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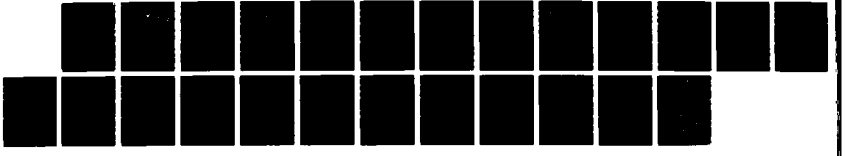

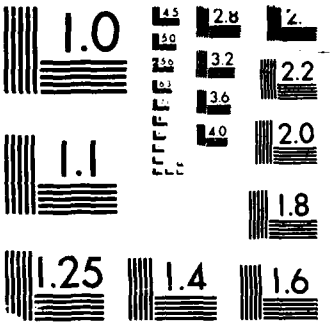

AIR COMMAND AND STAFF COLLEGE

STUDENT REPORT

CONCURRENCY IN SYSTEMS ACQUISITION - A CASE STUDY

MAJOR MICHAEL A. MCCLEARY 88-1725

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The F-15 System Program Office (SPO) "concurrently" contracted for the development and initial production quantities for the -4 Conformal Fuel Tanks (CFT's) and associated bomb racks to be delivered with the F-15E aircraft. The study reviews the program history, contractual implementation, problem identification, and corrective action. The study concludes that as a result of the F-15 SPO implementing the "concurrent" acquisition strategy the government saved valuable procurement time, achieved greater visibility into design/development costs, and was better prepared to resolve individual development problems associated with the CFT and bomb rack programs.

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PREFACE

There are a number of individuals who provided assistance which made this project possible.

I thank Major Randy King for his patience and technical assistance as my research advisor. A special thanks goes to my ex-teammates in the F-15 Contracts Division of the F-15 SPO, Ms Jackie Owens, Mr. Ken Phoenix, and Lt Patricia True who refreshed my memory and kept me informed of the contractual events which support this research project. To the Program Management side of the F-15 SPO, my sincere thanks to Capt Tom Grealish, Mr. Rick Boyer, and Major Bill Heincker who positively supported my review and analysis by providing valuable historical information. I particularly owe a great deal of thanks to Col Roger Alexander, Director of Contracts and Manufacturing, Deputy for Tactical Systems, Aeronautical Systems Division, for agreeing to sponsor this research topic.

Michael A. McCleary

ABOUT THE AUTHOR

Major Michael A. McCleary was born on 19 December 1952 in Coronado, California. The son of a career Naval officer, he graduated from Poway High School in Poway, California in 1971. Major McCleary then attended Arizona State University, graduating in June 1975 and receiving a Bachelor of Science degree in Business Management. Upon graduation, he received a commission in the United States Air Force through the Air Force Reserve Officer Training Corps Program, and also received recognition as an AFROTC distinguished graduate. His first assignment was as a Titan II Missile Combat Crew Member at Little Rock, Arkansas. While at Little Rock, Major McCleary completed a Masters degree in Business Administration/Public Administration on his own time through Webster University in 1979. After completing the four year directed duty assignment, Major McCleary transitioned into the Acquisition career field as the Assistant Chief, Quality Assurance Division, DCASMA Dallas in September 1980. Major McCleary worked in this capacity for over two and a half years, then attended Squadron Officer's School at Maxwell AFB, Alabama. Upon graduation from SOS, Major McCleary was assigned to Wright-Patterson AFB, Ohio as a Contracts Manager in the F-15 System Program Office. He was the Chief, F-15 Systems Branch and the Chief, F-15 Changes Branch before his assignment to Air Command and Staff College, Maxwell AFB, Alabama in August 1987.

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EXECUTIVE SUMMARY

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REPORT NUMBER 88-1725

AUTHOR(S) MAJOR MICHAEL A. MCCLEARY, USAF

TITLE CONCURRENCY IN SYSTEMS ACQUISITION - A CASE STUDY

I. Purpose: To investigate the difficulties experienced in a major weapon system program office's implementation of "concurrent" Research and Development (R&D) and Production programs.

