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Col. H. M. Forde
0-16409

REPORT OF JOINT ARMY-NAVY BOARD

TO STANDARDIZE AIR SUPPORT PROCEDURES

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JOINT ARMY-NAVY BOARD
Washington, D. C.

15 December 1945

SUBJECT: Report of Joint Army-Navy Board to Standardize Air Support Procedures.

TO : Chief of Staff, United States Army.

Chief of Naval Operations, United States Navy.

1. Attached hereto are the findings and recommendations of a board of officers appointed to study the present Army and Navy Systems of Air Support and to make recommendations for the establishment of a standardized system.

2. a. Appendix "A" - Authority for the board.

b. Appendix "B" - Findings of the board.

c. Appendix "C" - Recommendations of the board in the form of a Joint Army-Navy Paper. When approved, this paper should be published as basic doctrine for the preparation of War Department Training Circulars and Navy Department Fleet Tactical Publications.

d. Appendix "D" - Action recommended to the War Department to implement the recommendations of Appendix "C".

e. Appendix "E" - Action recommended to the Navy Department to implement the recommendations of Appendix "C".

3. The board finds that, except for terminology, the present Army and Navy systems are very similar. It is well realized that many individuals who review this paper may differ with the board in the matter of terminology. Inasmuch as the board has considered the terminology employed in all systems and in all theatres, the board strongly recommends that the provisions of Paragraphs 2 and 3 of Part I of Appendix "C" not be a subject for comment or criticism by subordinate components of the War or Navy Departments.

4. As many projects are being held within the War and Navy Departments pending the recommendation of this board, the board recommends that Appendix "C" be approved and published with the least practicable delay.

JAMES FERGUSON
Colonel, AC
Member

HARRY A. FRENCH
Colonel, AC
Member

ARGYLL E. BUCKLEY
Captain, USN (NA)
Member

JOHN W. HANSBOROUGH
Colonel, FA
Member

VERNON E. MEGEE
Colonel, USMC (NA)
Senior Member

CLYDE R. NELSON
Lt. Colonel, USMC
Member and Recorder

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DOWNGRADED AT 3 YEAR INTERVALS
DECLASSIFIED AFTER 12 YEARS
DOD DIR 5200.10

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# APPENDIX "A"

## AUTHORITY FOR THE BOARD

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HEADQUARTERS, ARMY AIR FORCES
WASHINGTON

2 November 1945

SUBJECT: Appointment: Joint Army-Navy Board for the Standardization of Air Support Control Procedure.

TO : Each Officer Concerned.

1. In compliance with War Department Directive, subject above, file WDGCT 353 (31 July 45), dated 28 September 1945, a Joint Army-Navy Board, to be known as the Army-Navy Board for the Standardization of Air Support Procedure, consisting of the officers named below, will convene at Washington, D. C., on or about 29 October 1945:

Colonel Vernon E. Megee, USMC (NA) 03772
Captain Argyll E. Buckley, USN (NA) 61112
Colonel James Ferguson, AC 021549
Colonel John W. Hansborough, FA, 018376
Colonel Harry A. French, AC, 022908
Lt. Colonel Clyde R. Nelson, USMC, 04983

2. The purpose of the Board is to study and make recommendations on common air-ground support methods in such fields as communications, liaison, air requests, operational terminology, and ground or surface control of aircraft in flight.

3. The final recommendations of the Board will be submitted in the form of a proposed Training Pamphlet which, upon approval, may be promulgated as a directive to Army and Navy Forces concerned.

4. The Board will convene and recess at the call of the senior member, and will stand adjourned upon submission of its final report to their respective Headquarters.

FOR THE COMMANDING GENERAL, ARMY AIR FORCES:

/s/ Hoyt S. Vandenberg

/t/ HOYT S. VANDENBERG
Lt. General, U.S.A.
Assistant Chief of Air Staff - 3

FOR THE CHIEF OF NAVAL OPERATIONS:

[redacted]

/s/ R. S. Edwards
Admiral, U. S. Navy



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WAR DEPARTMENT
WAR DEPARTMENT GENERAL STAFF
WASHINGTON

WDGCT 353 (31 July 45) 28 September 1945

MEMORANDUM FOR THE COMMANDING GENERAL, ARMY AIR FORCES:

SUBJECT: Implementation of Joint Army-Navy Board to Study Question of Standard Air Support Procedures.

1. It is desired that the Commanding General, Army Air Forces implement the Joint Army-Navy Board as War Department representative in direct coordination with Vice Chief of Naval Operations (Air). (Inclosure #3, Tab B.)

2. Army representation on the board is to consist of:

Army: Colonel, AAF
Colonel, AAF
Colonel, AGF

3. The Commanding General, Army Ground Forces has been directed to advise the Commanding General, Army Air Forces as to the Army Ground Forces member appointed to the board. (Inclosure #2).

4. Members of the board are to be appointed to full-time duty on the board until the study is completed.

5. It is expected that the board will consider common air-ground support methods in such fields as communications, liaison, air requests, operational terminology, and ground or surface control of aircraft in flight.

6. The study to be completed on submission of the recommendations of the board of officers to the War Department and Navy Department for approval respectively.

7. It is desired that the attached correspondence be returned to the War Department, G-3 for file when of no further need in connection with this directive.

BY ORDER OF THE SECRETARY OF WAR:

3 Incls
1. Memo to Gen Marshall fr Admiral King, dtd 26 Sept 45.
2. Memo to CG, AGF, fr ACofS, G-3, dtd 28 Sept 45.
3. SS with six incls as listed

/s/ I. H. Edwards
/t/ I. H. EDWARDS
Major General, GSC
Asst. Chief of Staff, G-3

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27 August 1945

MEMORANDUM FOR ADMIRAL KING:

SUBJECT: Training of Army Air Groups in Navy Air Support Procedure followed in the Pacific Theatre.

Careful consideration has been given to the suggestions which Admiral Bieri forwarded from the Commander, Air Support Control Units, Pacific Fleet, concerning the training of Army Air Forces groups in Navy air support procedures.

Although cessation of hostilities has removed the immediate necessity for this training, I fully agree that a standard procedure would be mutually beneficial to the two services. I propose, therefore, that a board of six senior Army and Navy officers be appointed to study this question. If you concur, the War Department will nominate three officers for such a board.

(sgd) G. C. Marshall
Chief of Staff

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FF1/QB 4 September 1945

Serial: 02600

CONFIDENTIAL

MEMORANDUM FOR GENERAL MARSHALL:

Subject: Joint Army-Navy Board to Study Question of Standard Air Support Procedure.

1. In your memorandum of 27 August 1945, you proposed that a board of six (6) senior Army and Navy officers be appointed to study the question of a standard procedure for air support of ground forces.

2. Since your proposal was based upon the recommendation that Army Air Force squadrons be trained in air support control procedure, as utilized by the Navy, it is my understanding that the proposed board would institute its study on the basis of adapting such procedure to Army use.

3. With that understanding I will take immediate steps to have three (3) representatives of the Navy Department appointed and have the War Department advised as to who they will be.

/s/ E. J. King
Fleet Admiral, U. S. Navy

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WDGCT 353 (31 July 1945)

WDGCT/rc
Col Terrell/5260

18 September 1945

MEMORANDUM FOR ADMIRAL KING:

SUBJECT: Joint Army-Navy Board to Study Question of Standard Air Support Procedure.

In your memorandum of 4 September you concur in my proposal to appoint a board to study air support control procedure, but assume that this study would be based on the adaptation of Navy procedure to Army use.

This was not precisely my intention. It may be that complete standardization of all tactical procedures will be found impracticable. Nevertheless, common air-ground methods in such fields as communications, liaison, air requests, operational terminology, and ground or surface control of aircraft in flight should be mutually beneficial.

If you desire to select three senior Navy officers for a board to study air support control procedures of the two services and recommend so much standardization as is feasible, I will appoint Army representatives of equal rank.

(Sgd) G. C. MARSHALL
Chief of Staff

Copies furnished
Admiral King
OCS

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UNITED STATES FLEET
HEADQUARTERS OF THE COMMANDER IN CHIEF
NAVY DEPARTMENT
Washington 25, D. C.

FF1/QB

Serial: 02793

26 September 1945

[redacted]

MEMORANDUM FOR GENERAL MARSHALL:

Subject: Joint Army-Navy Board to Study Question of Standard Air Support Procedure.

1. In your memorandum of 18 September you point out that it was not your intention to have the proposed joint Army-Navy Board study the question of air support control procedure on the basis of adapting Navy procedure to Army use, but rather to attain complete standardization, wherein determined practicable, especially in the fields of communications, liaison, air requests, operational terminology and ground or surface control of aircraft.

2. I agree that such standardization would be mutually beneficial, and I will have a board of three officers appointed to represent the Navy.

