Best
Available
Copy

REPORT DOC[UMENTATION PAGE]

AD-A280 615

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of informat... reviewing instructions, searching existing data sour... gathering and maintaining the data needed, and comp... rding this burden estimate or any other aspect of ... collection of information, including suggestions for re... r Information Operations and Reports, 1215 Jeffer... Davis Highway, Suite 1204, Arlington, VA 22202-4302, ... Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE April 1994	3. REPORT TYPE AND DATES COVERED FINAL

4. TITLE AND SUBTITLE
STRATEGIC C4I PLANNING THROUGH STEM

5. FUNDING NUMBERS

6. AUTHOR(S)
JOHN R. DAVIS

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
AIR WAR COLLEGE
325 CHENNAULT CIRCLE
MAXWELL AFB AL 36112-6427

8. PERFORMING ORGANIZATION REPORT NUMBER
Unnumbered AWC research paper

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
N/A

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
N/A

11. SUPPLEMENTARY NOTES
PAPER IS WRITTEN TO FULFILL ACADEMIC RESEARCH REQUIREMNTS FOR AN IN-RESIDENCE SENIOR SERVICE PROFESSIONAL MILITARY SCHOOL.

12a. DISTRIBUTION/AVAILABILITY STATEMENT
APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)
See page iii

14. SUBJECT TERMS
STRATEGIC, PLANNING, STEM

15. NUMBER OF PAGES
26

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRA[CT]
UNCLAS	UNCLAS	UNCLAS	UL

AIR WAR COLLEGE

AIR UNIVERSITY

STRATEGIC C^4I PLANNING THROUGH STEM

By

John R. Davis

A RESEARCH REPORT SUBMITTED TO THE FACULTY

IN

FULFILLMENT OF THE CURRICULUM

REQUIREMENT

Advisor: Dr. David Blair

MAXWELL AIR FORCE BASE, ALABAMA
April 1994

DISCLAIMER

This study represents the views of the author and does not necessarily reflect the official opinion of the Air War College or the Department of the Air Force. In accordance with Air Force Regulation 110-8, it is not copyrighted, but is the property of the United States government.

Loan copies of this document may be obtained through the interlibrary loan desk of Air University Library, Maxwell Air Force Base, Alabama 36112-5564 (Telephone [205] 953-7223 or DSN 493-7223).

ABSTRACT

TITLE: Strategic C^4I Planning Through STEM.

AUTHOR: John R. Davis, GM-14.

Command, Control, Communications, Computers, and Intelligence (C^4I) has become an inseparable part of today's military strategy. Until recently most Air Force commands were not concerned with true C^4I integration. They were only concerned with reacting to the day to day operational requirements and not to long range planning. This is where strategic planning has gained its foothold. The defense budget continues to shrink and Air Force planners must cope with this decline while continuing to enhance and modernize C^4I systems.

The best way to achieve this goal is through strategic planning. Strategic C^4I planning is the tool but you must also have a vehicle to lead you down the path to this goal. Systems Telecommunications Engineering Management or STEM is the vehicle chosen by the Air Force to achieve the goal of cost efficient C^4I modernization, integration, and standardization. STEM cannot work miracles but can provide deliberate long range C^4I planning for the Air Force. STEM accomplishes this by applying system engineering practices and principles to produce a telecommunications "Blueprint." The Blueprint is a detailed strategic C^4I plan covering 5-7 years. This document along with the continuous STEM process provides the needed long range planning for the Air Force.

BIOGRAPHICAL SKETCH

John R. Davis is a command level Systems Telecommunications Engineering Manager (STEM-C) responsible for the STEM efforts underway in the National Capital Region including the Pentagon, Defense Information Systems Agency, National Security Agency, and other Joint Facilities. He has also been the STEM-C for Air Force Intelligence Command and Air Force Intelligence Services Agency. Prior to his assignment to the STEM office, Mr. Davis served as a communications system engineer in the MYSTIC STAR Presidential Communications Upgrade Program and DoD Red Switch Program.