II. Problem: Although "concurrency" has been a common Air Force acquisition strategy for over twenty-five years, the numerous problems encountered by program offices utilizing concurrency, as well as the lessons learned by each, remains undocumented. For future acquisition personnel to be able to more effectively manage concurrent programs, they must have access to the lessons learned from previous programs of like and/or similar weapon systems utilizing the concurrency acquisition strategy.

III. Data: The F-15 System Program Office (SPO) fulfilled a Program Management Directive by simultaneously contracting for the development of, and the initial low rate production quantities for, both the -4 Conformal Fuel Tanks (CFT's) and associated Bomb Racks to be delivered with the F-15E aircraft. The contractor was given contractual authority via two change orders to begin the

efforts. After the contractor had performed on both efforts for over eighteen months the designs of the CFT's and the Bomb Racks were baselined. However, upon initial flight testing of the new configuration, several problems were experienced resulting in poor bombing accuracy and potential safety of flight deficiencies. Not all bombs were falling straight down and away from the aircraft upon release. Some types of bombs were uncharacteristically pitching up toward the aircraft. During one incident, a weapon pitched up and contacted the left horizontal stabilator.

Subsequent wind tunnel testing revealed the problem to be threefold. First, the two air intake vents on either side of the aircraft create a "bow wave" which affects some weapons after separation. Second, unexpected wind turbulence created by the LANTIRN pod affects certain types of bombs, mounted in close proximity to the pod under the aircraft. And finally, the release characteristics of the Bomb Racks are not sufficient, at certain stations, to counter the unexpected wind turbulence caused by the air intake vents and the LANTIRN pod.

After review and evaluation, the program office considered three possible alternatives. The first alternative was to redesign the air intakes to reduce or eliminate what was determined to be a "bow wave" problem. Next, it was suggested that the LANTIRN pod be relocated more towards the rear of the aircraft which would put the Bomb Rack stations ahead of the wind turbulence created by the pod. The last alternative was to stick with the current Bomb Rack design, but initiate another concurrent program in the form of a "Weapon Separation Feasibility Study", to study potential solutions to the separation problem. Knowing that redesigning either the air intake vents or the CFT's would prevent the program office from making the Initial Operational Capability (IOC) date, the SPO opted for the third alternative.

As a result of the development problems stated above, and due to contractor delays in providing adequate cost and pricing data to the government, the definitization of the development portion of subject change order was delayed from the scheduled 180 day requirement, to over 500 days. Consequently, delays in the definitization of the concurrent "production" portion of the subject change order were also experienced.

IV. <u>Conclusions:</u> The F-15 System Program Office did experience problems with the implementation of "concurrent" R&D and Production -4 CFT and Bomb Rack programs. Given three possible solutions, two of which involve major airframe redesign, the F-15 SPO (with the concurrence of TAC) accepted a reduced ordnance delivery capability of the current CFT/Bomb Rack configuration, versus continue the R&D program indefinitely and risk missing the directed initial operational capability

date. In order to expedite problem resolution the F-15 SPO has initiated a "concurrent" Weapons Separation Feasibility Study. However, to date, technology has not yet advanced to the state that will permit the F-15E to carry every ordnance on TAC's weapons requirement list. Consequently, the problems experienced by the F-15 SPO would have occurred regardless of whether the "concurrent" acquisition strategy had been implemented or not. Nevertheless, by aggressively utilizing the "concurrent" acquisition strategy, the F-15 SPO is forcing the technical interface problems to be surfaced more quickly, thereby significantly reducing the overall acquisition lead time.

