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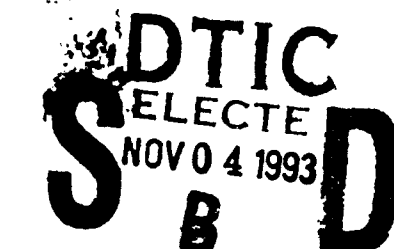
**Air Tasking Order Generation and Dissemination
Systems: A Solution for The Marine Corps**

Captain J. A. Herzberg, USMC; Captain L. A.
Row, USMC; Captain V. L. Tumilty, USA;
Captain B. T. Vaughn, USAF

Command and Control Systems Course
Communication Officer's School
2085 Morrell Avenue
Quantico, Virginia 22134-5058

Marine Corps University
Marine Corps Combat Development Command
2076 South Street
Quantico, Virginia 22134-5068

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Thesis: Current Air Tasking Order (ATO) generation and dissemination methods must be revised to produce a document which is reliably transmitted to all services and is standardized in format and terminology. This paper explores ATO issues encountered during Operation Desert Storm. Additionally, discussions involving CTAPS software, the Joint Air Tasking cycle, and standardized formats are included.

USMC; Command and Control; C2; C3; C4I;
Joint Command and Control; Air Support; Air Opns;
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AIR TASKING ORDER GENERATION AND DISSEMINATION SYSTEMS:
A SOLUTION FOR THE MARINE CORPS

Submitted to
Major Youtzy
and
Ms. Kirkpatrick
at the Communication Officers School
Quantico, Virginia

Captain J. A. Herzberg, USMC
Captain L. A. Row, USMC
Captain V. L. Tumilty, USA
Captain B. T. Vaughn, USAF

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**AIR TASKING ORDER GENERATION AND DISSEMINATION SYSTEMS:
A SOLUTION FOR THE MARINE CORPS**

OUTLINE

Thesis: Current ATO generation and dissemination methods must be revised to produce a document which is reliably transmitted to all services and is standardized in format and terminology.

- I. What problems were exposed during Desert Storm?
 - A. Transmission methods were ineffective.
 - B. The ATO format was confusing.
- II. Is CTAPS software the answer to Joint Air Tasking?
 - A. The CTAPS background explains some problems.
 - B. The Navy is attempting to become interoperable.
 - C. The Marine Corps has concerns about CTAPS.
- III. Is there a ready solution for the Marine Corps?
 - A. Hardware must process any designated software.
 - B. Software must be open architecture.
 - C. A variety of transmission media is needed.
 - D. One standardized ATO format must be created.

APPENDICES

- A. Questionnaire Results
- B. CTAPS Limitations/Concerns

**AIR TASKING ORDER GENERATION
AND DISSEMINATION SYSTEMS:
A SOLUTION FOR THE
MARINE CORPS**

Employing aircraft as instruments of warfare evolved during World War I. Since then, many attempts to integrate the air assets of the different services resulted in competition between commanders for control of those assets and failure to accomplish the assigned mission. Integration problems, with land-based air forces of the different services, have been noted in conflicts from Midway and the Solomons through Korea and Vietnam. (19:61) The need for detailed coordination during sustained theater operations was evident in Operation Desert Storm, when 2,000 daily sorties were flown against Iraq. The common denominator of those 2,000 daily sorties was the Air Tasking Order (ATO) -- a single document described as the "blueprint" for the allied air campaign.

Current ATO generation and dissemination methods must be revised to produce a document which is reliably transmitted to all services and is standardized in format and terminology. Desert Storm highlighted critical limitations in the ATO process, and despite successful execution of the Desert Storm ATO, the services experienced difficulties in

disseminating and receiving the actual document. In January 1993, the Joint Chiefs of Staff designated an Air Force software application to be the joint standard for ATO generation, after it completes certification testing in the spring of 1993.(22) Although this will satisfy requirements for a single, interoperable ATO dissemination program, services are still working with their own specific ATO generation systems. Furthermore, this Air Force software application possesses inherent problems which must be resolved before it is accepted as a joint standard.