Mr. Davis has a Bachelor of Science Degree in Computer Engineering and Master of Science in Management. During his 9 years of Air Force civil service experience he has attended Air Command and Staff College in 1991 and is a graduate of Air War College, Class of 1994.

TABLE OF CONTENTS

CHAPTER I

INTRODUCTION

Until recently the Air Force has not taken strategic C^4I planning seriously. Instead, they have taken a reactive approach to meeting Air Force telecommunications requirements. This reactive approach led us to a telecommunications environment that is overly complex and unmanageable. Strategic planning can be the key to turning this problem around but only if it is employed wisely. Strategic planning is a long range analysis tool that can tie requirements to resources. It will become invaluable in the struggle to meet base force requirements with declining resources.

The business environment realized the benefits of strategic planning long before the Air Force. This is at least partly due to the fact that most businesses and corporations must be profitable to survive. Strategic planning is one way they saw to shift their focus from a short range quick profit to a long range steady growth and profit. These business concepts still apply when you narrow the field down to our topic of C^4I. Business' equivalent of C^4I is information management. We all realize that this is the information age and high tech firms must stay up with technology to be competitive. When you get right down to it, the Air Force needs to be concerned with the management of information technology.[1]

One program within the Air Force has already put strategic planning to good use in developing the C^4I road map for the 21^{st} Century. This effort is the System's Telecommunications Engineering Management (STEM) program. Communications System Center (CSC) developed the STEM program to combat the short range focus that has plagued telecommunications planning. Contained herein is a careful examination of the STEM process and how it applies to strategic C^4I planning and system integration.

The intent of this analysis is not to cover all of the aspects associated with C^4I systems management but to extract examples from some of the key areas and expound upon them. These illustrations will show the benefits of strategic CC^4I planning and how the STEM effort interacts in the overall information management process.

CHAPTER II

STRATEGIC PLANNING; A NEW CONCEPT

Until the 1990's, when Air Force members talked about strategic planning they were generally talking about the planning process for strategic military operations. The word strategic in Air Force terms was associated with long range bombers and intercontinental ballistic missiles (ICBMs). Very few of the Air Force leaders associated strategic planning with the process of deliberate planning to reach long range goals and visions.[2] But now in 1994, I believe that current Air Force leadership understands the real meaning of strategic planning. This is not to say that they are using the process in the optimum way but it does mean that when sensible strategic planning approaches are presented to the decision makers they are generally well accepted. This is where the STEM process comes into light. In 1989, the STEM concept was presented to Air Staff as a strategic C^4 planning tool that could help integrate C^4 systems at the base level.

It was not an easy sell. Air Force Communications Command (AFCC) was skeptical about the concept and was not willing to present the idea to Air Staff. Forward thinkers at Communications Systems Center (CSC) took the risk and presented the idea directly to AF/SC. AF/SC accepted this concept and the STEM program was approved on a trial basis. The main drawback was that the STEM services were provided on a voluntary basis for Air Force MAJCOMs and bases. So, instead of having to sell them on just one new idea they had to be sold on two, strategic planning and STEM. Since the STEM program was funded directly by Air Staff all MAJCOMs were willing to try the process and see if it was beneficial.

I believe that funding was the key to STEM's acceptance because CSC tried to sell this process once before in the mid 1980's but no one took the idea seriously. There were several reasons for its lack of support in the early 80's. First of all, as I mentioned earlier, in the 80's strategic planning had to do with military operations not business planning. Air Force leadership did not see the AF as a business. Saving money and process improvement were not their highest priority, building the maximum military force to combat the cold war took all of the emphasis.

The second reason was the availability of the defense dollars. All MAJCOMs were building up in the 1980's and sufficient defense funds were available to support independent C^4I systems. There was no need to consolidate C^4I systems because the individual MAJCOM budgets supported the concept of reactive requirement implementation and stand-alone systems. This was the easiest approach that met the requirements of the early 1980's because C^4I technology did not allow for simple system integration. Therefore, most systems were independently procured and implemented.

