "mutable architecture," meaning the structure shifts to face the problems at hand. As the business opportunities and challenges change, people are changing their work processes, their connections, their relationship to technologies, even the values and directions embraced.[20]

The Scout/Troupe package operated in direct support of the AOC at Roving Sands 94, the Army Deep Operations Coordination Cell in Deep Look 95, the Navy's Tactical Exploitation of National Capabilities Program (TENCAP) in Night Vector 95, and provided a demonstration to the 366 CW at Mountain Home during Green Flag 94. *This responsive systems approach* "evolved" naturally from the diversity of roles the Scout/ Troupe package was asked to perform.

## MODULAR TROUPE

**The Senior Scout / Senior Troupe combination offered the potential customer a wide range of C4ISR capabilities. However, first time users were often reluctant to fund the C-130 aircraft required to transport the two Senior Troupe vehicles. (System operation required both trucks to deploy for proper integration.) Working closely with the FSR's, the unit worked out a plan to "gut" the trucks and link the various subsystems as separate modular components. There was some resistance to this initiative, even from the Big Safari representatives. The decision was made, however, to proceed as far as possible "short of making the new configuration irreversible." All work was done locally with roughly a $100 investment for cables to link the components. The flexibility of the new configuration was incredible. The system could be tailored to fit the requirements of a specific operation and transported on a pallet or in suitcases. The system was locally tested with the help of Scouts' Air Control Squadron neighbors. Just 30 days later, the new "Modular Troupe" system was introduced as a critical component in a JCS tasked C4ISR architecture and performed flawlessly during the 10 month operation.**

## Exhibit B

The real test of "responsiveness," however, came in the spring of 1997. USACOM was tasked by the JCS to explore options for a small scale C4ISR operation of an

undetermined duration. The J2 considered Senior Scout an appropriate platform. A Scout squadron team designed the architecture for the operation. The new "Modular Troupe" system, locally developed and tested only weeks earlier, became a critical ground link and constituted a "Go - No Go" component in the system. (See Exhibit B.) The new Modular Troupe could be tailored so that only subsystems required for the operation would be deployed. In fact, the package was shipped as commercial airfreight. The footprint was extremely small; one small room and a five man team. The Troupe package included secure voice communications, a secure data link, secure phone and facsimile machine; all of which could be plugged into standard wall sockets. This was a substantial departure from the original Senior Troupe package of at least two trucks, generators, tents, air conditioning units and roughly 30 personnel used in past exercise deployments.

The operation spanning a 10month period and reporting to the highest levels of the U.S. government, was a success. Of particular note, the Modular Troupe system never failed. Despite the old equipment and its "backyard" design, the system provided flawless voice and digital communications. The modifications were adopted by the 609th and 612th Intelligence Squadrons (IS). Later that year, while the Guard's Modular Troupe was still employed in support of the ACOM tasking, the 609th IS teamed up with the Guard and provided *their Modular Troupe* package to support a second Scout deployment to EUCOM. Again, the Modular Troupe capabilities proved vital to the operation. A system labeled obsolete by Pentagon planners was now providing a critical service in support of national objectives. The Scout/Troupe package had demonstrated its ability to respond effectively to Small Scale Contingencies.

Ironically, in a message put out by COMUSCENTAF, the commander identified "follow on requirements" for the Senior Troupe, specifying a need for a "modular, transit-cased, transportable system deployable with an AOC or independently to support a smaller scale operation."[21] Without the benefit of a "new program budget," the Modular Troupe concept envisioned by COMUSCENTAF had already been realized in the field, by an airborne unit that was "just trying stuff!"

The Scout program, in maintaining its viability in the face of changing demands, had adopted *a responsive systems approach* early on. They were often, as in the case of the Modular Troupe, several steps ahead of the demand. Responsive systems are processes or mechanisms by which raw capabilities are assembled in support of a tailored strategy. Versatile, modular components are used to create an architecture customized to meet the demands of Small Scale Contingency or expanded for the high capacity needs of a Major Theater Conflict. Key to this process is maintaining access to a wide range of *capabilities*, a wide range of *knowledge and expertise*, and an *effective network and logistics system* to link it all together. Figure 5 depicts the generic model used to tailor operational strategies to meet customer requirements. (Note the relationship to the Systems Model in Figure 1.)