/s/ E. J. King

/t/ E. J. KING
Fleet Admiral, U. S. Navy.

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Inclosure #1

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WAR DEPARTMENT GENERAL STAFF
DISPOSITION FORM

[redacted]

FILE NO WDGCT 334 Jt.
A. N. Board (26 Sept 45)

SUBJECT: Joint Army-Navy Board to Study Question of Standard Air Support Procedure.

TO:
CG, AAF (Attn: Col D. E. Newton)

FROM: G-3 DATE 1 Oct 45
COMMENT NO. 1
Col. Terrell/3857/mf

1. Reference is made to War Department memorandum for the Commanding General, Army Air Forces, WDGCT 353 (31 July 45), dated 28 September 1945, subject as above.

2. Attached copy of directive by the Commander in Chief, U. S. Fleet for the Vice Chief of Naval Operations is forwarded for your information in connection with reference 1 above.

1 Incl
cy memo fr Fleet Admiral
USN to Vice CNO, dtd 26 Sept 45.

I. H. EDWARDS
Major General, GSC
Asst Chief of Staff, G-3

/s/ Cyrus Q. Shelton
CYRUS Q. SHELTON
Colonel, General Staff
Executive

TO: WDGS, G-3 FROM: CG, AAF (AC/AS-3) DATE: 10 Oct 45 COMMENT NO. 2
Col Newton/ltm/74718

Receipt acknowledged. Inclosure withdrawn.

Incl: w/d

DORR E. NEWTON, JR.,
Colonel, Air Corps

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UNITED STATES FLEET
Headquarters of the Commander in Chief
Navy Department
Washington 25, D. C.

FFL/QB

Serial: 02794

26 September 1945

[redacted]

MEMORANDUM FOR VICE CHIEF OF NAVAL OPERATIONS:

Subject: Joint Army-Navy Board to Study Question of Standard Air Support Procedure.

1. In recent correspondence with the Chief of Staff, U. S. Army, I have agreed that it would be mutually beneficial for the board of three senior Army and three senior Navy officers to study the question of air support control procedures of the two services in order to determine and submit recommendation as to the standardized procedures agreed upon.

2. You are directed to appoint representation of the Navy by one senior Naval aviator, one senior Marine Corps aviator, and one senior officer of the Marine Corps ground forces, each of whom has had extensive experience in the question under consideration.

3. You will notify the War Department of the personnel you appoint and arrange for the meeting of this joint board in the near future.

/s/ E. J. King

Fleet Admiral, U. S. Navy

Copy to:
Chief of Staff, USA
DCNO (Air)
Commd Mar Corps

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Op 03-1A1-FB;BC
Serial: 067403
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4 October 1945

MEMORANDUM TO VICE CHIEF OF NAVAL OPERATIONS:

Subj: Joint Army-Navy Board to Study Questions of Standard Air Support Procedure; Nomination of.

Ref: (a) Cominch Conf memo FF1/QB ser 02794 of 26 Sept 1945.

1. In accordance with paragraph 2 of reference (a) and the directive contained in the first endorsement thereto, Captain Argyll E. Buckley is nominated as the Naval Aviator on the subject board.

M. A. MITSCHER
Deputy Chief of Naval Operations (Air)

cc:
Op 32
Capt. Buckley

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Serial 018802

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8 October 1945

MEMORANDUM FOR COMMANDER IN CHIEF, U.S. FLEET, AND CHIEF OF NAVAL OPERATIONS

Subj: Joint Army-Navy Board to Study Questions of Standard Air Support Procedure.

Ref: (a) Cominch conf memo FF1/QB Serial 02794 dated 26 September 1945.

1. In compliance with reference (a), the following officers have been appointed to represent the Navy on the subject board.

Captain Argyll E. Buckley, USN - Naval Aviator.
Colonel Vernon E. Megee, USMC - Marine Aviator.
Colonel Merill B. Twining, USMC - Marine Ground Forces.

2. The War Department has been notified of the personnel appointed.

3. The Senior Member of the Board will make arrangements for a meeting of this Joint Board as soon as practicable.

F. J. HORNE

Vice Chief of Naval Operations

Copy to:
Chief of Staff, U. S. Army.
DCNO (Air)
Comdt. USMC
Capt. Buckley.
Col. Megee, USMC.
Col. Twining, USMC.

BY REQUEST OF THE MARINE CORPS COMMANDANT COLONEL CLYDE R. NELSON, USMC, GROUND FORCES, WAS SUBSTITUTED FOR COLONEL MARILL B. TWINING.

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TO: Chief of Staff

FOR: Signature

FROM: Colonel Terrell, G-3, WDGS, (Extension 5260)

FILE NO: WDGCT 355 (31 Jul 45)

12 September 1945

SUBJECT: Joint Army-Navy Board to Study Question of Standard Air Support Procedure.

SUMMARY:

1. Admiral King's memorandum in reply to memorandum from General Marshall on the above subject concurs in the proposal of a board of Army and Navy officers with the understanding that this board will institute its study on the basis of adapting Navy air support control procedure to Army use. (Tab C)

2. The purpose of the proposed board has been misconstrued by Admiral King inasmuch as the Chief of Staff recommended standard procedure for the use of both services. (Tab D)

3. Army Air Forces has recommended to this Division that the subject board study standardization upon:

a. Communications and procedures required for ground forces requests for air missions and the dissemination of air-ground information.

b. Procedures of control of aircraft in flight for attack on ground objectives, especially objectives near friendly troops.

c. Terminology and designation of functional units required for the above. (Tab E)

4. It is considered necessary, before the board convenes, the Army proposal should be expanded and clarified so that Army and Navy representatives will meet with a common understanding.

5. By informal conference between the War Department (Colonel F. R. Terrell, G-3 WDGS) and Navy Department (Captain H. W. Taylor, COMINCH, Readiness Section), the basis for the proposed board of officers

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indicated in proposed Chief of Staff memorandum for Admiral King (Tab A) and additional detailed recommendations (Tab B) were mutually agreed upon.

6. It is recommended that:

a. Memorandum for Admiral King be signed and dispatched (Tab A).

b. That additional recommendations for implementation of proposed board of officers be approved (Tab B).

COORDINATION

7. AAF (Brig. Gen. McKee, Ext 6765)
AGF (Col. Moses, 818, Ext 276)

/s/ I. H. Edwards

6 Incls:
SGS DS for G-3
dtd 5 Sept 45.
Tabs A, B, C, D, E

/t/ I. H. EDWARDS
Major General, GSC
Assistant Chief of Staff,
G-3

N.E.T.
Noted Deputy Chief of Staff

Sept 18 1945
Approved
By order of the Secretary of War
G. C. Marshall
Chief of Staff

BWD
By B. W. Davenport
Lt. Col., Gen. Staff, Asst. Sec.
W.D.G.S.

[redacted]

Tab B

(To G-3 Summary Sheet for Chief of Staff, dated 12 Sept 45)

SUBJECT: Joint Army-Navy Board to Study Question of Standard Air Support Procedure.

Summary of recommendations mutually agreed upon relative Army-Navy Board by informal conference between War Department representative, Colonel F. R. Terrell, G-3, WDGS and Navy Department representative, Captain H. W. Taylor, COMINCH, Readiness Section:

1. That the board be appointed on the basis indicated in proposed Chief of Staff memorandum for Admiral King (Tab A).

2. That the board be composed of the following:

Army: Colonel, AAF
Colonel, AAF
Colonel, AGF

Navy: Colonel, USMC (Air)
Colonel, USMC (Ground)
Captain, USN (Air)

3. That members of the board be appointed to full time duty on the board until the study is completed.

4. That the study be completed by submission of recommendations of the board of officers to the War Department and Navy Department for approval respectively.

5. That upon dispatch of proposed memorandum by the Chief of Staff, and concurrence therein by the Commander-in-Chief, U. S. Fleet, that the War Department action consist of:

a. Commanding General, Army Ground Forces advise Commanding General, Army Air Forces of selected representative.

b. Assistant Chief of Staff, G-3 direct Commanding General, Army Air Forces to implement proposed board as War Department representative in direct coordination with Vice Chief of Naval Operations (Air).

6. That the Navy Department will take action similar to that outlined in paragraph 5 above.

7. Additional recommendations listed above are concurred in by AAF (Brig. Gen. McKee, Ext 6765). and AGF (Col. Moses, 818, Ext 276).

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FILE NO.
WDGCT 353 (22-Jun45)

SUBJECT:
Joint Training Exercise (Joint Air-Ground Training)

---

TO: G-3 FROM: CG, AAF DATE: 8 Aug 45
COMMENT NO. 4
Col. Donaldson/2992

1. In compliance with Comment 3, above, the following information is submitted:

a. It is desired that the study and recommendations be on the systems of liaison and aircraft control employed by the Army Air Forces and by the Navy Air in an amphibious landing or other joint operations utilizing air power of both services, to include such items as:

(1) The communications net and its employment, required for requests for air strikes and for dissemination of air-ground information.