The final reason for STEM's initial unacceptance was parochialism and ownership. During this buildup period each MAJCOM was competing for power and money. This struggle ended up in ownership disputes and separate funding for C^4I systems. Intelligence systems are a prime example of this problem. Until recently, all intelligence systems were kept behind the "Green Door" and only the owning unit was allowed to access the equipment. There was no need to make the systems interoperable since there was only one unit allowed to use the system. Each command and sometimes each unit procured and protected their own systems. These factors led us to a lot of the integration problems we are currently trying to fix today. As you can see, the road to STEM acceptance was not an easy one. Thanks to a little assistance from the declining budget, STEM is off and running.

Now that you know some of the factors that led to the STEM program acceptance it is important to show how it provides strategic C^4I planning for the Air Force. To accomplish effective strategic planning you must first know what strategic planning really is. Strategic C^4I planning is the process of mapping the roadway that links requirements and money to technology. Figure 1 provides and illustration of this process.

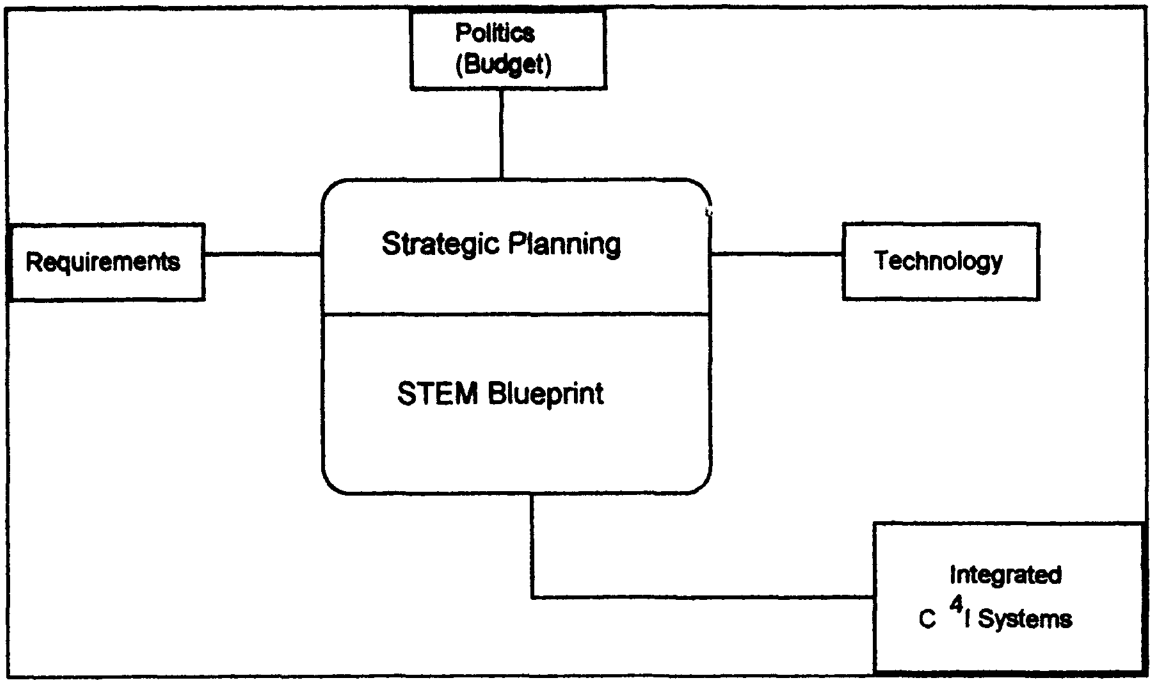

Figure 1: The Strategic Planning Process.

Even though the functional flow of Figure 1 appears simple it is not. Figure 1 is meant to show you the general process of strategic planning. Each of the inputs are multi-dimensional and complex, especially when you consider the political aspects involved in strategic planning. In addition to political considerations, each of the other inputs change rapidly and are difficult to predict future trends. STEM is there to pull it all together into one strategic planning document. STEM engineers do not generate the requirements nor do they invent the technology. They have the task of linking requirements to technology under budgetary constraints.

