THE C-130 AIRCREW TRAINING SYSTEM
- A TEAM SOLUTION -

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Abstract

Since 1984 the Military Airlift Command (MAC) has moved to improve aircrew training through the use of Aircrew Training Systems (ATS). ATS's represent a radical departure from MAC's traditional training approach because of the autonomy given the ATS contractor in creating and operating these training programs--an autonomy given the contractor in exchange for a qualitative guarantee of ATS graduates. Reliance on this guarantee, however, has limited utility in defining the relationship between the using command and the contractor during ATS development. ATS success requires an acknowledgement by the using command, the acquisition command, and the contractor that ATS development, and operation, is an integrated, long-term venture. That acknowledgement must occur from the outset of the ATS program. A cooperative managerial approach dedicated to fostering a sense of mutual ownership among all participants is paramount. The ATS concept necessitates modification of traditional management functions, modifications derived from "lessons learned" and a modicum of intuitive insight.

INTRODUCTION

In 1984 two related events occurred which dramatically altered the philosophy and structure of aircrew training within the Military Airlift Command (MAC). The Pentagon's Scientific Advisory Board conducted a study to determine the feasibility of improving the quality and efficiency of aircrew training. This led to the C-130 Model Aircrew Training System (MATS) Study, which was conducted by Seville Training Systems under contract to the Air Force Human Resources Laboratory (AFHRL). This study was designed to:

- o Apply state-of-art techniques of training development, delivery, and management to C-130 aircrew training.
- o Provide the context for evaluating these techniques and addressing other training system research issues.[1]

The principal results of the MATS study Phase II final report documented the development of an enhanced Instructional Systems Development (ISD) methodology responsive to extant state-of-the-art training technology and validation of that methodology with respect to its theoretical utility for training system design.[2] The C-130 MATS specification was unique with regard to its operational definition of the total training system concept, and the integration of state-of-the-art training technology through functional requirements at the macro system level.[3] The C-130 MATS specification led to a total contract training system for the C-130 Weapons System. The latter recommendation provided the catalyst for the continued growth of an entire aircrew training genre within MAC, as manifest in the C-130 ATS, its predecessor, the C-5 ATS, and training systems for C-141, C-17, and, most recently, Special Operations Forces aircraft weapons systems. Among these systems, the C-130 ATS is emerging as the preeminent example of the potential inherent in the ATS concept. The C-130 ATS is a clear demonstration of the critical importance of developing a contractor/using command team in order to fulfill the complex, expansive requirements of any Aircrew Training System. It is that critical element which we address here in terms of programmatic evolution, potential ATS pitfalls, management and operational relationships which have proven essential to program success, and recommendations for emerging and future programs which incorporate the ATS concept.

As a result of the MATS Study and the impetus provided by the Military Airlift Command, the C-130 Aircrew Training System program became a reality in April 1987. CAE-Link (then Singer Training Systems Group) was awarded the contract and is responsible for:

- o Development of new C-130 aircrew training curricula for formal school and continuation training
- o Conduct of aircrew ground training at the formal school, five Main Operating Bases, and three remote sites
- o Incorporation of six modifications to ten Weapons Systems Trainers (WST's) and two Cockpit Procedures Trainers (CPT's)
- o Continuous operation and maintenance of the total system.

CAE-Link's C-130 ATS performance is subject

to both qualitative and quantitative student guarantees. Formal school students who are determined to be unqualified by Air Force administered aircraft checkrides are remediated at CAE-Link expense; CAE-Link also guarantees annual formal school student throughput. In addition, the C-130 ATS incorporates computer-based training technology and a prototypical Training Management System (TMS) which provides management/data support for all elements of ATS operation.

THE ATS GUARANTEE

Underlying the ATS concept is the premise that ATS development and implementation is under purview of the selected contractor. Fundamentally, this means that curricula development, including ISD methodology, media selection, syllabi structure and training device utilization, is, to a large extent, the sole province of the contractor. The government's protection and primary recourse resides with the qualitative and quantitative student guarantees. This provision holds that any formal school student found deficient by Air Force evaluation is retrained by the contractor at no additional cost to the government. Implicit in the ATS student guarantees levied upon the contractor is a limitation of government involvement during ATS development by the contractor. The implied government limitation is defined by compliance with contractual requirements and, with respect to curricula, verification of the technical accuracy of the courseware. The Using Command's designated Subject Matter Experts (SME's) provide the means for verification of technical accuracy. Contractor latitude within these defined boundaries is substantial and, even in concert with the C-130 ATS requirement for on-site management and development, can evolve into a substantively unilateral approach to contractor development of the ATS.