V. Recommendations: Concurrency is an extremely valuable acquisition strategy that should be used more extensively by more program offices as a means of shortening acquisition lead times and as a management tool to help solve tough engineering problems that tend to plague developmental programs. The F-15 SPO demonstrated the versatility of the strategy as a problem solving tool when it initiated the concurrent "Feasibility Study", to assist in resolving the technical difficulties associated with the CFT and Bomb Rack Programs. However, program managers intending to use the "concurrent" acquisition strategy should be aware that there are lessons to be learned from the experience of the F-15 SPO. Management should realize that concurrent programs tend to take a little longer to definitize than usual, and by necessity, force problem identification and resolution earlier than what traditional nonconcurrent programs experience. Also, program managers may find themselves trying to solve multiple problems as a result of concurrent programs becoming interdependent. On the other hand a major benefit that can result from utilizing the "concurrent" acquisition strategy is the greater visibility into design/development costs that is achieved. The increased visibility can translate into a significant savings for future production buys.

Chapter One

INTRODUCTION

BACKGROUND OF THE PROBLEM

Concurrency is an acquisition strategy whereby the government attempts to shorten the procurement cycle for weapon systems by initiating: "1) parallel (back-up) technological development, 2) simultaneous, but independent, technological development and testing, 3) co-production, and 4) overlap of dependent, normally sequential activities." (5:II-2) By using this strategy, one hopes to achieve an earlier operational capability date for a weapon system. (2:3) Though the strategy has been around since 1958 it has seen limited use in government contracting. In fact, Major David Spencer pointed out that the government's reduced reliance on concurrency, coupled with excessive testing and funding restrictions, are major reasons for the increase in military acquisition lead times. (8:36) In comparison, commercial lead times have stayed relatively stable. (3:47) Commercial industries attribute their success in maintaining stable lead times to their extensive use of phase compressions, also known as concurrency. (1:28) Though concurrency appears to be an easy solution to the tough problem of shortening acquisition lead times, it has not always achieved the desired result. In fact, the intentional overlapping of development and production of weapon systems was said to have been the downfall of the scuttled DIVAD program. (3:47) Certainly there are greater risks to managing concurrent programs because the success or failure of one program will invariably affect all parallel programs. And if more than one of the parallel programs is in trouble, the problems, and required solutions, are further multiplied.

SIGNIFICANCE OF THE PROBLEM

Most concurrent programs experience the classic "domino effect" when one of the programs gets into trouble. That is, when one program experiences a technical problem it usually causes at least one of the concurrent programs to make adjustments to any changes that are made. While the contractors are making changes, the government representatives administering the programs also have to react to those changes.

In doing so, government personnel are quite often faced with some rather significant challenges, which are not necessarily unique to only concurrent programs, but are, none the less, much more complicated to deal with when concurrent programs are involved. The major challenges facing government employees who will be administering concurrent programs pertain to definitization and program schedule changes, funding adjustments, and increased status reporting.

In most cases, concurrent programs experiencing troubles usually result in difficult times trying to maintain program schedules. For example, when program "A" encounters technical problems which result in schedule delays, the concurrent "B" program schedule will almost always be impacted. As a result, the program manager is faced with trying to come up with workarounds to fix two or more programs instead of having to worry about only one. The more concurrent programs involved, the tougher the problem solving process. More times than not, some sort of schedule extension results.

When it becomes apparent that a schedule extension is imminent, the next challenge involves identifying, and gaining approval for, the increased funding necessary to cover the schedule slippages (assuming that the programs have not been definitized yet). If the concurrent programs were initiated by an unpriced action (i.e. letter contract or change order), then approval must be obtained from the authority who originally approved the unpriced action to both extend the definitization schedules and increase the respective funding--an extremely tedious process. And it can be further complicated if separate approving authorities are involved (i.e. program "A" requires Intermediate Headquarters approval and program "B" requires Higher Headquarters approval).