The end product of integrated C^4I systems seems easy enough but once you take all of the factors into account you can see how difficult it becomes. To get to the desired goal, the Blueprint begins by providing a comprehensive telecommunications baseline including shortfalls and deficiencies. The second step in strategic planning is a solid vision of where you want to go or as we call it in the communications world, the target architecture. The STEM process forms current Air Force architecture guidance into a viable base target architecture. With these components of strategic planning in hand, STEM engineers can develop the Blueprint's phased implementation plan to reach the C^4I goals. This plan covers anywhere from five to seven years and provides sufficient detail to implement new technology and reach the target architecture. This provides you with the fundamentals of strategic C^4I planning and touches on how STEM ties into the overall planning process. Further explanation of the STEM process is provided in the next chapter.

CHAPTER III

THE STEM PROCESS

The best way to illustrate the details of the STEM program is to describe the STEM process, products and services, current status, and where it's headed. STEM's parent unit, CSC, is a Fee-for-Service organization that relies, at least partially, on customer service sales for operation. After meeting with the MAJCOM representatives, CSC determined that the STEM program would get off the ground only if it was available free of charge to the customer. The main reason was that in 1989, telecommunications took a back seat to jet fuel and bombs. MAJCOM funding for long range telecommunications planning was definitely out of the question. Even today communications is considered the "Cinderella" of defense procurement.[3] To further compound the problem of STEM acceptance, Air Staff made involvement in the program voluntary. Therefore, it was clear that the MAJCOMs would only accept STEM if it could provide quick beneficial results without burdening operations. Fortunately, several STEM engineers proved the value of the program through crisis action planning and operational recovery. As a result, all commands jumped on board early in the program to give it a try and see what STEM services really offered.

The STEM task force consists of over 100 senior electronics engineers dedicated to base and MAJCOM support. There are two categories of STEM engineers, STEM-Bs and STEM-Cs. STEM-Bs are telecommunications engineers that are dedicated to providing engineering consultative services to Air Force bases. STEM-Cs, on the other hand, provide engineering consultative services to Air Force MAJCOMs. The main difference between the two types of STEM engineers is their focus. STEM-Bs are dedicated to base operations and deployments while STEM-Cs are dedicated to MAJCOM operations, planning, and budgeting. STEM-Cs also provide a vital support link between the bases and MAJCOM.

The main product of the STEM effort is the Base Comprehensive Blueprint or "Blueprint." The Blueprint is a strategic planning document produced by the STEM-B to be used by the base and MAJCOM as an aid in preparing the Program Objective Memorandum (POM) submissions and upgrading the base telecommunications infrastructure. STEM engineers apply system engineering techniques to inventory the current base telecommunications infrastructure, identify shortfalls and deficiencies, and to develop a long range strategic plan to reach the target architecture. Our customer's inputs are a vital part of the system engineering that takes place in the Blueprint process. The STEM-B works hand-in-hand with base leadership to determine each aspect of the Blueprint. The STEM-B then correlates this information, combines it with Air Force architecture guidance and prepares the Blueprint in two volumes.

Volume 1 details the baseline infrastructure, base shortfalls and deficiencies, the target architecture, and a phased implementation plan to reach the target architecture. The phased implementation plan includes budgetary pricing and requirement justifications to be used in the POM process. The information contained in the Volume I target architecture is the result of a collective engineering effort that takes into account the user's requirements as well as the Air Force's standard telecommunications architecture. The general cost information for these planned upgrades contained in Volume 1 is designed to be at a sufficient level of detail for base POM submissions. It provides both system upgrade justification and new system requirements. To get the Blueprint into service quickly, Volume 1s were produced for each base and published prior to completion of Volume 2s. This allowed base and MAJCOM planners to take advantage of the information at the earliest possible date. Volume 2's were started upon the completion of the Volume 1.