WHAT PROBLEMS WERE EXPOSED DURING DESERT STORM?

Desert Storm exposed serious flaws in the services' ability to share crucial air planning information via the ATO. The ATO was used by flying units and command and control agencies to plan and coordinate from 1,000 to 3,000 sorties per day. Critical, time-sensitive ATO information included mission numbers, flight call signs, radio frequencies, takeoff times, in-flight refueling information, types of ordnance to be employed, targets to be engaged, etc. Some military units received the ATO late or not at all. For air control and air defense units functioning as critical command and control nodes, not receiving the ATO could mean the difference between ensuring flight safety and contributing to fratricide. After finally receiving the

ATO, some organizations had tremendous difficulty finding needed information in the document due to its tremendous volume. We therefore perceive two major problems with the current ATO system: (1) timeliness of receipt is poor (which is inextricably tied to transmission method) and (2) the format of the document itself is confusing. Both issues were repeatedly identified in responses to questionnaires soliciting ATO problems (see Appendix A). All services must establish an automated ATO interface capability to enhance joint interoperability. Modifying existing systems to meet joint standards is an increasingly important concept given potential funding constraints.

Transmission Method

Varied methods of transmission used by each of the services complicated effective distribution of the joint ATO and contributed to timeliness problems. A Headquarters Marine Corps message noted "The single most important problem with the ATO is message dissemination rather than the format or information it contains."(4:1) Doctrinally, transmission of the ATO occurs through the use of U. S. Message Text Format (USMTF) within the military message system (Autodin) using centralized computers and printers.

However, using message transmission systems can delay the ATO because higher precedence traffic must be sent first. According to one user of the ATO:

Both during Desert Storm and while on NAVCENT staff in the summer of '92 timeliness was always the weak link. We had four methods of receiving: GENSER message, ATOX, JOTS, and CTAPS. We would consistently receive incomplete ATO's from all systems and they were usually late. During Southern Watch, they could have the ATO written by 1500 and it would take up to eight hours to transmit.(51)

Recently (including Desert Storm), the Computer Assisted Force Management System (CAFMS) has been used by the Air Force to generate and disseminate the ATO. Units using CAFMS reported problems of lengthy transmissions (up to six hours); limited software capability; reliance upon secure communications (which may not always be available); non-standard system terms, acronyms, and procedures; and a lack of common hardware compatibility between service assets.

Ineffective transmission of the Desert Storm ATO resulted in "workarounds," including transmission through computer diskette, courier, local area network, or via modem over telephone or radio.(23:1) Although these alternative transmission methods were employed with varying degrees of effectiveness, the need for a system which conforms to joint standards still exists. Resorting to innovative "workarounds" should not be a battle management function of command and control units attempting to prosecute a theater

air campaign. A more efficient transmission means must be developed because, as Headquarters Marine Corps officially noted, "The size of the ATO message prohibits effective and timely dissemination via Autodin." (4:1) It is also important to not go to the opposite extreme and rely solely on one specialized transmission means, as this precludes needed redundancy. The other major problem we noted with the ATO, which will be examined next, is the format.

ATO Format

The ATO format used during Desert Storm was confusing because it contained too much free text information. Although standard data fields were used to provide normal ATO information (aircraft type, mission number, ordnance, and so on), the accompanying Special Instructions (SPINS) contained airspace control measures, surveillance control measures, and Operations Order changes. SPINS were transmitted during each ATO cycle and reflected daily, weekly, and monthly changes. Much of this information was written in free text rather than a specified format. The enormous amount of sortie information, when combined with the SPINS, produced an ATO averaging 600 - 750 pages in length. Many items contained in the SPINS should, according to doctrine, be published in Tactical Operations Data, Air Defense Plan, and Airspace Control Order messages. Because

the ATO and SPINS contained an inordinate amount of information and used free text writing, many users were unable to break down and disseminate necessary data. According to one unit "Even when the ATO was received, due to the size of the document, the Navy was reluctant to reproduce copies for further dissemination." (32) As a result, some Navy units, including those performing anti-air warfare functions, operated with an incomplete air picture.