Conceptually, the potential risks of "hands-off" government program management of an ATS are off-set by the singular provision which remains sacrosanct: the guaranteed product of the training system, i.e., the student. In theory, government recourse against the contractor via the student guarantee provides sufficient protection for the government. In reality, however, the government's "protection" is an ex post facto provision, effective only subsequent to ATS implementation. It does not provide for protection from a technically accurate, contractually compliant ATS developed unilaterally by the contractor which, upon implementation, is operationally infeasible. The "guarantee" will not expediently resolve substantial operational design flaws within an implemented ATS. Despite the government's recourse against the contractor and its ability to recompete an implemented ATS program, the detrimental effects of student throughput disruption and the resulting decline in crew force readiness on a strategic weapons system have ramifications which can only be termed as "wholly unacceptable" to the using command and the ATS contractor. The student guarantee is, in effect, a symptomatic panacea. Development and implementation of an operationally effective ATS requires a management philosophy and approach which, from the outset of an ATS program, belies the "hands-off" government program management concept implicit in the guaranteed student provisos.

A CULTURAL PERSPECTIVE

The ATS contractor requires information and insights which only the using command possesses. In the case of the C-130 Weapons System, the Air Force has been successfully training airlift crewmembers for three decades. CAE-Link, as the C-130 ATS contractor, entered an incredibly mature system, developed and nurtured over time by two major commands: the Tactical Air Command and the Military Airlift Command. The history of the C-130 weapons system appears to have little relevance to the management or development of an ATS using state-of-the-art training technology and refined Instructional Systems Development methodologies. That perspective is, in reality, a critical element in understanding the necessity for contractor/user rapport.

Aircrewmembers, regardless of whether they are operating on a flight line or in a command staff position, are part of a culture which tends to be unique to the weapons system in which they are most experienced. The strength of that culture, and its associated attitudes, styles, preferences, loyalties, expectations, and esprit de corps, evolves from historical reference. The ATS contractor must be aware of that culture and be responsive to it. The implementation of a state-of-the-art training system will not alter the culture. In fact, it must meld with it and, eventually, become transparent to it in order to be successful.

ATS contractor sensitivity to the operating aircrew culture which pervades a mature weapons system must be established from the outset. To achieve that, the contractor must establish a close, viable relationship with the user at all functional levels. The contractor must be attentive to the operational constraints, "lessons learned", preferences and styles which define and give credence to the environment in which the ATS must operate. Failure to do so may result in misdirected efforts, lack of user acceptance, and loss of contractor credibility.

An inherent element of the aircrew culture is the Flight Evaluation (i.e. checkride) which, when incorporated into the ATS setting, assumes a different connotation. The use of an Air Force conducted Flight Evaluation to determine the quality of an ATS program graduate and validate the guarantee presents a very real dilemma. A Flight Evaluation, as a discrete evaluative instrument, does not, and can not, encompass the entire body of cognitive or psychomotor skills requisite to verify the adequacy or completeness of crewmember formal school training. In recognition of this, the C-130

ATS incorporates a Training Management System (TMS) developed by CAE-Link. The TMS, which supports the ATS, tracks specific behavioral objectives, academic evaluation, hands-on performance, remediation, and scheduling. The system correlates over 18,000 formal school objectives with individual student mastery of each criterion referenced objective. The resulting data is available to Air Force C-130 flight instructors/evaluators within the formal school and serves as the baseline for proficiency training in the operational environment. These objectives also provide the basis for expedient student remediation during the conduct of a given training curriculum, define superordinate and sub-ordinate instructional goals, and serve as key components for system-level evaluation. The objectives, and their associated performance standards, represent the foundation of the ATS. They can not be developed, assessed, or validated without the direct involvement of the using command. As such, the fundamental goal of the ATS, i.e. production of a qualified crewmember, necessitates extensive user involvement from the outset because these behavioral objectives are established during the initial analytical phase of the ATS contractor's ISD effort.