(2) Methods and means employed to control aircraft in flight for attack on ground objectives, especially near friendly troops.

b. Standardization is desired to the extent and degree that there be established one (1) standard procedure for liaison (a (1) above) and control (a (2) above) during operations in which both Navy and Army Air are participating. This standard system to prescribe the means of communication and set forth the terminology for the various units performing like duties. Similarly functional units to be similarly named regardless of the fact that they may be composed of Navy or Army personnel or any combination thereof.

c. War Department Field Service Regulation, FM 100-20, does not prescribe a liaison or aircraft control system and therefore does not become a subject for consideration by proposed Joint Board. War Department Training Circulars No. 17 and No. 30, and the proposed circular on recognition and designation of targets are considered matters for study by the Board convened to harmonize procedures. Training Circular No. 17 offers a means to obtain air-ground liaison, acceptable to Army Air Forces and may or may not be acceptable to the Navy. Training Circular No. 30 is broad in scope, and is considered applicable to any large air-ground operation, and for other than possible changes in terminology will undoubtedly serve as a guide under any system recommended by the Joint Board. Proposed



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circular on recognition and designation will apply to any adopted system on liaison and control of aircraft, if both services are provided with the necessary equipment. Being primarily a guide for the ground forces, this proposed circular will be acceptable to the Navy, though again some changes may be requested in terminology.

d. It is proposed that initially the Board be composed of Army Air Force and Navy Air Officers. Primary differences in systems employed by the Air components to be harmonized before it can be established that other forces have an interest. For instance, should the Navy accept the principles enunciated in Training Circular No. 17, which has been accepted by Army Ground Forces, and in proposed circular on recognition and designation, then no action in the matter of liaison would be required by Army Ground Forces.

e. Further standardization of communication equipment and procedures employed by air units of the Army and Navy in joint operations is envisioned to the extent that members of either control element would be able to function without the requirement for training in the system employed by the other service. This might include such action as the adoption and operation of the radio equipment now employed by the Navy, in cooperative missions, by the Army Air Force Tactical Air Commands.

f. Major changes in organization of Army Air Force and Army Ground Force units are not envisioned.

2. The request to appoint a Joint Board purposely avoided submitting a proposal to consider only concrete questions, since it was envisioned that any list proposed by Army Air Forces could well omit items that might be considered important from the Navy's viewpoint. Further, that a proposal for an open discussion of the liaison and control systems as now employed by the two services, with a view to recommending one (1) standard system, would be more acceptable to the Navy than any proposal limiting the action to be taken to specific parts of the systems in use. Accordingly, it is requested that the information contained in paragraph 1, above, be omitted from any proposal made to the Navy and that the memorandum for Admiral King be signed and forwarded substantially as written and attached as Inclosure No. 2.

3. It is believed that following a thorough study of the systems now employed, the Board will be able to recommend a standard system, employing standard terminology, which will be advantageous to the Army Air Forces and the Navy Air and also simplify the problems of the Commanders of Ground Force units participating in joint operations.

FOR THE COMMANDING GENERAL:

(signed)

REUBEN C. HOOD, JR.
Brigadier General, U.S. Army
Deputy Chief of Air Staff

2 Incls:
n/c

APPENDIX "B"

FINDINGS OF THE BOARD

Findings of Joint Army-Navy Board to Standardize Air Support Procedures

1. The board convened at Washington, D. C. on 28 October 1945. The membership of the board consisted of:

a. Colonel John W. Hansborough, FA, 018376, representing Chief of Staff, U. S. Army for the Army Ground Forces. Colonel Hansborough was liaison officer from Headquarters Western Task Force to Headquarters XII Air Support Command during the invasion of North Africa; Chief of the Air Support Control Section, Headquarters Fifth Army from 1 October 1943 to 15 July 1944: Chief of Air Support Section, Headquarters Seventh Army from 15 July 1944 to 5 October 1944; and Director of Ground Liaison Officers School, Key Field, Meridian, Mississippi, from 15 November 1944 to 22 October 1945. Present assignment, Chief of Air Support Section, Army Ground Force Board #1, Fort Bragg, North Carolina.

b. Colonel James Ferguson, AC, 021549, representing Chief of Staff, U. S. Army for the Army Air Forces. Colonel Ferguson commanded a fighter pilot replacement group, teaching tactics in air-to-air and air-to-ground fighting from August 1942 to November 1943. Commanded a fighter bomber group from November 1943 to May 1944. Assistant Operations Officer for IX Fighter Command for the Normandy operation. Operations Officer and later A-3 of XIX Tactical Air Command from July 1944 to June 1945. One of ten (10) officers from IX Air Force on temporary duty with FEAF from July to September 1945 to assist in organization of Tactical Air Commands in the Pacific. Present assignment XIX Tactical

c. Colonel Harry A. French, 022908, AC, representing the Chief of Staff, U. S. Army for the Army Air Forces. Colonel French was Executive Officer of the 57th Fighter Group of the IX Air Force in the Libyan and Tunisian Campaigns in North Africa from 1 July 1942 to 5 June 1943; a member of the IX Fighter Command A-3 Section from 5 June 1943 to 15 November 1943; Chief of Plans, Organizations and Movements Section of A-3 of the IX Tactical Air Command from 15 November 1943 to 10 February 1944; a member of the Operational Planning Section of A-3 IX Tactical Air Command from 10 February 1944 to 1 April 1944; Executive Officer of the 100th Fighter Wing from 1 April 1944 to 31 December 1944; Commanding Officer XIX Tactical Control Group (Prov.) from 1 January 1945 to 30 June 1945. Present assignment Commanding Officer, 3rd Tactical Control Group, Barksdale Field, La.

d. Colonel Vernon E. Megee, USMC (NA), 03772, representing the Chief of Naval Operations for Marine Corps Aviation. Detailed as an air support observer for the Palau operations in September 1944. Organized and trained the Marine Landing Force Air Support Control Units, and commanded them in the Iwo Jima and Okinawa operations. Served as Chief of Staff to Commander, Air Support Control Units, Amphibious Forces, Pacific Fleet, from 20 April to 15 September 1945. At present on duty with Marine Corps Headquarters.

e. Captain Argyll E. Buckley, USN (NA), 61112, representing the Chief of Naval Operations for Naval Aviation. Captain Buckley was officer

[redacted]

[redacted] [redacted]

in charge of the Aviation Section, Readiness Division in the Headquarters of the Commander in Chief United States Fleet from November 1942 to February 1945, (the Aviation Section also handled the aviation problems for Amphibious operations). Commander Air Support Control Unit No. 7 from February 1945 until October 1945 during which time this unit was employed in the Okinawa Invasion. Present assignment, special duty with Deputy Chief of Naval Operations (Air).

f. Lt. Colonel Clyde R. Nelson, USMC, 04983, representing the Chief of Naval Operations for Marine Ground Forces, was Commanding Officer Signal Company or Division Signal Officer of the 2d Marine Division from Pearl Harbor to January 1944, including participation in the latter stages of the Guadalcanal operation and the seizure and occupation of Tarawa. After a brief period on the Staff of Commander, Fifth Fleet, during the planning of the Marshall's operation he returned to the U.S. and organized the Communication Officers' School for training all Marine Corps ground and aviation communication officers. Except for a brief period on the staff of Commander, Expeditionary Troops, Third Fleet, during the Palau operation he remained as Director of the Communication Officers' School.

2. The board studied and considered all information available bearing on the use of air power in conjunction with or in close support of ground forces. Some of the items studied and considered were:

a. Field Service Regulations, FM 100-20, Command and Employment of Air Power, dated 21 July 1943.

[redacted] [redacted]

b. War Department Training Circular No. 17, Air-Ground Liaison, dated 20 April 1945.

c. War Department Training Circular No. 30, Tactical Air Command: Organization and Employment, dated 19 June 1945.

d. Ground Liaison Officers School, Joint Air-Ground Action, 15 July 1945.

e. A report on the Combat Operations of the XIX Tactical Air Command, dated 30 May 1945.

f. Tactical Air Operations in Europe, Headquarters XIX Tactical Air Command, dated 19 May 1945.

g. A Description of the Mission, Organization and Employment of Reconnaissance Aviation and Photographic Facilities in the Ninth Air Force. (Undated).

h. Reconnaissance in the Ninth Air Force, dated 9 May 1945.

i. Letter, Headquarters, Aircraft, Fleet Marine Force, Pacific, file No. 002233, dated 28 August 1945, subject: Air Support.

j. Various Overseas Reports from the files of the Air Branch, G-3 Section, Headquarters Army Ground Forces.

k. Pacific Warfare Board Report No. 46, Subject: Air Support in the Okinawa Operation for the period 1 April to 22 June 1945.

l. Fighter Bomber Control, prepared by Headquarters Ninth Air Force. (Undated).

m. Report No. 7, Army Air Forces Evaluation Board, Pacific Ocean Areas, Iwo Jima, dated 10 May 1945.

n. Amphibious Forces Circular Letter Al 11-Rev. 2, dated 13 July 1945, Subject: Air Support in Amphibious Operations.

o. Reports on various amphibious operations, Pacific.

p. The Board also took cognizance of many additional reports and documents studied by individual members prior to the convening of the Board.