## Senior Scout Program Summary

The accomplishments of the Scout program between FY94 and FY98 are noteworthy. The squadron's participation in military operations-other-than-war (MOOTW) saw the Senior Scout deploy in support of missions for SOUTHCOM, ACOM, and EUCOM. At

their peak, between July 1997 and March 1998, the Guard's Scout unit averaged 18.8

**The Responsive Systems Approach**

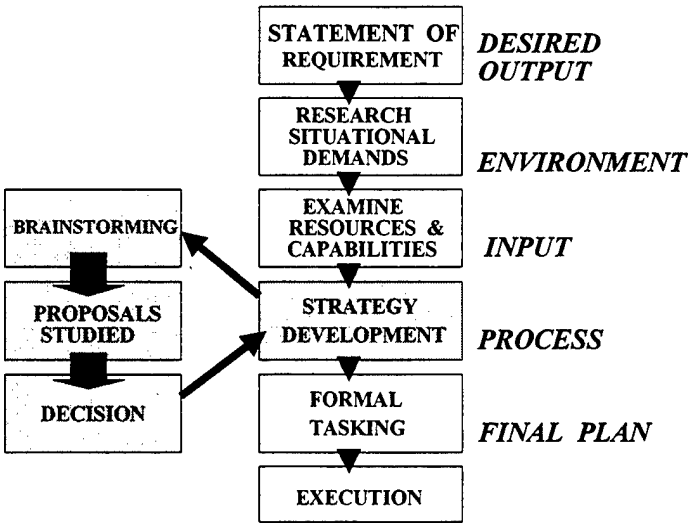



**Figure 5**

operational sorties per month. (Average sortie duration was 8.9 hours.)

In their annual Scout Program Review, the squadron voluntarily tracked "pay-for-play" dollars – that is dollars provided by outside sources (customers) for Scout participation in exercises and JCS tasked operations. The staff believed the "pay-for-play" figures were good indicators of the demand for Scout services. In 1994 the "pay-for-play" totaled $300,000. By 1997, that number grew steadily to over 3.2 million dollars. The demand was so high in 1997 the JCS had to cancel two funded exercises for Scout in favor of higher priority MOOTW missions. The trend may reflect the growing demand for services in Small Scale Contingencies.

While the above figures are an indicator of the squadron's "business trends," it is more important to appreciate the way this success came about. In a period of dramatic budget cuts, the Scout program managed to avoid the axe. Their competitive edge

was rooted in the effective application of *systems thinking* in response to growing complexity and continual change. As a new player in the C4ISR community, they were quick to unload the baggage of the Cold War era and fashion a mechanism to handle today's challenges. They adapted internally to the demands of a *learning organization*, and externally to the "value added" qualities of a *service orientation.* The Senior Scout squadrons' goal was to establish itself as a reliable player in the C2W arena. The relationships created with ACC, ACOM, and the JCS reflect favorable progress in reaching that goal.

# Conclusions

The greatest challenge facing tomorrow's commanders is the development of highly sophisticated management structures and systems capable of incredible speed in assessing contingencies, developing tailored operational strategies, and assembling the necessary knowledge and resources to conduct effective operations. A decade of Post Cold War frustration will continue at the expense of National Security unless we, as a military, stop waiting for "things to return to normal," and face the fact that *this is the pace of an Information Age*. Systems thinking offers a conceptual handle by which strategic leaders can grasp the complexity in today's operations and position their organizations well ahead of a continually evolving threat.

# Endnotes

[1] John Naisbitt, Megatrends, (New York, New York: Warner Books, 1990), 17.

[2] Ibid., 15.

[3] Tom Peters, Thriving on Chaos, (New York, New York: Alfred A. Knopf, 1987), Cover.

[4] Chairman, Joint Chiefs of Staff, "National Military Strategy," Course 3: Joint Processes and Landpower Development Vol III, (US Army War College, Carlisle Barracks, Pa., 14 October 1998), 18.

[5] US Marine Corp, "Building a Corps for the 21st Century," Course 4: Implementing National Military Strategy, Vol IIa, (US Army War College, Carlisle Barracks, Pa., 19 November 1998), 11-4/11-3.

[6] Peter M. Senge, The Fifth Discipline, (New York, New York: Doubleday, 1990), 7.

[7] Ibid., 72.

[8] William Knoke, Bold New World, (New York, New York: Kodansha America, Inc., 1996), 118/119/120.

[9] Dr. Robert J. Mowitz, Lecture: "The Systems Approach," (State College, Pennsylvania: Pennsylvania State University 1981)

[10] The Fifth Discipline, 69.

[11] Ibid.,4.

[12] "Building A Corps For The 21st Century," 11-5.