Volume 2 takes the Volume 1 requirements and cost details one step further by breaking down the planned telecommunications upgrades into Blueprint Phased Implementation Directives (BPIDs). The BPID is a detailed cost analysis of each phase of the planned upgrades. It breaks down the long range goals into achievable segments and then provides the justification and detailed costs for the equipment and services required to accomplish each phase. New BPIDs are accomplished as necessary to continue the implementation plan.

Both Volumes of the Blueprint are produced by the STEM-B with MAJCOM guidance from the STEM-C. After careful review by the STEM-B, STEM-C, and the base they are released by the STEM office for publication. As each part of the Blueprint is completed it is added to the overall document until one complete document is produced. Once published, it is endorsed by the base communication unit and then sent to the MAJCOM SC to be validated. As you can see, STEMs do not approve the contents of the Blueprint they only provide an engineering consultation service to the bases and MAJCOMs. The approval process is established and executed by each MAJCOM with the support of their bases.

Air Staff has recently approved the MAJCOM validat lueprint (i.e. BPID) as a requirement's justification document ıor Communications-Computer Systems (C-CS). What this means is that once the Blueprint is validated by the MAJCOM, the planned telecommunications upgrades can be implemented by the base without further justification or approval. Once up and running this new process will drastically shorten the C-CS requirements process and get the new equipment in the field quicker and cheaper. Current projections indicate that implementation times will be reduced by up to two-thirds using the new approved process. Blueprint planning is also predicted to significantly reduce system duplication across the Air Force.

Even though STEM is tasked with supporting all Air Force agencies and units, not all Air Force bases fit into the standard mold . To solve this problem, the original Blueprint format had to be adapted to fit the unique needs of some of our Air Force customers. Therefore, some base Blueprint formats have been changed to satisfy customer requirements. Examples of these changes are classified addendums for AF/IN units and C^4I

deployable architecture appendices for ACC's composite wings. Changes to the standard Blueprint format are going to be a fact of life and that is why adaptability was built into the process. The basic Blueprint format will continue to be standardized but adaptable to meet the requirements of all Air Force units and agencies.

Although the STEM effort is over three years old, the real benefits are just now being realized. Most MAJCOMs and bases were skeptical about the benefits of the STEM effort at first. I am satisfied that the main reason they supported it was because it was a free engineering service. In today's Air Force most leaders realize that you have to take advantage of all free services that provide beneficial products. Once STEM efforts began to show their worth more and more Air Force members signed up for STEM assistance. Even though STEM has shown steady progress since its conception, we still encounter skeptics . There are several reasons for this skepticism. First of all, the STEM program was a new concept of major proportion that went against the grain of Air Force policy. Air Force bases did not consolidate C-CS funding. This occurred mainly as a result of inter-command rivalries competing for Air Force funds. Each unit, depending on their parent MAJCOM received and spent C-CS funding separately. Naturally, this nurtured system ownership disputes and produced stand-alone systems. Consolidated communications systems were not widely accepted for this reason.

In addition to funding and ownership issues, the shear size of the effort was of concern. Ninety two STEM-Bs were authorized to accomplish 130 Blueprints in less than two years. Sorting and validating baseline documentation is a tedious task that is extremely time consuming. The Blueprint process is a continuous cycle where STEM-Bs are working on next revision Blueprint updates even before the current issue is published. As a result, STEM-Bs must continually work to keep the Blueprint process flowing. To further complicate the initial process there was a substantial gear up time for STEM-Bs to become familiar with their assigned bases before they could produce an effective product.

These issues have been resolved and the STEM process is making progress in leaps and bounds. All initial Blueprint Volume 1s have been completed and many Volume 2s have already been completed. STEM's current AF coverage of 130 bases illustrates how all MAJCOMs have requested STEM assistance and depend on it for their telecommunications planning. The STEM effort has proved it's value in today's Air Force, but the long term value of the STEM effort is only beginning. Over the next two years the true benefits will come to realization. This will happen when a sizable number of BPIDs have been implemented. Then we can use C-CS implementation metrics to measure the true benefits of STEM. By examining the current status of the STEM effort, future benefits can be accurately predicted.