Many concurrent programs involve large dollar amounts and are normally turned on by an unpriced action. If the unpriced action is not definitized within the 180 day schedule (which is the normal required time), then the program begins to appear on the Higher Headquarters "overage" tracking list. Consequently, there is a tremendous increase in the number and frequency of status reports briefed to upper management, and numerous additional methods of monitoring contractor progress are almost always instituted. Again, the number of overage actions that can result, in most cases, is directly related to the number of programs impacted by a single change between concurrent programs. Though concurrency has greatly contributed to shortening the procurement cycle for most weapon systems in general, because of the increased management attention and associated pressures it attracts, use of the strategy has, and will continue to offer significant challenges to program managers and contract administrators in the future.

PREVIOUS STUDIES

Numerous short articles have been published which briefly summarize the history of concurrency. Also, President Reagan appointed a Blue Ribbon Commission on Defense Management which issued it's final report in June 1986 that in essence gives credence to the use of concurrency in order to cut down the tremendous amount of time it takes to field a weapon system. (2:68-70) The latest analysis available specifically on the use of concurrency was conducted by Captain Wayne C. Foote, USAF, Air Force Institute of Technology, in a Thesis, presented in September 1986. In his analysis, Captain Foote provides an update to the strategy's history and also reveals the opinions of current managers in the Aeronautical System Division (ASD) concerning the implementation of concurrency within ASD. (2:--) Notwithstanding the above, to my knowledge, there does not currently exist an up-to-date analysis of a major weapon system program office's experience utilizing the concurrency acquisition strategy.

OBJECTIVE OF THIS STUDY

The objective of this study is to investigate the difficulties experienced in a major weapon system program office's implementation of "concurrent" R&D and Production programs. Specifically, an analysis will be conducted of the F-15 System Program Office (SPO) and it's management of the -4 Conformal Fuel Tank (CFT) and Bomb Rack R&D and Production programs. The program history will be investigated, up to and including program management direction and rationale for implementing concurrent R&D and Production programs. The business strategy will be reviewed, as well as the contractual method selected to accomplish the program directive. A description will be given of the problems experienced during the R&D phase and subsequent impact on the Production program schedule. An analysis will be conducted of the corrective actions taken by the program office to resolve and/or limit the impact on the production program schedule. Finally, recommendations will be made, in the form of lessons learned, to be used by future program offices who intend to utilize the concurrency acquisition strategy to satisfy an immediate program management directive.

Chapter Two

PROGRAM IDENTIFICATION

HISTORY - F-15 CONFORMAL FUEL TANKS/BOMB RACKS

In January 1984 the F-15E won the Dual Role Fighter (DRF) flyoff competition against the F-16. (9:--) Being a Dual Role Fighter means that the F-15E will perform not only as an Air Superiority Fighter but also as a bomber in support of air-to-ground tactical missions. Before the F-15E can perform as a bomber some significant structural modifications are necessary to allow the aircraft to carry additional ordnance . Modifications include beefing up the Conformal Fuel Tank (CFT) structures so that additional bomb racks can be added, as well as designing new bomb racks to fit the new bomb rack stations. Additionally, a LANTIRN pod is to be mounted under the center fuselage of the airplane to allow the aircraft to see during night attack missions. The center fuselage also requires additional reinforcement before the LANTIRN pod can be mounted on the F-15E. To demonstrate the appropriate theoretical performance characteristics that the F-15E would have incorporating the above modifications, and at the same time reduce development costs, an F-15B aircraft, modified to look like an F-15E, was used in the DRF flyoff competition. (4:--)

The competition aircraft had -2 CFT's modified to look like the proposed -4 CFT's, with the bomb rack stations semi-inserted into the CFT's. (4:--) Due to the fact that neither the CFT's nor the bomb racks had been developed yet, and since actually dropping bombs and judging accuracy was not part of the competition, the bombs were more or less mounted "fixed" in their proposed locations. (4:--) Also, the LANTIRN pod had not completed the design/development phase yet and was not used during the flyoff demonstration. In making the above modifications the contractor attemped to demonstrate the relative effects the proposed configuration would have on increasing the total "drag" of the aircraft. Speed, rate of turn, and the increase in the total gross weight of the aircraft were prime considerations as the F-15E had to keep essentially the same performance characteristics that it had as an Air Superiority Fighter. (4:--)