The ATO standardization problem must be resolved in consonance with efforts to develop a better transmission means. The standardization process should include input from all services to ensure a useful joint document. The CAFMS system mentioned earlier is a small part of an Air Force battle management system architecture called the Contingency TACS (Theater Air Control System) Automated Planning System (CTAPS). The joint staff has declared the CTAPS ATO software application to be the joint ATO standard. This application will be reviewed in the following section.

IS CTAPS THE ANSWER TO JOINT AIR TASKING?

Despite inherent limitations, CTAPS is being developed as the joint standard for ATO systems. CTAPS is an Air Force software architecture built to Air Force standards. As a result, CTAPS was not designed to meet joint

requirements. The United States Army, as an adjunct to Air Force operations, will be accommodated in Air Force development efforts.(35:23) The Army does not use an ATO to task organic aviation assets, but must receive the ATO for other services' flights so that air defense units are informed of friendly missions. Because the Air Force is actively pursuing integration with the Army, and since the Army does not produce an ATO, future discussions will focus on Navy and Marine Corps integration efforts.

Background

The goal of CTAPS is to automate and modernize major TACS elements (Air Operations Center, Air Support Operations Center, Wing Operations Center, Control and Reporting Center) from the top down. CTAPS is an Air Force umbrella system composed of a number of software packages which will ultimately be fully integrated through a relational database system and a common operating system. CAFMS is the current ATO software package, but will eventually be replaced by the Advanced Planning System application.(44:1)

CTAPS is being developed at Langley AFB -- through non-traditional development and procurement channels. Critics outside of the Air Force believe this deviation is an attempt to subvert joint acquisition processes and that, by

developing the architecture quickly, the Air Force can circumvent joint testing and immediately subject CTAPS applications to a Joint Certification Test. To the contrary, one of the major precepts behind CTAPS was that it was to be expeditiously fielded using off-the-shelf technology, and it was not originally intended to be a joint system.

Interface problems currently affect the CTAPS architecture and could eventually be carried over into interoperability problems with other services. As an operating system, CTAPS applications are functioning independently of each other, precluding transfer of critical information. Once the CTAPS architecture is correctly integrated, an entry into one application will automatically be forwarded into related applications. For example, the Advanced Planning System will ultimately include aircraft maintenance status information, which will be used to assist with sortie scheduling and ATO generation. Incorporation of such external information to supplement or assist ATO development could pose a problem for units which are only using the ATO application of CTAPS. Aircraft maintenance status is not currently disseminated between joint units. Should this aircraft status information become essential to the production of the ATO, then the other services would be forced to use CTAPS even more than is currently anticipated. The Air Force must determine what information will become

critical for ATO development after the CTAPS architecture is functioning as a fully integrated architecture. The Air Force must then assess what subsequent requirements would be imposed on other services for the acquisition of supporting hardware and software. In addition, only thirty percent of the Advanced Planning System application is currently written in Ada, which is the joint software development language. The present decision, to use language other than Ada, could pose other joint integration problems. Designed as an Air Force system, CTAPS will need more work prior to becoming a viable joint program. Now that CTAPS development issues have been reviewed, the Navy's perspective on ATO integration efforts will be presented.