STEM services do not stop with the Blueprint. The STEM-Bs and STEM-Cs are dedicated to their assigned bases and MAJCOM's respectively. If the MAJCOM needs assistance in preparing their POM submission, the STEM-C is available to provide telecommunications consultation. The same is true between the STEM-B and the base. Whenever telecommunications problems arise on a base the STEM-B can be brought in to develop solutions. They are tasked with providing both long range planning as well as short range problem solving. The easiest way to look at STEM is as an telecommunications engineering service for the Air Force. Underneath the telecommunications umbrella, STEM services cover a vast array of electronic equipment and systems. For instance, telecommunications engulfs C^4I systems, C-CS, and even video teleconferencing systems. Basic navigational aids and Air Traffic Control systems also depend on telecommunications. When you get down to it, everyone associated with the Air Force depends on telecommunications. In all STEM services can cover a great deal of the base operational and support electronic systems.

CHAPTER IV

STEM: THE LINK BETWEEN INTEGRATED C^4I REQUIREMENTS AND CAPABILITIES

As stated earlier, underneath the telecommunications umbrella is C^4I. One of the biggest problems facing the Air Force of the 21st century is C^4I integration. No longer can the Air Force afford to procure stand-alone stovepiped systems. We must now use our scarce resources wisely because C^4I is a crucial part of our national defense strategy. C^4I does not just include the Command, Control, and Intelligence functions; it also stands for the necessary support systems of communications and computers. STEM does not get into the middle of the Command and Control battles nor does it engineer the national intelligence systems. It just provides the systems engineering required to get the functional information to the war planner and fighter.

STEM is the link between short range base goals, medium range MAJCOM goals, and long range Air Force goals. This link is accomplished in Volumes 1 and 2 of the Blueprint. STEM can be the "yellow brick road" to our C^4I architectural goal but only if the Air Force continues to support and use it wisely. C^4I systems are covered in the Blueprint process but they have some unique requirements that are not totally covered by the STEM process. One unique issue in C^4I systems is that they are global in nature and must be capable of deployment into the battlefield.

C^4I systems are not base oriented like the Blueprint but do play a large part in the base telecommunications infrastructure. To cover this global connectivity, STEM is working with the Defense Information Systems Agency (DISA) to ensure compatibility between the proposed base systems and the planned long haul networks.

STEM currently plays an important role in integrating C^4I systems into the base Blueprint plan even though most C^4I systems are still stand-alone unique systems that are not incorporated into the base infrastructure. In the near future, this will change. The concept that will make this transition possible is "multi-level security (MLS)."

The lack of MLS systems is the number one stumbling block of C^4I integration into the rest of the telecommunications environment. This concept, when implemented, will allow varying levels of classified data to traverse on the same base network backbone and even operate on the same computer platforms. At the present time networks are segregated according to their classification. This requires each classified system to carry its own infrastructure. Since the infrastructure is a large portion of the implementation cost, this significantly raises the overall C^4I system cost without increased performance. STEM is currently working this issue by incorporating MLS systems into future planned upgrades.

One good example of a stand-alone C^4I system is the World-Wide Military Command and Control System (WWMCCS).[4] WWMCCS is the heart of US Command and Control. It provides the path to virtually every unified and specified command in the US Armed

Forces. This system depends on hundreds of computer platforms as well as thousand's of computer workstations. Every Air Force base is tied to WWMCCS through the Defense Information System Network II (DISNET II). This network is the Top Secret portion of the Defense Data Network (DDN). DISNET II is a distinct network dedicated to WWMCCS and cannot be integrated into other C^4I networks of different classification levels without expensive encryption equipment at each node. This is not what you would consider integrated. Many more examples exist that illustrate the problems associated with C^4I integration, but our task is not to list examples of non-integration but to determine STEMs role in integration of these systems.