PROGRAM MANAGEMENT DIRECTION

After the F-15E was selected as the Dual Role Fighter, Program Management Directive (PMD) 2060(43)27130F/F15, dated 19 Sep 85, which superseded PMD 2060(36)27130F/F15A, dated 28 Mar 83, was received directing the F-15 System Program Office (SPO) to procure the design/development and initial low rate production quantities for both the -4 Conformal Fuel Tanks and the tangential weapons carriages (bomb racks) as part of the F-15E DRF weapon system procurement. (9:--) The Initial Operational Capability (IOC) date for the DRF is late calendar year 1989. (4:--)

PROGRAM MANAGEMENT PLAN

No specific program management plan was developed for the procurement of the CFT's or bomb racks. All planning was based strictly on meeting the aircraft IOC date of late 1989. (4:--)

Chapter Three

BUSINESS STRATEGY

CONTRACTUAL IMPLEMENTATION

The Letter Contract initiating the DRF effort was distributed 4 January 1985, under contract F33657-83-C-2133/P00035. (6:--) However, the decision was made to break out the development and production of the Conformal Fuel Tanks and the Bomb Racks due to the need to more clearly define technical baselines. Consequently, two separate change orders were issued, contract F33657-83-C-2133/P00119, issued 10 January 1986, began the concurrent design/development of the Bomb Racks and CFT's under CCP's 312 and 292, respectively. (6:--) Contract F33657-83-C-2133/P00128, issued 9 May 1986, authorized the start of the initial low rate production quantities for both the Bomb Racks and the CFT's under ECP's 1655 and 1652, respectively. (6:--)

DEFINITIZATION SCHEDULE

The following reflects the original definitization schedule for CCP's 312 and 292:

Receive Price and Delivery Proposal	20 Dec 85
Complete Negotiations	14 Apr 86
Contractor Sign Document	31 May 86
Distribution Complete	13 Jun 86

(9:--)

The following reflects the original definitization schedule for ECP's 1655 and 1652:

Receive Price and Deliver Proposal	29 Apr 86
Complete Negotiations	24 Aug 86
Contractor Sign Document	3 Oct 86
Distribution Complete	22 Oct 86

(9:--)

Neither one of the above definitization schedules were achieved. The contractors have updated their proposals to reflect current rates and actual expenditures. (9:--)

Chapter Four

PROBLEMS/CORRECTIVE ACTION

DEVELOPMENT PHASE

The design/development phase of the CFT's and Bomb Racks is being accomplished by two separate contractors. Tactical Air Command had given the SPO a laundry list of weapons that the F-15E was required to carry. However, during initial flight testing of the F-15E configuration, it was discovered that some of the desired weapons had experienced unusual release characteristics which resulted in poor bombing accuracy and which could potentially affect safety of flight. Not all bombs were falling straight down and away from the aircraft upon release. Some types of bombs were uncharacteristically pitching up toward the aircraft. During one incident a weapon pitched up and contacted the left horizontal stabilator. Fortunately, the pilot recovered the aircraft without incident.

Subsequent wind tunnel testing validated the concerns and determined the problem to be threefold. First, the two air intake vents on either side of the aircraft creates a "bow wave" which affects some weapons after separation. Second, unexpected wind turbulences created by the LANTIRN pod affects certain types of bombs, mounted in close proximity to the pod under the aircraft. Finally, the release characteristics of the Bomb Racks are not sufficient, at certain stations, to counter the unexpected wind turbulence created by the air intake vents and the LANTIRN pod. That is, the bombs were not being ejected far enough away from the aircraft into the unaffected airstream. As a result of the problems experienced during initial flight testing, additional wind tunnel testing was directed and conducted on every ordnance included on TAC's requirements list.