Navy Position

The Navy is proceeding with plans to establish interoperability with CTAPS using the Navy Tactical Command System - Afloat (NTCS-A). The Navy, through the Commanders-in-Chief Atlantic and Pacific, endorsed CTAPS in a recently published Concept of Operations for the Joint Force Air Component Commander.(44:11) An Air Force/Navy ATO link was established between Air Force air control units and Navy carriers/command ships, via Navy installation of Super High Frequency satellite communications equipment. A joint Memorandum of Agreement was formulated, and training and

weekly operations are underway at both 507 and 602 Air Operations Squadrons. The Navy expects to establish a joint core between the Navy Unified Build and the Air Force CTAPS which will allow sharing of applications.(1:2)

Successful deployment of CTAPS occurred, with mixed results, during Operation Southern Watch and two JCS exercises. In Southern Watch, the Navy ATO exchange system disseminated the ATO throughout the fleet by converting a CTAPS ATO into a format compatible with existing Navy satellite communications systems. During exercise Tandem Thrust 92, the 11th Air Force noted "CTAPS worked ... but was hindered by the slow baud rate.... hampered by the lack of two-way data flow. The Navy could only receive the ATO, but not pass data back to the JFACC."(6:1-3,13) During the same exercise, the commander of Carrier Group One observed "Only once was the ATO received over CTAPS or Autodin....Recommend continued development of NTCS-A and CTAPS."(6:2-12) The Navy's goal for integration of NTCS-A and CTAPS is December 1993. Issues to be resolved include communication systems, databases, hardware, and software. Specific items to be corrected are listed in Appendix B. The Marine Corps is also dealing with the issue of CTAPS integration and this process will be addressed next.

Marine Corps Concerns

The Marine Corps has serious concerns about CTAPS, and misunderstandings among Marines continue to exist. Is CTAPS hardware, software, or both? Current CTAPS applications are software "stovepipes." They use the same operating system, but do not function as an integrated architecture because they can't pass data from one application to another. One application must be able to simultaneously work with another to be "integrated." Under CTAPS, CAFMS is still the program which builds and distributes the ATO and it requires an independent work station. Simply buying into CTAPS does not provide interoperability. There are message text format disagreements between the services. Specific communication and data path requirements must be determined, and the related issue of identifying hardware requirements must be resolved.(46) The Marine Corps has limited funds with which to buy new hardware to replace or augment existing systems.

Despite being part of the Department of the Navy, the Marine Corps is not as eager as the Navy to accept CTAPS. The Marine Corps has been developing its own air command and control system during the past five years -- the Advanced Tactical Air Command Center (ATACC). The ATACC system handles many of the functions of CTAPS but is a Marine Corps specific program.(41:3) ATACC is a USMTF/Autodin-based system, and while the Marine Corps now recognizes the

impracticality of using USMTF and Autodin in large scale air campaigns, CTAPS is not yet viewed as an acceptable alternative. Marine Corps hesitancy was described in an ATO message from October 1992:

The single most important problem with the ATO is message dissemination rather than format or information elements it contains. The size of the ATO message prohibits effective and timely dissemination via Autodin. The use of dedicated communications lines, as utilized by CTAPS, is one solution. However, adopting CTAPS, a USAF umbrella system for total battlefield management, would not address service specific requirements and would require the dedication of scarce comm circuits to ATO information exchange.(4:1)

(Other Marine-perceived limitations of the CTAPS program exist as well, and are listed in Appendix B.) The Marine Corps must interact with the Air Force to overcome CTAPS interoperability deficiencies. Discussions in the next section will focus on problems already encountered during initial testing with CTAPS and the ATACC, and potential solutions. These issues include hardware, software, transmission media, and format.

IS THERE A READY SOLUTION FOR THE MARINE CORPS?

During a recent Marine Corps conference, one of the key issues was how to achieve full ATO production capability while adhering to current Marine Corps doctrine and long

range development goals. In order to serve as the Joint Force Air Component Commander, the Marine Corps must generate and disseminate the ATO for all services, and this must occur using organic systems. Another significant observation is that, during this time of reduced military expenditures, Marines must use systems funded by other services, and can no longer afford to be unique.(46) The following paragraphs will explore potential ways to achieve the goal of acquiring ATO production capability, while using current budget appropriations and also accommodating the Joint Staff directed application.