The big question is, can STEM handle the task of C^4I integration for the Air Force? This is a large task with many problems that have to be resolved. STEM is currently dealing with the three major problems associated with C^4I Integration. These problems can be detailed as: the lack of timely access to information, duplication of effort, and the shrinking defense dollar[5]. Some may ask how STEM is helping to solve these issues. The answer may not be a simple one but it is a concrete one. The day of plentiful funding is over and with this ends the possibility of every command owning unique C^4I systems. If you take a snapshot of the current Air Force C^4I infrastructure you will see that it is full of stand-alone, stovepiped, and non-interoperable systems. This condition is a result of many years of reactive procurement actions with little or no Air Force strategic planning. Each command and even sometimes each base had their own solution to the problem. Consolidation and integration was not the issue, ownership was.

Now is the time that the Air Force can begin to reap the rewards of careful strategic planning through STEM. With the Blueprint providing the link between C^4I requirements and capabilities we can use it to help procure and implement integrated C^4I systems on an Air Force wide level. By working with the base and MAJCOM leadership, STEM engineers can consolidate C^4I requirements and turn those requirements into feasible implementation plans. This includes provisions for technological advancement of information management systems. In the five year plan provided in the Blueprint, modernization is factored in by the STEM engineers. These modernization plans are derived from a combination of Air Force architecture guidance, customer requirements, extensive STEM education, and market surveys. This technique protects our standardization and integration goals because one organization, STEM, handles the entire process. These implementation plans can then be executed by Air Force elements as budget dollars become available.

CHAPTER V

FUTURE C^{4}I TRENDS

The future holds a different picture for C^{4}I systems, and I believe that communication planners realize this. At least I know that DoD, Air Staff, and Air Force MAJCOMs all realize that drastic changes in C^{4}I requirements and technology are inevitable. There are four main causes for these changes: "budgetary constraints, the end of the Cold War, the press of new regional crises, and the move to truly joint operations." [6] As we all know DoD requirements eventually flow down to the Air Force. The STEM/Blueprint process is one method that will be used to help the Air Force reach its C^{4}I strategic goals. Through STEM Blueprint management, Air Force planners can accurately predict long range telecommunications requirements and costs. It will also help to rectify the duplication and interoperability problems because STEM engineers provide the bridge between all Air Force Bases, MAJCOMs, and Air Staff. This bridge will aid Air Force decision makers in choosing standard systems and sharing the burden as well as the benefits of one overall Air Force information management infrastructure. Never before has this type of effort been supported to this great of an extent on strictly a voluntary basis.

Every good analysis presents the alternatives but there is really no other current program capable of handling this problem for the Air Force. STEM currently covers all active duty, reserve, and even most guard bases. In addition, all MAJCOMs, Forward Operating Agencies (FOAs), Air Staff, and some associated Joint agencies are covered by STEM. No other Air Force agency has a program such as STEM so I really see no immediate alternative to STEM. This covers the Air Force but what about the other services.

C^4I integration is not just an Air Force issue, it is a Department of Defense (DoD) issue. Integrating Air Force C^4I systems is only one piece of the pie. Office of Secretary of Defense (OSD) attempted C^4I integration through system consolidation under Defense Information Systems Agency (DISA). These plans were directed under Defense Management Review Decisions (DMRDs). Two of these decisions in particular come to mind when dealing with information management. The first of these is DMRD 924 which was designed to consolidate individual information processing centers into regional processing centers. The main flaw to this plan so far has been the concept that collocating the same old computer systems in a central processing facility will reduce costs and improve service. In reality though, this has not been the case. In the centers that have already been consolidated we have seen that what works on paper does not always work in reality. In this case, long haul communications is the choke point to improved serviced. DISA is currently scrambling to make DMRD 924 reach its goals.