3. The board finds that the Army and Navy Systems of providing air support for ground forces, except for major differences in organizational terminology and minor differences in operational procedure, are basically the same. Each recognizes the need for a system of aircraft control and direction which is closely associate with the ground forces from the lowest to the highest level of command. Control of the air being centralized normally in the air organization at the level of the Army or Amphibious Task Force, but capable of being decentralized to an air organization at Corps or Amphibious Task Group level when necessary, and of further decentralizing the control of individual close support missions to air control units at division, regiment or battalion level as required. Chart number 1 is a comparison, at the various levels of ground command, of the components of the Army and Navy systems for providing close air support.

4. The board finds a definite need for the publication of a standardized terminology to govern the preparation of training literature. Such a list of standardized terminology is included in Appendix "C".

5. It is essential that the Army and Navy Departments standardize airborne radio equipment to insure efficient control of both Army and Navy aircraft. It is recommended that a ten (10) channel VHF radio transmitter-

receiver be installed on all high performance aircraft. This is especially important in fighters and fighter bomber type aircraft where space and weight considerations govern. Chart Number 2.

6. The board finds that it is practicable to standardize the tactical doctrine and organization of the Army and Navy for the control of air power in support of ground forces. The board does not consider it advisable to prescribe a standard administrative organization for the control units. Separate recommendations for the Army and Navy are included in Appendices "D" and "E".

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APPENDIX "C"

JOINT ARMY-NAVY PAPER TO STANDARDIZE AIR SUPPORT PROCEDURES



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## INTRODUCTION

## JOINT ARMY-NAVY PAPER TO STANDARDIZE AIR SUPPORT PROCEDURE

This Joint Army-Navy Paper is published to standardize common air-ground support methods in such fields as organizational terminology, liaison, communications, and ground or surface control of aircraft in flight. Pending revision of existing War and Navy Department publications which are affected by the provisions of this paper, these instructions will govern. War and Navy Department publications will be revised to conform to the terminology and procedures outlined herein.

1. General-a. Purpose: This Joint Army-Navy Paper is to standardize between the War and Navy Departments, the organizational terminology and procedures employed when air power is used in conjunction with or to support ground forces. A standard system of air-ground control is considered essential in order to permit air, surface, and ground forces of the Army and Navy to engage in joint operations without confusion, or disruption of established practices. The system herein prescribed is designed to insure a smooth transition of air-ground control from ship-based control centers to the land-based control center, using the same procedures throughout.

b. Scope: This Joint Army-Navy Paper deals primarily with the organizational terminology and procedures to be used when solving the problem of employing Army, Navy or Marine air power in support of Army or Marine Ground Forces AND NAVAL SURFACE FORCES from the time an Amphibious Task Force is launched

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toward an objective area until the air-ground team is firmly established ashore and land mass operations are undertaken.

SECTION I

2. Terminology and Definitions:

A. Organizational:

(1) Tactical Air Command (TAC Air Com) - A major component of an Army or Naval Tactical Air Force assigned to conduct offensive and defensive air operations in conjunction with an Army, an Amphibious Force, or smaller independent task force.

(2) Tactical Air Control Group (TACG) (Land-Based) - A flexible administrative and tactical component of the Tactical Air Command which provides aircraft control and warning functions ashore for offensive and defensive missions within the Tactical Air Command area of responsibility.

(3) Tactical Air Control Group (TACG) (Navy) - An administrative and tactical component (ship-based) of the Amphibious Force which provides aircraft control and warning functions afloat for offensive and defensive missions within the Tactical Air Command area of responsibility.

(4) Tactical Air Control Squadron (TACS) (Land-Based) - A flexible administrative and tactical component of the Tactical Air Control Group (land-based) which provides the control mechanism for a land-based Tactical Air Control Center, or a Tactical Air Direction Center, or Tactical Air Control Parties.

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(5) Tactical Air Control Squadron (TACS) (Navy) - An administrative and tactical component of the Tactical Air Control Group (Navy) which provides the control mechanism for the ship-based Tactical Air Direction center or the ship-based Tactical Air Control Center.

(6) Tactical Air Control Center (TACC) - The principal air operations installation (land or ship-based) from which all aircraft and air warning functions of a Tactical Air Command are controlled. The Tactical Air Control Center is the operational component of the Tactical Air Control Group operating at Army or Amphibious Force level.

(7) Tactical Air Direction Center (TADC) - A subordinate air operations installation (land or ship-based) from which aircraft and air warning operations within a restricted area are directed. The Tactical Air Direction Center is the operational component of a Tactical Air Control Group operating at Corps or Amphibious Group level.

(8) Tactical Air Control Party (TACP) - A subordinate operational component of the land-based Tactical Air Control Group designed for the control of aircraft from forward observation posts. The Tactical Air Control Party operates at division, regimental, or battalion level, as required by the situation.

(9) Tactical Air Commander (Tac Air Cmdr) - The senior air officer (Navy, Marine, or Army) who exercises operational control of a Tactical Air Command.

(10) Tactical Air Controller (TAC) - The officer-in-charge of all operations of the Tactical Air Control Center. He is responsible to the

Tactical Air Commander for the control of all aircraft and air warning facilities within his area of responsibility.

(11) Tactical Air Director (TAD) - The officer-in-charge of all operations of the Tactical Air Direction Center. He is responsible to the Tactical Air Controller for the direction of all aircraft and air warning facilities assigned to his area of responsibility. When operating independently of a Tactical Air Control Center, the Tactical Air Director assumes the functions of the Tactical Air Controller.

(12) Fighter Defense Controller (FDC) - The senior officer on the staff of the Tactical Air Controller charged with the coordination and evaluation of air warning reports and the operational control of aircraft assigned for defensive missions.

(13) Fighter Defense Director (FDD) - The senior officer on the staff of a Tactical Air Director responsible for the direction of such aircraft and air warning facilities as may be allotted to him for the defense of his area. Additional Fighter Defense Directors may be assigned to outlying picket ships as required.

(14) Forward Air Controller (FAC) - The air officer in charge of the Tactical Air Control Party who directs, from a forward observation post, the action of combat aircraft engaged in close support of ground units.

(15) S-3 Air - An assistant S-3 on the staff of each infantry and tank battalion, cavalry squadron, infantry regiment, tank and cavalry group and armored combat command who has been specially trained in the use

of air power wit[redacted]

(16) Air-Ground Section (AGS) - A staff section, composed of specially trained Army or Marine personnel, in the headquarters of brigades, divisions, corps, and armies.

(17) Ground Liaison Officer (GLO) - A ground force officer stationed in a liaison capacity, at the air bases, on the carriers, and at the major control agencies of the Tactical Air Command.

(18) Air-Ground Information Center (AGIC) - An installation operated by the Air-Ground Section at Army Headquarters, or similar independent task force headquarters, for the receipt and dissemination of air and ground information and for the processing of ground force requests for preplanned and call air missions.

(19) Air-Ground Officer (AGO) - The senior officer assigned to an air-ground section.

(20) Anti-Aircraft Artillery Liaison Officer (AALO) - An anti-aircraft artillery officer stationed at a TACC or a TADC as a representative of the anti-aircraft artillery commander ashore. He is responsible for receiving from the Fighter Defense Controller at the TACC or the Fighter Defense Director at the TADC the orders to start or suspend AA fire, and with transmitting these orders to shore-based AA installations.

(21) Naval Anti-Aircraft Liaison Officer (NAALO) - A naval officer stationed at a TACC or a TADC ashore as a representative of the Senior Officer Present Afloat (SOPA). He is responsible for receiving from the Fighter Defense Controller at the TACC or the Fighter Defense

Director at the TADC the orders to stand down and [illegible] with transmitting these orders to the SOPA.

(22) Anti-Aircraft Artillery Operations Room (AAOR) - An anti-aircraft artillery installation ashore from which the operations of shore-based AA weapons, searchlights, barrage balloons, and smoke generators are controlled.

(23) Tactical Air Coordinator (Airborne) (TAC(A)) - An air officer who coordinates, from an airplane, the action of combat aircraft engaged in close support of ground or sea forces.

(24) Tactical Air Observer (TAO) - An officer, trained as an air observer, whose function it is to observe from an aircraft in flight and report on the movement and disposition of friendly and enemy forces.