THE ATS USERS

In truth, an ATS serves two users: the using command and the ATS contractor. That is not surprising statement given the ATS concept, but it contains a dichotomy which, if not managed, can create havoc during ATS development. From one perspective the ATS contractor is delivering the ATS to himself. The ATS contractor develops the training system, implements the system using his own instructor cadre, manages the conduct of training and, ultimately, guarantees the product of the implemented system. This perspective, if left unattended, can allow the ATS contractor to place himself in a form of developmental isolation from the using command. Given the experience, resources, and culture resident in the using command, a unilateral approach to ATS development by the contractor can potentially generate an environment which inhibits compromise, stifles creativity, and reduces credibility. Interchanges between the two ATS users can become confrontational. Information may not be shared. ATS contractor productivity can decline and schedule pressures increase. In this environment the ATS contractor's development program performance enters a decline, accelerated by continuous discord, non-negotiable positions, and the exigencies of milestone achievement. Ultimately, the ATS contractor is unable to deliver a viable training system to himself or to the using command.

From another perspective, the using command is the pivotal element during ATS acquisition and development. The definition of aircrew training requirements for an ATS acquisition is undeniably the charter of the using command. Similarly, the using command brings nonpareil expertise and insights regarding the nuances of aircrew training to the developmental phases of an ATS, factors which increase in depth and detail as function of the age of the weapons system. It is the non-alignment of the using command's expertise and insight with the role of the ATS contractor which can create a schism between the two ATS users.

Just as the ATS contractor must acquire a sensitivity for, and respond to, the culture which is imbued in the aircrew community associated with the ATS weapons system, the using command inherits a correlative responsibility. The using command must acknowledge the ATS contractor's professional expertise in the variety of disciplines required for ATS development and not lose sight of the fact that the ATS contractor is obligated to live with the ATS in a manner not dissimilar from the using command. ATS acquisition replaced a key, traditional capability of the using command, (i.e. aircrew training for a specific aircraft weapons system) with a surrogate capability (i.e. the ATS contractor). While the fundamental aircrew training tasks and requirements remain intact, interface between the using command and its aircrew training element changes with the acquisition of a surrogate. The using command has, in some ways, abrogated direct control over activities traditionally under its absolute purview. The ATS contractor, by virtue of contractual requirements and the onus of student guarantees, exercises a degree of non-traditional independence. If that independence is perceived at any level within the using command as being non-responsive or contradictory to the established culture, the relationship between the two users begins to deteriorate.

An aircrew training system is, a "marriage" intended to last a decade, or more. The using command, in effect, divorced a part of its own training function and replaced it with an ATS contractor. A fundamental assumption must be made given this "marriage": the using command can work as effectively with the new partner as it did with its own personnel. This need to function as a unified entity must also be met under the same circumstances that existed when the Air Force was the singular training component. Adverse or unanticipated circumstances which would have been overcome in the traditional system must also be overcome with equal alacrity in the ATS. The cooperative environment required to achieve this level of compatibility must have its inception during acquisition and last through the life of the program.

COOPERATIVE MANAGEMENT

The C-130 ATS program did not bypass the pitfalls of contractor/using command discord and mutual misunderstandings. The onset was slow and insidious, taking almost ten months to gain perceptible momentum. Earlier recognition was masked by the elation which follows contract award, a novitiate perspective of the complexities of ATS development/management, and CAE-Link achieving all initial, "measurable" developmental and operational milestones on, or ahead, of program schedule. Nonetheless,

the tension between the using command and the contractor increased as the development effort moved closer to initial implementation of ATS curricula. As the relationship became more disassociate, credibility and motivation declined. Schedule suffered along with the disenchanted participants. Within a period of four months, however, program decline was arrested and an ascent measurable not only in terms of production but also in terms of cooperative attitude began. The catalysts for such a dramatic reversal are of equal, if not greater, importance than are the causal factors for the decline.

It would be most gratifying to state that, once decline of the developmental program was evidenced, the causal factors were expediently identified and management took immediate action to rectify the problems. Such was not the case; the causal factors became evident only after program descent was arrested. At the nadir of decline, the C-130 ATS development program could be described as "dissociate", the direct manifestation of schedule pressures. Decisions were being made within the context defined by an emerging discord between the using command (MAC), the acquiring command (ASD), and CAE-Link, i.e. reactionary.