Hardware

The ATO process requires the Marine Corps to have automated systems that are interoperable with other services and can provide joint air command and control. During an air command and control seminar in April 1992, the Marine Corps acknowledged the criticality of joint service hardware compatibility and the influence of shrinking budgets on joint systems. Marine equipment must be capable of rapid ATO construction and distribution. This equipment must be automated, and interoperable with the other services' air command and control systems. For training purposes, Marine air command and control personnel must have access to

equipment used for joint air operations and must also be trained to maintain joint equipment.(7:5)

A proposed compromise for the Marine Corps would preserve the already funded ATACC system and incorporate CTAPS, creating a joint system. Specific recommendations are to complete all ATACC testing and then purchase two complete sets of equipment, which is one half of the planned purchase. Two shelters would be provided to each aircraft wing and two to the maintenance facility at Albany, Georgia. CAFMS consoles can also be purchased (to provide immediate ATO receipt) using money available to upgrade the current system. Sun Sparc work stations can then be purchased to allow interactive exchanges with the ATO system. The ATACC funding from 1994 and 1995, (which would not be used for the second half of the originally planned purchase), could be redesignated to make the ATACC software "open architecture" so that it could then interface with CTAPS. The 1996 funds earmarked for automated data processing upgrades could be used to buy whatever work station the Air Force chooses for ultimate use with CTAPS. This total scenario was provided by an officer of the Marine Corps Systems Command and is thus believed to be a viable solution.(46) Such a compromise by the Marine Corps, to incrementally link the ATACC to CTAPS hardware, would take advantage of current development efforts and joint needs. The open environment

would also allow CTAPS to use ATACC software.(46) The next segment will discuss software issues in more detail.

Software

Software conflicts between CTAPS and ATACC must be corrected for efficient and complete data transfer to occur. ATO's were transmitted using CTAPS and ATACC during recent joint exercises. In November 1992, a 200 mission ATO from the Air Force was encrypted and transmitted to the Marine Corps in ten minutes. The ATO was pulled from CTAPS to ATACC. Manual corrections to the ATO were needed which required forty minutes of work by an operator in order to parse the data into the database.(45:1) This occurred because the ATO was not sent in the correct USMTF format and the ATACC is designed to identify errors in messages. Potential problem areas can be alleviated through agreement with the Air Force on data element definition (format), or by programming the ATACC software to recognize differences between Air Force and Navy/Marine ATO formats and automatically make corrections. Other software concerns identified by the Marine Corps are listed in Appendix B. The next area of consideration for the Marine Corps is the transmission media to be used for CTAPS.

Transmission Media

A standard communication architecture is required for ATO interoperability. The ATACC can and will automatically process USMTF formatted messages. However, if the ATO reaches the ATACC in non-USMTF format, it will not be mappable to the data base. The Marine Corps must identify the need for a dedicated communications port which can be used for passing the ATO automatically via a system other than Autodin. The USMC does not desire an extra box tacked on to the ATACC or to the Air Force's system that translates CAFMS software into ATACC software, or vice versa.

Although too slow for effective dissemination of a large ATO, Autodin is still a functional transmission means and is viable for shorter ATO's or when dedicated communications are not available. The USMC is using a bit-oriented message for transferring ATO data between Marine units along the battlefield. Using this bit-oriented message greatly reduces communication system bandwidth requirements over normal character-oriented messages. In addition, the Marine Corps is using a single shared database for Marine Corps specific messages and USMTF, which allows the ATACC to achieve rapid, automated message handling.(42:6) These concepts should be evaluated for use by all services and for the potential to reduce demands on transmission media. Again, the media must not be restricted to one type, but

must allow for variety and redundancy. In addition to resolving transmission system issues, the specific format of the ATO message must be standardized. Discussion of this issue is in the following segment.

Format

The services must agree upon which ATO format -- ATO Confirmation, Request Confirmation, or a whole new format -- should become standard. Once determined, the format must be adhered to by all services. Under current doctrine, the Air Force uses the ATO Confirmation while the Navy and Marine Corps use the Request Confirmation. The fields in the messages are different and the Marines feel strongly that they want certain features which are inherent in the Request Confirmation format. Furthermore, the Marines need an ATO document which will allow tasking of helicopters.