SECTION II

3. RADIO NETS

(1) Tactical Air Command Net (Tac Air Com Net) - A restricted command net for the transmission of operational traffic between the Tactical Air Commander, the Tactical Air Control Center, the Tactical Air Direction Centers, and the various air bases and carriers providing aircraft for the Tactical Air Commands.

(2) Tactical Air Administrative Net (TAA Net) - A net designed to provide direct communication for administrative purposes between the Tactical Air Commander, the Tactical Air Control Center, Tactical Air

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Direction Centers, and the various air bases and carriers providing aircraft for the Tactical Air Commander.

(3) Tactical Air Direction Net (TAD Net) - An air-ground net designed to facilitate direct communication between aircraft engaged on offensive missions and the various elements of the control system. There will normally be provided sufficient TAD frequencies to enable the controllers to handle several simultaneous air-ground missions.

(4) Tactical Air Request Net (TAR Net) - A net designed to facilitate direct communication between the Forward Air Control Parties with the subordinate ground echelons and the Tactical Air Control or Tactical Air Direction Center.

(5) Tactical Air Observation Net (TAO Net) - An air-ground net designed to permit direct communication between the Tactical Air Observer, the Tactical Air Control Center, and the Tactical Air Direction Centers.

(6) Fighter Defense Net (FD Net) - A net designed to provide direct communication for air defense between the Tactical Air Control Center, Tactical Air Direction Centers, and Fighter Defense Directors.

(7) Fighter Air Defense Net (FAD Net) - An air-ground net designed to provide direct communication between the Fighter Defense Controller, Fighter Defense Directors, and aircraft in flight assigned to defensive missions.

(8) General Air Warning Net (GAW Net) - A net designed to provide communication between Tactical Air Control Centers, Tactical Air Direction Centers and other forces for the exchange of operational intelligence

and information.

(9) Tactical Alert Net (TA Net) - A net which provides a rapid means of disseminating information concerning imminent or actual attack.

(10) Itinerant Air Traffic Net (IAT Net) - An air-ground net on which itinerant aircraft entering the area of responsibility of a Tactical Air Control or Direction Center reports to the Tactical Air Controller or Director for instructions.

(11) Air-Sea Rescue Net (ASR Net) - An air-ground net for directing air-sea rescue operations and for reporting aircraft in distress.

(12) Anti-Submarine Warfare Net (ASW Net) - An air-ground net used to control aircraft on anti-submarine patrol and to conduct hunter-killer operations.

(13) Air-Ground Officers Net (AGO Net) - A net established between Air-Ground Officers and the Air-Ground Information Center for the interchange of information and the transmission of requests for pre-planned and call air missions.

(14) Ground Liaison Officer Net (GLO Net) - A net established between Ground Liaison Officers and the Air-Ground Information Center for the interchange of information.

(15) Reconnaissance Broadcast (RBC Net) - A radio broadcast operated by the Ground Liaison Officer with a reconnaissance unit to disseminate the results of visual and photographic reconnaissance. This broadcast is monitored by the AGIC, by the AGO's of corps and divisions, and by any other interested party.

(16) Anti-Aircraft Artillery Command Net (AAC Net) - A net established between the Anti-Aircraft Artillery Liaison Officer at the TACC and TADC's and the anti-aircraft artillery batteries and battalions ashore, and later the AAOR ashore, to control the fire of land-based anti-aircraft artillery. When the TACC moves ashore this net will be used by the NAALO to communicate with SOPA.

SECTION III

4. ABBREVIATIONS

(1) Organizational:

| | |
|---|---|
| AA | Anti-Aircraft Artillery |
| AALO | Anti-Aircraft Artillery Liaison Officer |
| AAOR | Anti-Aircraft Artillery Operations Room |
| AGC | Auxiliary General Command Ship |
| AGIC | Air-Ground Information Center |
| AGO | Air-Ground Officer |
| ASR | Air-Sea Rescue |
| AGS | Air-Ground Section |
| CAP | Combat Air Patrol |
| DF | Direction Finding |
| EW | Early Warning |
| FAC | Forward Air Controller |
| FCRT | Forward Control Radar Team |

| | |
|---|---|
| FDC | Fighter Defense Controller |
| FDD | Fighter Defense Director |
| FM | Frequency Modulated Radio |
| GCI | Ground Controlled Interception |
| GLO | Ground Liaison Officer |
| GO | Ground Observer |
| HF | High Frequency |
| LW | Light Warning |
| MEW | Microwave Early Warning |
| NAALO | Naval Anti-Aircraft Liaison Officer |
| NGF | Naval Gunfire |
| SOPA | Senior Officer Present Afloat |
| TACA | Tactical Air Coordinator Airborne |
| TAC | Tactical Air Controller |
| TACC | Tactical Air Control Center |
| TACG | Tactical Air Control Group (land-based or Navy) |
| TACP | Tactical Air Control Party |
| TACS | Tactical Air Control Squadron (land-based or Navy) |
| TAD | Tactical Air Director |
| TADC | Tactical Air Direction Center |
| TAO | Tactical Air Observer |
| Tac Air Com | Tactical Air Command |
| Tac Air Cmdr | Tactical Air Commander |
| V-Beam | High Power Early Warning Radar |
| VHF | Very High Frequency Radio |

(2) Radio Nets:

| | |
|---|---|
| AAC | Anti-Aircraft Command |
| AGO | Air Ground Officer Net |
| ASR | Air-Sea Rescue |
| ASW | Anti-Submarine Warfare |
| FAD | Fighter Air Defense |
| FD | Fighter Defense |
| GAW | General Air Warning |
| GLO | Ground Liaison Officer |
| I.T | Itinerant Air Traffic |
| RBC | Reconnaissance Broadcast |
| TAA | Tactical Air Administrative |
| TA | Tactical Alert |
| Tac Air Com | Tactical Air Command |
| TAD | Tactical Air Direction |
| TAO | Tactical Air Observation |
| TAR | Tactical Air Request |

PART II

TYPES OF AIR OPERATION

5. Strategic: Strategic air operations attack the enemies economic structure and attempt to destroy his economic ability to sustain an armed force.

6. Tactical: Tactical air operations can be broadly defined as the employment of air power in coordination with Ground or Naval Forces. Tactical air operations generally consist of the following:

A. Offensive Air Operations:

(1) Maintain Air Superiority: Maintain air superiority in localized sectors to the degree that ground or naval forces can operate freely without effective opposition from the enemies air power.

(2) Isolation of the Objective Area: Prevent movement of enemy forces into and within the objective area and to seek out and destroy these forces and their supporting installations.

(3) "Air Support: Join with Ground or Naval Forces, in operations within the objective area, in order to assist directly in the attainment of their immediate objective. Close Air Support is further defined as attack by aircraft of hostile ground targets which are so close to friendly front lines as to require detailed integration of each air mission with the fire and movement of the ground forces."

(4) Miscellaneous:

(a) Air Sea Rescue: The employment of aircraft, surface craft, submarines, and other special equipment suited to the rescue of personnel in distress at sea. Fighter escort will be provided as required.

(b) Naval and Artillery Spotting: The employment of high performance aircraft for the adjustment of naval or long range artillery fires.

(c) Anti-Submarine Patrol: During amphibious operations aircraft are assigned to anti-submarine patrol as required. These aircraft, in cooperation with hunter-killer forces, under operational control of the Tactical Air Commander form a protective screen about the transport and supply area.

(d) Anti-Surface Craft Patrol: During an amphibious operation aircraft may be assigned to anti-surface patrols against E-Boats, suicide craft, or other hostile surface forces threatening the Amphibious Force.

B. Defensive Air Operations:

(1) Combat Air Patrol (CAP) is provided over the objective area or over the critical areas of th combat zone, under the operational control of the Tactical Air Controller, or Tactical Air Director, for the purpose of intercepting and destroying hostile aircraft before they reach their target. During the amphibious phase of the operation the CAP would, in all probability, be provided by carrier forces. Later, as control goes ashore, and airfields are captured, or developed, such CAP will be augmented and finally taken over by land based aircraft. Such hostile plots as are reported by Ground Observers, Radar Reporting Stations, and friendly aircraft are filtered by the FDC or the FLD and interception effected by this officer, under the direction of the TAC or TAD as the case may be.

(a) Day Raids: When a hostile raid in daylight reaches proportions beyond the control of the CAP, the FDC or the FDD may request the TAC to divert part or all of the offensive strikes in the area to this defensive mission. In addition, certain AA batteries may be released for firing when friendly aircraft are not endangered.

(b) Night Raids: If the hostile raid occurs at night the FDC will normally attempt interception with his night fighters. If this fails, or if the raid is too big for the number of interceptors available, then the FDC may direct the NAALO and AALO to release the AA batteries for action.