Key program management personnel from each of the above organizations decided to relieve the perceived schedule pressure by amplifying the necessity of a quality product and deceasing the apparent emphasis on schedule achievement. The ATS development schedule retained importance, but a detailed contingency plan was developed to offset any detrimental impacts of schedule slippage. Existing interim milestones were adjusted within the overall contractual performance period to effect a smoother developmental flow. These decisions were not made unilaterally. They were made as a unified, mutually cooperative decision involving MAC, ASD, and CAE-Link. The decisions created a perceived release from schedule pressures. That perception, attributed to a unified managerial approach among MAC, ASD, and CAE-Link, began to foster a cooperative atmosphere. Product quality increased. Increased product quality enhanced mutual appreciation, credibility, and cooperation. Overall production began to increase. The C-130 ATS development effort began to ascend.

The perceived release from schedule pressure was not the singular key to program reversal. Once a reversal was apparent, impetus was necessary to maintain the ascent and subsequently accelerate to effect full developmental schedule recovery. Motivational recovery from a disharmonious environment requires an adjustment in behaviors which, at times, seem endemic to the industry as a whole. Programs like the C-130 ATS inherently have a multitude of regularly scheduled meetings (e.g. Management Reviews, Technical Interchange Meetings, Design Reviews, etc.) involving representatives from all parties evidencing association with, or concerned about, the program. These Air Force/contractor meetings invariably focus upon program problems, regardless of the successful accomplishments of the program, and, in the case of the C-130 ATS, the successful accomplishments were substantial. Nonetheless, mid and lower grade managers can depart such meetings with negative perceptions. Once again, in a cooperative, unified approach, we (MAC/ASD/CAE-Link) used these regularly schedule meetings as the opportunity to provide positive reinforcement to all parties (Air Force and CAE-Link) involved in the day-to-day ATS development effort. This reinforcement served to acknowledge that, collectively, "we" have achieved positive results and, collectively, "we" can attain our mutual goals.

Attaining these positive outcomes represents one of ASD's major roles in developing an ATS program. The primary element of this role is the emphasis on "we". This orientation must extend to all program phases, particularly in the area of problem solving. At the low point of Air Force/CAE-Link relations, it became apparent that the top down decision making process was ineffectual. Reestablishing the requisite rapport among program participants would, of necessity, require the combined talents of every member of the government/contractor organizations. Teams of functional experts were organized to focus upon problem areas with the mandate to bring back solutions.

This "grass roots" approach to problem solving worked. It served not only to resolve programmatic difficulties, but fostered team building by giving "custody" of the solutions to the people who would have to implement them. ASD's role became one of orchestrating the abundant talent within the contractor/government team and creating an atmosphere which encouraged candid discussion and productive dialogue.

An impression of cooperative management is the derivative of these actions. It represents the most important role that the acquiring command can play: developing and nurturing a paramount sense of mutual program "ownership." This does not negate the importance of ASD's traditional roles but, in the end, the ultimate goal of the acquiring command is to ensure MAC's, ASD's, and the contractor's programmatic focus is maintained.

CONCLUSION

Each organization makes unique contributions to an Aircrew Training System consistent with their respective roles. However, from a managerial perspective, those roles must reflect the same level of total integration as that of the Aircrew Training System itself. Lacking that integration, management imparts a sense of disunity which is mirrored by the functional line elements of the program.

To effectively achieve a successful using command/ATS contractor marriage and avoid the difficulties experienced by the C-130 ATS, each organization must commit, from the outset, to a cooperative venture. That implies a mutual understanding of roles

and responsibilities, capabilities, and goals. Under the conceptual structure of the ATS, each must: relinquish a measure of "control"; manage as an integrated, concordant entity with mutual goals; and resolve problems without becoming confrontational. Similarly, the acquiring command must participate in kind, relinquishing programmatic elements traditionally held under their control and completing the ATS managerial triumvirate. Examples of these elements include, but are not limited to, quality assurance and training management development.

The ATS concept is relatively new. The advent of each ATS program breaks new ground and sets new precedents. The Air Force and industry are brought together in this arena with a set of traditional approaches, perceptions, and processes which may not readily adapt to the ATS concept or its environment. Traditionally, management is one of the last elements to evolve in any organization. The authors of this paper hope that we have, perhaps, assisted in accelerating that evolutionary process.

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