[13] Fremont E. Kast and James E. Rosenzweig, Organization and Management, (New York, New York: McGraw – Hill Book Inc., 1984), 115.

[14] Cpt. Robert C. Ehrhart, "Military and Naval Forces in Isolationist America," Modern Warfare and Society, Vol I, (, Maxwell AFB, Alabama, Air Command and Staff College 1988), 18-13.

[15] 366 Wing, "Support to 366 WG Prior to and During Green Flag 94-03," (366WG, Mt Home AFB, ID//CC//Msg DTG 071830z Jun 94).

[16] CDRFORSCOM, "Intelligence Squadron Support To Roving Sands," (CDRFORSCOM, Ft. McPherson, Ga//AFIN//Msg DTG 011710zAug94).

[17] Senior Scout Program Review, "Senior Troupe Update Briefing," (Big Safari, Detachment 4, Palmdale, California, 1997).

[18] 24 Wing/ CA, "Mission Report," (24 Wing/CA, Howard AFB, Panama, Msg DTG 240809L Jul 95).

[19] Gigi Whitley, "Authorizers Support Plan Giving National Guard One Rivet Joint," Inside Washington,
(Washington DC, 17 May 1998), 3.

[20] The End of Bureaucracy and the Rise of the Intelligent Organization, 19.

[21] COMUSCENTAF, "Deployable Ninth Air Force Intelligence Exploitation Systems," (COMUSCENTAF, Shaw AFB, SC, Msg DTG 172052 Jun 97).

## Bibliography


CDRFORSCOM, "Intelligence Squadron Support To Roving Sands." (Ft McPherson, Msg. DTG 011710zAug94.)

Chairman, Joint Chiefs of Staff, "National Military Strategy," Course 3: Joint Processes and Landpower Development,Vol III. (Carlisle Barracks: US Army War College, 1998.)

Clary, Maj David C., Case Study "Bekaa Valley Operations" (Maxwell AFB: Air University, 1988.)

Commander, 366 Wing, "Support to 366 Wing Prior to and During Green Flag 94-03," (Mt Home AFB, Msg DTG 071830z Jun 94.)

COMUSCENTAF, "Deployable Ninth Air Force Intelligence Exploitation Systems" (Shaw AFB: Msg DTG 172005z Jun 97.)

Ehrhart, Cpt. Robert C., "Military and Naval Forces in Isolationist America, Modern Warfare and Society, Vol I (Maxwell AFB: Air Command and Staff College, 1988.)

Kast, Fremont E. and James E. Rosenzweig, Organization and Management (New York: McGraw – Hill Book Inc., 1984)

Knoke, William, Bold New World (New York: Kodansha America, Inc., 1996)

Moore, James F., The Death of Competition (New York: HarperCollins Publishers Inc., 1996)

Naisbitt, John, Megatrends (New York: Warner Books, Inc., 1984)

Peters, Tom, Thriving on Chaos (New York: Alfred A. Knoff, 1987)

Pinchot, Gifford, Intrapreneuring (New York: Harper & Row, Publishers, 1986)

Pinchot, Gifford and Elizabeth, The End of Bureaucracy and The Rise of the Intelligent Organization (San Francisco: Berrett-Koehler Publishers Inc., 1993)

Schine, Eric, "Out at the Skunk Works, The Sweet Smell of Success," Business Week (New York: McGraw Hill Companies, 26 April 1993.)

Senge, Peter M., The Fifth Discipline (New York: Doubleday, 1990)

Senior Scout Program, "Senior Troupe Update Briefing" (Palmdale: Detachment 4, 1997)

Tichey, Noel M. and Mary Anne Devanna, The Transformational Leader (New York: John Wiley and Sons, 1986)

Toffler, Alvin, Power Shift (New York: Bantam Books, 1990)

Toffler, Alvin and Heidi, War and Anti-War (New York: Little, Brown, and Company, 1993)

TRADOC, "Initial Impressions Report Operations Joint Endeavor," Course 4, Implementing National Military Strategy, Vol I (Carlisle Barracks, 1998)

US Air Force, Air Force Issues Book 1997 (US Air Force, 1997)

US Marine Corp, "Building a Corps for the 21st Century," Course 4: Implementing National Military Strategy, Vol IIa (Carlisle Barracks: US Army War College, 1998)

Whitley, Gigi, "Authorizers Support Plan Giving National Guard One Rivet Joint," (Inside Washington, Washington DC, 17 May 1998)

24 Wing/CA, "Mission Report" (Howard AFB: Msg DTG 240809L Jul 95)