(2) Anti-Aircraft Defense:

(a) Initial Phase: During the initial phase of an amphibious operation only shipborne AA defenses are involved. This fire power is controlled and coordinated by the TAC. In the defense of the anchorage and the beachhead, the TAC must coordinate the employment of defensive fighters with the Navy AA guns. By close control of ship based weapons and the defensive fighters, a well integrated defense is established.

(b) Anti-Aircraft Artillery Operations Room (AAOR): As AA batteries are set up ashore, an AAOR must be provided to link together the control of these batteries. The AAOR, in turn, is connected by the AAC Net to the TACC afloat and takes its orders from the TAC through the AALO.

(c) Transition Ship to Shore: When control of all aircraft and AA is passed ashore, the AA batteries of the ships remaining in the anchorage must then come under the operational control of the TAC

ashore. The AAC Net will provide this communication and naval personnel must be furnished to relay instructions of the TAC to the SOPA.

(d) Land Mass Phase: As the operation moves inland and a ~~frontier~~ Defense command assumes the responsibility for the defense of the beachhead area, the naval personnel are withdrawn, leaving the AALO, with the TACC, as the sole representative of the AA defense of the area.

(3) Control of Itinerant Flights: Itinerant flights in the zone of responsibility will be warned by the TAC when hostile aircraft are in the area. He will direct such flights to leave the area, land immediately, or provide them with fighter escort as dictated by the urgency of the situation.

C. Reconnaissance Air Operations: To procure by aerial visual, electronic, and photographic means information of value to air, ground, or naval units at all echelons of command for planning, accomplishing, and assessing tactical operations against the enemy. To provide meteorological, hydrographic, and terrain information for operational planning.

7. Special Air Operations: The following special operations are recognized, but their study is not considered within the scope of this paper, except that such operations must be coordinated with the Tactical Air Commander concerned.

(1) Air Evacuation: The employment of aircraft for the removal of sick, wounded, and other personnel from the combat area.

(2) Courier Service: The employment of aircraft for the rapid movement of mail, critical supplies, official communications and

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personnel.

(3) Air Supply: The employment of transport type aircraft for the delivery of critical items to forward drop or landing areas, and the delivery of such items by combat type aircraft to forward or isolated units.

(4) Psychological Air Warfare: The employment of aircraft for the delivery of psychological warfare material.

(5) Airborne Operation: The mass movement by air and the delivery of ground forces by parachute, gliders, or air landing within the objective area.

8. Aviation Organic to Ground Units: Light aircraft, normally considered of the liaison type, are assigned organically to ground forces. Operations of this type of aircraft are not considered within the scope of this paper, except that their activities must be coordinated with those of the Tactical Air Command.

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PART III

Support of Ground Forces

9. Introduction: The support of Ground Forces may be divided into two categories; offensive operations, and reconnaissance operation. Each of these will be considered separately.

SECTION I

Offensive Operations

10. Types of Air Missions:

(1) Preplanned Mission: Preplanned missions are those missions which are planned at least twelve hours ahead of the time of execution. In general these missions are planned on one day for execution the following day. This type of mission is rather rigid and is employed only when time permits. Ample time must be allowed for careful planning, collection of data, detailed briefing of air crews, and coordination with all air and ground elements concerned. The most effective bomb loading and fuzing can be employed, and the air unit both in formation and number of planes can be properly fitted to accomplish the desired effect on the target. Normally preplanned missions are carefully coordinated as to time and space with other weapons and must be executed exactly as scheduled. The preplanned mission, except for the time involved, is the most effective of all types of missions. This type of mission can be performed by any type of aircraft either land based or carrier based.

(2) Call Mission: This type of mission starts with a standard

number of planes on ground or carrier alert, armed with a standard load in possition ready to take off as soon as the aircrews have been briefed. The aircrews are in the briefing room standing by for a target to be designated. Time is allowed for detailed briefing and coordination with all air and ground elements concerned but not for change of armanent or for any increase in the number of planes available. This type of mission can be executed by fighter bombers or carrier aircraft in approximately two hours and by light or medium bombers in approximately four (4) hours from the time the target is discovered.

(3) Air Alert Mission: This type of mission starts with a formation of planes in the air awaiting the designation of a target. The planes carry a standard load. As a target is discovered, the pilots are informed by radio and are briefed in the air for an attack. This type of briefing is necessarily sketchy and incomplete. A high degree of control is necessary to insure that the pilots reach and attack the proper target. Control may be exercised through either electronic or visual control means. Time required for an attack, by planes on air alert, from the discovery of target to delivery of fire is about twenty minutes. This type of mission is executed normally by fighter bombers or carriers based planes.

11. Air-Ground Planning:

(1) Introduction: The basic problem of air-ground planning is to prepare an air plan which is part of a closely integrated and coordinated fire power plan worked out for the ground front as a whole. Fire power as developed by an airplane is only part of the total fire power available to

support the contemplated operation. Other sources of fire power are: Navy guns, artillery, tanks, mortars, rockets, etc. Air-ground planning seeks to integrate the air power into an overall fire power plan.

(2) Target Selection: The problem of target selection for air attack in close support of ground troops rests with the ground commander. The air commander advises the ground commander on the suitability of targets for air attack and on the effect that the air attack can be expected to have on the target. In target selection the capabilities and limitations of each source of fire power must be carefully considered and targets allocated to the weapon which is most capable, at the time, of producing the desired result.

(3) Planning Conference: A daily planning conference should be held between ground, air and navy commanders and key staff officers to evolve the air plan for the following day. At this conference the friendly and enemy situation on the ground, at sea, and in the air is freely discussed. The ground intentions and a requested program of air action for the following day is presented by the ground commander. This program will normally include requests for certain air effort to be made available on a preplanned, call, and air alert status. A list of targets is presented for the preplanned missions. Each target must include a priority, a detailed description and location, any time limits on the attack, and a statement of the effect desired. As the final step to the conference, the air commander, considering his resources, the requirements of air defense, the requirements to gain or maintain air superiority, the requirements to isolate the battlefield, and the requirements for close support of ground troops, evolves the air plan including an allocation of aircraft for preplanned, call, and air alert

missions in such proportions as to fit the tactical situation.

12. The Air-Ground Team: In the following discussion of the air-ground team the terms battalion, regiment, division, and corps are used to indicate either a Marine or Army Unit. The term air unit is used to include Navy, Army, or Marine Air Units. The term Army when used to designate an echelon of command includes Fleet Marine Force or Expeditionary Troops.

13. Introduction: The Air-Ground Team is divided into the ground and air components. Each component has certain responsibilities for personnel and communications facilities. The Air-Ground Team is shown on Charts 3, 4 and 5.

14. Ground Responsibilities:

(1) Assistant S-3 Air on infantry and tank battalion and cavalry squadron staffs. An assistant S-3 officer who has been specially trained in the use of air power with ground units. This officer is an organic part of the battalion staff and represents his battalion commander with the Tactical Air Control Party. The S-3 Air has no communication facilities other than the normal communications of his organization.

(2) Assistant S-3 Air on infantry regiment, tank and cavalry group, and armored combat command staffs. An assistant S-3 officer who has been specially trained in use of air power with ground units. This officer is an organic part of the regiment, group or combat command staff, and represents his commander with the Tactical Air Control Party. The S-3 Air has no communication facilities other than the normal communications of his organization.

(3) The Division Air-Ground Officer (AGO). This officer is the chief of the Air-Ground ~~sub-section of the division~~ Section. He is a specially trained officer in the use of air power with ground units. He prepares plans for the use of air in conjunction with his division and subordinate units. He submits the division requests for preplanned and call air missions, both offensive and reconnaissance, to the next senior ground headquarters, and requests for air alert missions to his companion Tactical Air Control Party. He is responsible for receiving and disseminating, within his division, the results of air action. The division AGO supervises the S-3 Airs of all subordinate units. He makes full use of organic communication facilities. Each Division AGO has under his control communication facilities to operate in the AGO Net to the Air Ground Information Center at the Army or Task Force Headquarters, to monitor the Tactical Air Observation Net, and to monitor the Reconnaissance Broadcast Net.

(4) The Corps Air-Ground Officer (AGO). This officer is the chief of the Air-Ground ~~sub-section of the Corps~~ Section. He is a specially trained officer in the use of air power with ground units. He prepares plans for the use of air in conjunction with his corps and subordinate units. He receives and consolidates the division requests for air preplanned and call action, both offensive and reconnaissance, and submits the corps requests to the Army Headquarters or to the Tactical Air Direction Center for action. He is responsible for receiving and disseminating the results of air action within his corps. The Corps AGO

supervises the AGO's of the subordinate divisions and maintains very close relations with the corps artillery commander to insure proper employment and coordination between the air fire power and the artillery fire power in support of the corps. He makes full use of organic communication facilities of the corps. Each Corps AGO has under his control communication facilities to operate in the AGO Net to the Air Ground Information Center at the Army or Task Force Headquarters, to monitor the Tactical Air Observation Net, and to monitor the Reconnaissance Broadcast Net.