Specific ATO uses must be defined by all services, to hold the ATO to a manageable size and to minimize free text information. When one commander is serving as the Joint Forces Air Component Commander, the Area Air Defense Coordinator, and the Airspace Control Authority, one can easily see how too much information could be loaded into a single document -- the ATO. Joint agreement is required to resolve issues of information dissemination. Furthermore,

changes to Special Instructions should be published on an "exception/ required change basis to the basic document." (32) Formatting Tactical Operational Data information, Air Defense Plans, and Airspace Control Orders as independent messages, in accordance with current doctrine, will reduce the bulk of the ATO.

The issue of facilitating joint interoperability is complex and is more publicized today than ever before. Interoperability has received much attention since Desert Storm ended, when the military began to correct deficiencies noted during the war and to restructure for a smaller force. The lessons of Desert Storm must be learned and the errors corrected. The ATO situation is one symptom of a larger problem. There is already a pervasive interoperability problem between the services. The situation may worsen as technology advances so rapidly that military development programs are unable to keep pace. A whole new spectrum of acquisition is emerging which takes advantage of off-the-shelf hardware and software. It will become increasingly more difficult to ensure interoperability as individual services buy more and more of this equipment. The Joint Staff needs to apply controls in this area to ensure that such purchases are in the best interest of all services, and to ensure that each service can afford to purchase items when needed to integrate with others.

Establishing CTAPS ATO software as the joint standard is somewhat premature, but is an advance in the right direction. It is imperative that the ATO process be streamlined and integrated now for all services. The time has come to set aside petty service-peculiar desires and to strive for interoperability. Since CTAPS ATO software is now the joint standard, the Marine Corps must integrate this program into the ATACC. A realistic timeline allowing for acquisition, training, deployment, and employment schedules must be established. The Joint Staff should ensure that Navy and Marine Corps' concerns about CTAPS are addressed by the Air Force. Possession of an interoperable ATO generation and dissemination system, such as CTAPS, will enable the Marine Corps to effectively prosecute air operations in the joint environment. President Dwight D. Eisenhower summed up the responsibility of the military services, in a speech to the National War College in October 1950, with these words:

If, as Services, we get too critical among ourselves, hunting for exact limiting lines in the shadow land of responsibility.... hunting for and spending our time arguing about it, we will deserve the very fate we will get in war, which is defeat. We have got to be of one family, and it is more important today than it ever has been.(40)

Over forty years later, General Eisenhower's words ring true -- as though written for this decade of budget cuts and worldwide crises. Today, more than ever before, the services must work as one.

APPENDIX A

QUESTIONNAIRE RESULTS

Questionnaires were sent to 45 units of the Navy, Air Force and Marine Corps. Responses were received from 39 people. It is not possible to state the exact return breakdown, because non-attribution was afforded in order to obtain a higher return. A copy of the questionnaire is included on the next two pages. A statistical summary of the results is provided here, and it clearly indicates the order of magnitude of problems to be as follows.

- A. Receiving ATO in time to work it (timeliness).
- B. Obtaining the document (transmission media).
- C. Breaking it down into usable portions.
- D. Locating pertinent items within the document.
- E. Reading the specific elements.

These letter designations are used in the following chart to indicate the topic, while numbers are used to show how many respondents ranked each item in the associated position, of the questionnaires received which had ranked that item.