After determining the nature of the problems, the SPO looked for potential solutions. One suggestion was to redesign the air intakes to reduce or eliminate the "bow wave" problem. Though it was a valid consideration, the suggestion gained no support as the air intakes were a major design feature of the aircraft and to change intake design would require major airframe redesign. Next, it was suggested that the LANTIRN pod be relocated more toward the rear of the aircraft which would put the Bomb Rack stations ahead of the wind turbulence created by the pod. To move the LANTIRN pod would also require redesign of the CFT's to reinforce the new mounting points.

The last suggestion consisted of sticking with the current Bomb Rack design (since it worked well for most of the weapons on TAC's requirements list), and at the same time, initiate another concurrent program in the form of a "Weapon Separation Feasibility Study". The objective is to find the right combination that will work with the remainder of the TAC weapons requirements.

IMPACT ON PRODUCTION PHASE

Other than the contractual delays in negotiating the change orders, there is no delivery schedule impact on the production phases of either the CFT or Bomb Rack programs, even with the addition of the extensive wind tunnel testing. The F-15 SPO is projecting meeting the required IOC date of late 1989 for aircraft delivery. (9:--) Management has decided not to make any major design changes in either the CFT's or the Bomb Racks at this time. The reason no changes are forthcoming is that, to date, there has not been an acceptable design that is compatible with every ordnance on TAC's requirements list relative to adequate weapons separation. The current baselined design is considered the best there is to date. (4:--) The major impact will be at the operational (user) level. Some ordnances on TAC's requirements list cannot be carried at certain Bomb Rack stations and some won't be carried at all without modifications to the ejection mechanisms of the Bomb Racks.

MANAGEMENT CORRECTIVE ACTION

The F-15 SPO has initiated a "Weapons Separation Feasibility Study", concurrent with the production phase, in an attempt to solve the ejection/release problems for the affected ordnances on TAC's requirements list. (4:--) Since the current CFT/Bomb Rack design satisfies most of TAC's requirements, the SPO intends to press on with the procurement of the currently baselined designs. Management feels that it is better to meet the IOC date with some capability than to miss it completely and not have an operational capability at all. The plan is to try and solve the problem before full rate production. If the problem can be solved by a new Bomb Rack design, then another change order can be issued to initiate production of the new design. At the same time a stop work order can be issued for the current design, which could eventually be terminated. However, if a new design is not found to solve the current problems, the current design will be retained and fielded. To date, the contractor has submitted a Price and Delivery (P&D) Proposal for the full rate production of the CFT and Bomb Rack programs. The P&D incorporates the current baselined design in its engineering estimates for the Bomb Racks. (9:--)

Chapter Five

CURRENT STATUS

REVISED BUSINESS STRATEGY

The F-15 Contracts Division completed negotiations and distributed the contract documents for CCP's 292 and 312 on 31 Aug 87 and 12 Nov 87, respectively, which formally baselined the designs for both the -4 CFT's and the Bomb Racks. Additionally, negotiations were completed, and contract document distributed, for the initial low rate production of the -4 CFT's (ECP 1652). Negotiations were completed for the initial low rate production of the Bomb Racks (ECP 1655) on 6 Nov 87, and the contract document is currently out for contractor signature. The Contracting Officer (PCO) does not anticipate issuing a Change Order in calender year 1989 to approve changing the design for the Bomb Racks. The current baselined design appears to be the best there is, even though it doesn't accommodate every ordnance on TAC's requirements list. (9:--)

REVISED DEFINITIZATION SCHEDULE

The -4 CFT Production effort has been definitized, and in all likelihood the design will not change. However, the definitization schedule for the Initial Low Rate Production of the Bomb Racks (ECP 1655) is incomplete and is, therefore, reflected below:

Received Price and Delivery Proposal	29 Apr 86
Negotiations Complete	6 Nov 87
Contractor Signature	29 Jan 88(F)
Distribution Complete	3 Feb 88(F)

(7:--)

(F) = Forecasted dates

Chapter Six

FINDINGS

During the investigation to support this study the following observations were made:

1. The CFT/Bomb Rack programs are interdependent. That is, the success of one program depends on the success of the other. This situation tends to complicate problem solving. The program manager has to be conscious of how each change made to one program impacts the other. A good illustration of this point is that when the suggestion was made to move the LANTIRN pod station towards the rear of the aircraft the program manager recognized that to do so would have required a complete redesign of the -4 CFT's to strengthen the new mounting points. Also, he recognized that to make the change would have required a significant increase in development cost and a tremendous slip in the delivery schedule of the aircraft.