(5) The Army Air-Ground Officer (AGO). This officer is the chief of the Air-Ground ~~sub-section of the Army G-3~~ Section. He is a specially trained officer in the use of air power with Ground Units. He prepares plans for the use of air in conjunction with the army and subordinate units. He receives corps and division requests for air preplanned and call action, both offensive and reconnaissance. Requests for offensive air action are approved by G-3 or other designated staff officer prior to transmitting the request to the Tactical Air Commander for action. Requests for reconnaissance are approved by G-2 prior to transmitting the request to the Tactical Air Commander for action. The Army AGO is responsible for receiving the results of air action from GLO's and with disseminating this information to all elements of the army. He is responsible for keeping the GLO's fully informed of ground action and contemplated ground action. The Army AGO is responsible for the operation of the AGO, GLO, and Reconnaissance Broadcast Nets.

(6) The Air-Ground Information Center (AGIC). The AGIC is that portion of the air-ground ~~subsection of the Army G-3~~ Section which operates

at the Army Headquarters in close conjunction with the Tactical Air Controller. It is under the immediate control of the Army AGO. It consists of duty officers to receive and process requests and information over the AGO, GLO, and Reconnaissance Broadcast Nets, necessary personnel for a cryptographic section and operators for the net control stations of the AGO and GLO Nets, and monitoring stations for the TAO and Reconnaissance Broadcast Nets.

(7) Ground Liaison Officers (GLO). The Ground Liaison Officer is a ground force officer stationed in a liaison capacity at the air bases, on the carriers, or at the major control agencies of the Tactical Air Command. He is part of the air ground section of the Army or Task Force Headquarters and looks to the AGO of his headquarters as his commander. As a liaison officer he is the representative of the ground commander at the air element at which he is stationed. He operates in the GLO Net to receive and transmit information. The GLO must be carefully briefed by his commander into the plans for contemplated action. GLO's must be carefully trained and must have a complete basic knowledge of the tactics and technique of all arms. The GLO is responsible for keeping the air element fully informed of ground action and contemplated ground action within the limits of security, and for securing from the pilots all information of value and interest to the ground commander and transmitting this information to the AGIC.

15. Air Responsibilities: The control system for air-ground operations is a function of the Air Commander. It is in effect the control mechanism which enables the Tactical Air Commander to effectively apply air power in the place, at the time, requested by the ground commander. The system as herein outlined is designed to function for either ship-based or land-based control of aircraft and air warning facilities, and to permit the smooth transition from Naval to Army control during an amphibious operation. There are three principal echelons for effecting this control:

(1) The Tactical Air Control Center is the principal element which controls tactical air OFFENSIVE AND DEFENSE MISSIONS throughout the zone of responsibility of the Amphibious Force or the Army. This element functions initially from the joint operations room of the command ship utilizing the facilities provided by the Tactical Air Control Group (Navy). When the Army (or Marine Landing Force) assumes command ashore, and when the Tactical Air Control Group (Land-based) is ready to function, the centralized control of air activities is shifted to the Tactical Air Control Center (land-based), operating under the Tactical Air Commander. The Tactical Air Control Center is organized with two principal operational sections; (1) The Air Support Control, and (2) the Air Defense Control Sections. Normally, these sections are housed in the same or adjoining rooms or tents, in order that the Tactical Air Controller may readily supervise both operations.

(a) The Air Support Control Section comprises an air operations table with remote control radio facilities for the various stations, a ground situation map board, an aircraft status board, and a tactical air mission board. Stations on the operations table are provided for the Tactical Air Controller and for the various operational assistants manning the TAD, TAR, TAO, and other prescribed nets. The radio receivers and transmitters serving the Air Support Control Section, together with their operators, are housed in separate compartments aboard ship, and in mobile communication vans ashore.

(b) The Air Defense Control Section comprises an air operations table with stations for the various control and filter personnel, plotting boards, and the necessary aircraft status boards. Ship based units include tactical radars within the Air Defense Section of the Combat Information Center; land based units normally utilize dispersed radar equipment reporting into the air defense control section.

(2) The Tactical Air Control Center (land-based) is landed with the headquarters of the Army (or Marine Landing Force) Commander, as a part of the operational component of the Tactical Air Command. Usually the Air Support Control Section is set up first, being more mobile, and assumes control of air support operations when directed by the TACC afloat, leaving the control of air defense with the latter until such time as the TACC is in full operation ashore.

(3) The Tactical Air Direction Center is organized and equipped exactly as the Tactical Air Control Center, insofar as ship-based units are concerned; and similarly in the case of land-based units. It is designed to discharge the same functions as the TACC, but on a lower level of command responsibility. The TADC is landed with the Corps headquarters in order to assume control of air support operations within the Corps Area as early as possible. Pending the establishment ashore of the land-based TACC, the TADC ashore operates under the direction of the TACC afloat. Land-based TADC's may or may not require the services of an Air Defense Control Section initially, in situations where all fighter defense is being controlled from the TACC, but it is considered desirable that such

facilities be included as an organic part of the TADC and placed in operation as soon as they can be landed and set up.

16. The Tactical Air Control Party consists of an air officer and necessary enlisted assistants equipped with vehicular and portable radio equipment capable of manning the TAR Net, and the TAD Net of the TACC or TADC under which the TACP operates. The function of the TACP is to provide the operating link between the Tactical Air Commander and the subordinate ground commanders, down to and including the battalion level. The TACP provides the subordinate ground commander a direct channel to the TACC or TADC for the transmission of requests for air alert missions (TAR Net), and it permits the Tactical Air Commander to decentralize the control of such air support to a forward air controller operating at the same level as the ground commander who submits the request. Thus air-ground coordination for close support of front line troops may be effected from an observation post within the front lines. The TACP is an organic part of the Tactical Air Control Group (land-based). For an amphibious operation the TACP's are assigned to divisions, regiments, and battalions during the training and rehearsal stage, are loaded out with the headquarters of these units and are landed with them. Thus the battalion TACP is the first link of the air-ground control system to start functioning ashore. As soon as the regimental TACPs are ashore and functioning, a gradual withdrawal of TACP's from the battalion level is usually feasible. Similarly, as the action progresses inland and becomes a land mass operation involving large ground and air forces, it should be possible to begin withdrawal of the TACPs back to division level.

SECTION II

17. Reconnaissance Operations:

(1) Responsibility of the Tactical Air Commander: The Tactical Air Commander is charged with the responsibility of receiving requests for photographic reconnaissance from the associated ground commander, causing the photographic mission to be flown, developing the resulting film and delivering the original negative to the ground commander or his representative at a predesignated point.

(2) Responsibility of the Ground Force Commander. The ground force commander is charged with receiving the original negative from the Tactical Air Commander, producing the required number of photographs, interpreting the photographs for information of interest to the ground force, distributing the photographs within the ground force, furnishing the Tactical Air Commander with such photographs as he requires, and with filing and storing the original negatives.

(3) Responsibility of the Amphibious Force Commander. The amphibious force commander is charged with the responsibility of making the facilities of the photographic laboratory on each AGC available to the ground force commander for the production of aerial photographs until such time as the ground force laboratory is established ashore.

(4) Purposes of Aerial Photography: Aerial photography is carried out for three general purposes; intelligence photography, basic cover photography, and photography for the production of maps or map supplements. The same photograph may be and often is, used for all three purposes.

(a) Intelligence Photography: Intelligence photography is carried out to provide repetitive photographic cover of the best possible scale for study by trained photo interpreters. The photographs are reproduced in limited quantity and are provided normally at the rate of two sets for each division or higher interested headquarters. The photographic plan should provide for photographing the complete combat zone to a depth of fifteen thousand yards every day.

(b) Basic Cover Photography: Basic cover photography is carried out to provide the best possible photographs for quantity distribution to ground forces.

(c) Photography for the Production of Maps and Map Supplements: The photography required for the production of maps is carried out months or years prior to the issue of the maps. Photography for this purpose will not be discussed herein. Photography required for the production of map supplements includes that required for the preparation of mosaics and that required to produce various types of obliques. The Tactical Air Commander is again responsible for providing the necessary original negatives for the production of mosaics and obliques by the ground forces.

(5) Request for Photographic Reconnaissance: Requests for photographs within a division are processed through normal division channels to the Division G-2 where the various division requests are coordinated and a request transmitted to the Corps or Army Headquarters. The facilities of the AGO Net are available for the transmission of these requests. The Corps

or Army G-2 coordinates all requests of subordinate units and submits the requests to the Tactical Air Commander for execution of a photographic mission when suitable negatives are not already available. When suitable negatives are available the necessary reproduction is carried out and the photographs or mosaics dispatched to the requesting division or other unit.