RANKING	<u>PROBLEM</u>				
	A	B	C	D	E
1	22/38	7/38	5/37	4/38	1/37
%	57.9	18.4	13.5	10.5	2.7
2	10/38	14/38	8/37	4/38	2/37
%	26.3	36.8	21.6	10.5	5.4
3	2/38	8/38	12/37	7/38	8/37
%	5.3	21.1	32.4	18.4	21.6
4	2/38	4/38	6/37	18/38	7/37
%	5.3	10.5	16.2	47.4	18.9
5	2/38	4/38	6/37	5/38	19/37
%	5.3	13.2	16.2	13.2	51.4
1&2 %	55.2	84.2	8.1	21.0	35.1

APPENDIX A

QUESTIONNAIRE FORMAT

ATO Development/Dissemination

1. Rank the items below in order of difficulty which each presented to your unit. Use number one (1) for the MOST SIGNIFICANT difficulty.

a. Development of the ATO

- ___ Obtaining aircraft availability information
- ___ Obtaining target list/priorities
- ___ Obtaining allocation/apportionment guidance
- ___ Obtaining BDA information to guide retargeting
- ___ Requesting preplanned air support missions
- ___ Providing aircraft availability to higher HQ

b. Dissemination of the ATO

- ___ Obtaining the document (transmission media)
- ___ Receiving ATO in time to work it (timeliness)
- ___ Reading the specific elements (format)
- ___ Locating pertinent items within the document
- ___ Breaking it down into usable portions

2. For the TWO most significant difficulties in each area, briefly state what caused the problem to occur.

a. (1)

(2)

b. (1)

(2)

Enclosure (1)

APPENDIX A

QUESTIONNAIRE FORMAT

3. How did your unit overcome each problem?

a. (1)

(2)

b. (1)

(2)

4. What recommendations do you have to improve the ATO Development/Dissemination process for future joint operations?

5. Please provide any other information regarding ATO Development/ Dissemination which you believe is pertinent to this research project.

___ Mark here if you request that your identity remain confidential. A non-attribution policy will then be implemented.

Enclosure (1)

APPENDIX B

NAVY IDENTIFIED CTAPS LIMITATIONS

The CTAPS ATO software does not do the following:

- provide an ATO generation capability for USN/other services.
- meet requirements for JFACC afloat.
- support transfer of JFACC (ship-ship, ship-shore, shore-ship).
- support all USN missions (TLAM, UAV, etc).
- support LAN operations -- requires stand alone USAF hardware in addition to existing shipboard configurations.
- provide backward compatibility with previous software programs, (therefore requiring complete replacement/reloading of systems).

These additional problems are also noted.

- There is only Air Force hardware and training support.
- Equipment is not readily available for distribution.
- CTAPS has a limited capability for two-way comm between JFACC and remote wings during ATO cycle.
- CTAPS limits access and manipulation of database information for wing level users.
- Connectivity to the Navy is limited to SHF and X.25 FTP, but a variety of comm paths are needed.
- ATOX is needed to convert CTAPS ATO to Navy compatible format.(44:15-16)

MARINE CORPS IDENTIFIED CTAPS LIMITATIONS

The following weaknesses were noted in the CTAPS system architecture.

- CTAPS has limited TADIL capability (TADIL A and B receive only; TADIL J planned).
- CTAPS has weak message processing and is not MTS capable.
- CTAPS has insufficient voice communications.
- The equipment has weak EMI and TEMPEST protection.
- The system requires twelve 3:1 ISO shelters.
- CTAPS is not a bonafide "program" as it hasn't gone through the acquisition process.
- CTAPS violates DoD Directive 5105.4 (6Dec90) for mapping standards.
- The CTAPS ATO Confirmation message format does not comply with Pub 6 of USMTF standards.(40:9)

APPENDIX B

MARINE CORPS IDENTIFIED CTAPS SOFTWARE CONCERNS

The Marine Corps has identified specific needs with respect to CTAPS ATO software applications, and believes that the Air Force should accomplish the following tasks.

- Ensure the software contains the required Application Program Interfaces (API) to support integration with other systems.

- Ensure software is not dependent on CMS. The software should be limited to information and data exchange, and not mapping or display capability.

- The only documentation costs to users should be reproduction costs. Documentation should be under the development contract.

- Software documentation should conform to DoD Standard 2167A rather than 7953A.

- Joint funding should be provided to support Engineering Change Proposals.

- Funding from services must not include costs for correcting System Trouble Reports.(44:14-15)

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