2. Initiating the CFT and Bomb Rack development and production programs concurrently will ultimately save the government a great deal of time in the total weapon system acquisition of the F-15E. However, definitization of the contracts themselves tend to take longer than normal for several reasons. First, any changes to the development portions of the program will most often cause delays in the production program because of the uncertainty of the impact of the corrective action taken. The contracting officer wants to insure that the actions taken to correct problems on the development programs are effective before proceeding on with procurement of the production portions. Second, development programs almost always experience technical problems which usually contribute to the delays. Consequently, management must postpone authorization of the production portion of a program until the design has been successfully tested and proven. And finally, the time allotted to properly evaluate and negotiate major developmental programs initiated by unpriced actions is insufficient to properly accomplish the task. Collecting the proper cost and pricing data on sophisticated, state of the art technology, in the time frames required, continues to be a tough objective to achieve.

3. Concurrently initiating the development and production portions for the CFT and Bomb Rack programs benefited the government in two additional ways:

a. The government achieved greater visibility into the costs associated with the design/development of the CFT's and Bomb Racks that would otherwise have been obscured in the "bottom line" negotiation settlement. The increased visibility will result in reduced procurement costs for future production buys of CFT's and Bomb Racks.

b. The program office was better prepared to quickly resolve the individual development problems encountered during the development phase of the CFT and Bomb Rack programs because of the concurrent strategy implementation.

CONCLUSIONS

The F-15 System Program Office did experience problems with the implementation of "concurrent" R&D and Production -4 CFT and Bomb Rack programs. Given three possible solutions, two of which involve major airframe redesign, the F-15 SPO (with the concurrence of TAC) must accept a reduced ordnance delivery capability of the current CFT/Bomb Rack configuration, versus continue the R&D program indefinitely and risk missing the directed initial operational capability date. In order to expedite problem resolution the F-15 SPO has initiated a "concurrent" Weapons Separation Feasibility Study. However, to date technology has not yet advanced to the state that will permit the F-15E to carry every ordnance on TAC's weapons requirement list. Consequently, the problems experienced by the F-15 SPO would have occurred regardless of whether the "concurrent" acquisition strategy had been implemented or not. Nevertheless, by aggressively utilizing the "concurrent" acquisition strategy, the F-15 SPO is forcing the technical interface problems to be surfaced more quickly, thereby significantly reducing the overall acquisition lead time.

RECOMMENDATIONS

Concurrency is an extremely valuable acquisition strategy that should be used more extensively by more program offices as a means of shortening acquisition lead times and as a management tool to help solve tough engineering problems that tend to plague developmental programs. The F-15 SPO demonstrated the versatility of the strategy as a problem solving tool when it initiated the concurrent "Feasibility Study", to assist in resolving the technical difficulties associated with the CFT and Bomb Rack Programs. However, program managers intending to use the "concurrent" acquisition strategy should be aware that there are lessons to be learned from the experience of the F-15 SPO. Management should realize that concurrent programs tend to take a little longer to definitize than usual, and by necessity, force problem identification and resolution earlier than what

traditional nonconcurrent programs experience. Also, program managers may find themselves trying to solve multiple problems as a result of concurrent programs becoming interdependent. On the other hand, a major benefit that can result from utilizing the "concurrent" acquisition strategy is the greater visibility into design/development costs that is achieved. The increased visibility can translate into a significant savings for future production buys.

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