The other decision that deals with information management is DMRD 918. This decision was planned to consolidate all long haul communications and service agencies, such as CSC, under DISA. The plan originally carried a paper savings of $12 Billion. This figure has been continually reduced until the savings is really not significant. When it reached that point, DoD put it on hold for further analysis and feasibility. Under the original DMRD 918, STEM was slated to transfer from the Air Force to DISA. A big political battle ensued and the Air Force won when the decision was placed on hold. The Air Force benefited from this decision but DoD did not. Even after DoD placed all of this emphasis on integrated DoD information management, the other services still are not pursuing real strategic C^4I planning. DoD must continue to push for C^4I integration on a joint level or the ultimate goal of an integrated C^4I environment will not be realized. This is a necessity of the 21st Century since the defense spending trends predict increased mission requirements with decreased resource allocation. On the bright side of this issue is the prediction that telecommunications funding will remain relatively constant into the 21st Century. I believe this is a result of the arrival of the information age. The information age is upon us and our dependence on information is only going to expand in the future. Information management is the main function and telecommunications is the backbone of the information age. Wars in the future will be fought and won on the basis of the availability of information and without integrated C^4I systems DoD will not be able to meet the nation's security requirements.

How DoD planners are going to accomplish this is unknown. STEM is currently working on expanding its services where possible. Manpower is limited and support from the other services is not there. STEM is expanding to some Joint areas such as the Pentagon, STRATCOM, TRANSCOM, and DISA. Eventually, strategic C^4I planning will have to shift to a DoD agency but until then the Air Force must focus on fixing its own problems and setting an example for the rest of DoD.

CHAPTER VI

CONCLUSIONS

As you have seen, the STEM effort has grown from a non-existent program into an Air Force wide service in under two years. STEMs provide engineering services to MAJCOMs and bases at no additional cost. Sure there is a price to pay for this service but it is taken care of at the Air Staff level. This is very important in today's fee-for-service environment. Air Force planners now have a proven service that can help them modernize, integrate, and standardize its C^4I systems while reducing the overall cost of information management. This is accomplished through the effective management of information technology. Either the Air Force strategically plans for advancements in information management technology or the success of future conflicts may be at risk due to our smaller force size.

The only problem is that the Air Force will probably never fight a war as a single service and as such the rest of DoD must also rely heavily on integrated C^4I systems for future conflicts. Unfortunately, there is no strategic planning service for information management that covers all of DoD. Numerous agencies are trying to set the direction for the next generation of C^4I systems to include modernization and integration. The long range goals of C^4I^2 can only be realized if there is one agency overlooking the whole process. Since DISA only handles long haul communications and does not have the infrastructure to take information management down to the base level there is only one solution that can be implemented by the end of the century. As I see it, only STEM can be expanded DoD wide and get to work solving the real problem of C^4I integration by the end of the century.

NOTES

1. Madnick, Stuart E., The Strategic Use of Information Technology, New York: Oxford University Press, 1987, pp 3-4.

2. Bhalla, Sushil K., The Effective Management of Technology, Massachusetts: Battelle Press, 1987, pp 6-7.

3. Williamson, John, Jane's Military Communications. Virginia: Jane's Information Group Inc., pp 15.

4. Rackham, Peter, Jane's C^3I Systems. Virginia: Jane's Information Group Inc., pp 11.

5. Lobdell, Doug, Jr., *Favorite Rice Recipes: The C^4I^2 Muddle.* Defense Electronics, pp 39-41.

6. Paige, Emmett, Jr., *Re-Engineering C^3I Operations.* Defense 93, Issue 6, pp 15-18.

BIBLIOGRAPHY

1. Madnick, Stuart E., The Strategic Use of Information Technology, New York: Oxford University Press, 1987.

2. Bhalla, Sushil K., The Effective Management of Technology, Massachusetts: Battelle Press, 1987.

3. Paige, Emmett, Jr., *Re-Engineering C^3I Operations.* Defense 93, Issue 6.

4. Lobdell, Doug, Jr., *Favorite Rice Recipes: The C^4I^2 Muddle.* Defense Electronics, September 1993.

5. Rackham, Peter, Jane's C^3I Systems. Virginia: Jane's Information Group Inc., 1993.

6. Williamson, John, Jane's Military Communications. Virginia: Jane's Information Group Inc., 1993.