18. Visual Reconnaissance:

(1) Responsibility of the Tactical Air Commander. The Tactical Air Commander is responsible for receiving requests for visual reconnaissance from the associated ground commander, causing the necessary missions to be flown, and making the resulting information available through the TAO Net at the TACC and the TADC's and to GLO's at the air base.

(2) Responsibility of the Ground Force Commander. The ground force commander is responsible for consolidating and coordinating all ground requests for visual reconnaissance, transmitting the requests to the Tactical Air Commander, monitoring the TAO Net at division, corps and army headquarters to receive flash reconnaissance reports, providing GLO's at the air bases to assist in interrogation and briefing of reconnaissance pilots, operating the reconnaissance broadcast net, and with monitoring the reconnaissance broadcast at division, corps and army headquarters.

(3) Purpose of Visual Reconnaissance: Visual reconnaissance is carried out to secure through the reports of a visual observer, information concerning movement of enemy and friendly forces, conditions of roads, bridges and other means of movement, locations of enemy installations, hydrographic information, and to provide a general surveillance of

an area. Visual reconnaissance is limited to those things that a man can be expected to see while moving in a high performance aircraft through an area defended by anti-aircraft artillery. The observer reports only what he sees. The reliability and effectiveness of the report depends upon the skill and knowledge of the observer.

(4) Requests for Visual Reconnaissance: Requests for visual reconnaissance within a division are processed through normal division channels to the Division G-2 where they are consolidated and transmitted to the corps or army headquarters. The facilities of the AGO Net are available for the transmission of these requests. The Corps or Army G-2 coordinates all requests of subordinate units and submits the requests to the Tactical Air Commander for execution of a mission.

19. Electronic Reconnaissance: (Television or Radar-Link)

(1) Responsibility of the Tactical Air Commander: The Tactical Air Commander is charged with the responsibility of furnishing high-performance aircraft with suitable transmitting equipment, receiving requests for electronic reconnaissance from the associated ground commander, causing the necessary missions to be flown, making the resulting information available through suitable receiving equipment at Tactical Air Control and Direction Centers, and recording the results of electronic reconnaissance.

(2) Responsibility of the Ground Force Commander: The ground force commander is responsible for consolidating and coordinating all ground requests for electronic reconnaissance, receiving information from electronic reconnaissance by suitable receiving equipment at army, corps,

division, and other headquarters as necessary, and receiving the recorded results of electronic reconnaissance from the Tactical Air Commander.

(3) Responsibility of the Amphibious Force Commander: The amphibious force commander is charged with the responsibility of making suitable receiving and recording facilities available on each AGC for the use of the Tactical Air Commander and the Ground Force Commander.

(4) Purpose of Electronic Reconnaissance: Electronic reconnaissance is conducted to supplement photographic and visual reconnaissance by providing instantaneously at ground and surface installations representations of the view from an airplane in flight as viewed by either optical or electronic means.

(5) Requests for Electronic Reconnaissance: Requests for electronic reconnaissance are processed in the same manner as requests for visual reconnaissance.

[redacted]

PART IV

COMMUNICATION

20. GENERAL:

(1) For effective air-ground coordination, a communication system must be provided for the transmission of information, requests and orders. For maximum utilization of the mobility and flexibility of air power, rapid communication is essential. Direct channels must be provided between activities which normally exchange information, requests or orders; relays are generally unsatisfactory. Communication systems must therefore be based upon functional organization rather than the chain of command. Normal command channels do not meet the requirements of air-ground coordination, necessitating the establishment of separate channels.

(2) In the early stages of amphibious operations, sufficient radio communication must be provided to satisfy all commication requirements as it is the only rapid means available during this period. For land operations wire communication should be used wherever possible in preference to radio. As operations move inland, wire communication is installed as rapidly as practicable

SECTION I

21. REQUIREMENTS AND RESPONSIBILITY. - The air-ground communication system must be based upon a study of the requirements for any particular



[redacted]

situation. The following major requirements are generally applicable and are used as a basis for normal organization. Requirements:

(1) Communication from the command posts of ground unit commanders to Tactical Air Control or Direction Centers for requesting air ALERT missions in support of ground operations. In the initial stages of amphibious operations and other fluid situations, facilities for requesting air missions directly from TADCs must be provided down to and including battalion commanders. In more stable situations, such facilities are normally provided only down to regimental commanders. This is an aviation responsibility and is a normal function of Tactical Air Control Parties. Units which do not have Tactical Air Control Parties must submit requests via ground force channels to echelons which do have Tactical Air Control Parties attached.

(2) Direct communication from Tactical Air Control and Direction Centers to aircraft in flight on an air alert status or executing offensive missions. This is an aviation responsibility.

(3) Direct communication from Tactical Air Control Parties to aircraft in flight which have been assigned to them for the execution of missions. This is an aviation responsibility.

(4) Direct communication from Tactical Air Control and Direction Centers to aircraft on reconnaissance missions. This is an aviation responsibility.

(5) Direct communication for operational and administrative purposes between the Tactical Air Commander, the Tactical Air Control Center, Tactical Air Direction Centers and airbases and carriers providing aircraft for the Tactical Air Commander. This is an aviation responsibility.

(6) Communication for air defense:

(a) Direct communication between the Tactical Air Control Center, Tactical Air Direction Centers, and Fighter Defense Directors for the transmission of orders and information. This is an aviation responsibility.

(b) Direct communication from the Fighter Defense Controller and Fighter Defense Directors to aircraft in flight assigned to defensive missions. This is an aviation responsibility.

(c) Direct communication from Tactical Air Control and Direction Centers to the Anti-Aircraft Artillery Operations Room. This is ground force responsibility.

(d) Communication from Tactical Air Control or Direction Centers to all interested commands for warning of actual or imminent attacks. This is an aviation responsibility.

(e) Communication between adjacent Tactical Air Control or Direction Centers and other forces in the same general area for exchanging operational intelligence

and information. This is an aviation responsibility.

(7) Direct communication between the Air-Ground Information Center and Air-Ground Officers of divisions and corps, for requesting preplanned and call missions and for disseminating air-ground information. This is a ground force responsibility.

(8) Communication between division Air-Ground Officers and the battalion and regimental S-3's Air, of their divisions, for requesting preplanned and call missions and for disseminating information. This is a ground force responsibility.

(9) Direct communication between the Air-Ground Information Center and the Ground Liaison Officers at airbases and in carriers. This is a ground force responsibility.

(10) Communication for air-sea rescue. This is an aviation responsibility.

(11) Communication for anti-submarine warfare. This is an aviation responsibility.

(12) Communication between Tactical Air Control and Direction Centers and itinerant aircraft in the area of their responsibility. This is an aviation responsibility.

(13) Communication for disseminating complete information obtained from air reconnaissance. This is a ground force respnsibility

(14) Other ground force communications are required but not discussed herein.

(15) Other tactical air communications are required but not discussed herein.

(16) Other Naval communications are required but not discussed herein.

SECTION II

22. RADIO COMMUNICATION:

(1) Paragraph 23 (below) lists typical radio nets with their organization to satisfy essentially all requirements listed in paragraph 21 (above). The nets shown are typical to the initial stages of amphibious operations when complete reliance must be placed on radio communication. As the operation moves inland, radio nets may be combined or eliminated, as reliable wire communication is established.

(2) Requirements of paragraph 21, parts (14), (15), and (16) are not discussed in paragraph 23 (below). Normal ground, naval, and tactical air communication channels are beyond the scope of this paper. Communication between division Air-Ground Officers and battalion and regimental S-3's Air, must be conducted via normal command channels.

(3) Where ground, voice, high frequency radio nets are prescribed in paragraph 23, operators should be prepared to shift to key operation if required by unusual distances or unfavorable terrain.

23. TYPICAL RADIO NETS (Chart 6)

(1) Tactical Air Request Net (TAR Net)(Chart 7 and 8):

(a) This net links Tactical Air Direction Centers with Tactical Air Control Parties operating under them. Tactical Air Control Centers monitor all frequencies of this net used by subordinate Tactical Air Direction Centers.

(b) It is used primarily for forwarding requests for air alert missions from ground unit commanders to Tactical Air Direction Centers.

(c) It is a high frequency net using voice transmission.

(d) When Tactical Air Control Parties are assigned to battalion level, a separate frequency is assigned for each division. When Tactical Air Control Parties are assigned only to regimental or division level, one frequency per corps is adequate.

(e) Equipment used on this net should have a minimum reliable voice range of fifteen (15) miles over unfavorable terrain.

(f) This net satisfies the requirement of paragraph 21 part (1).

(2) Tactical Air Direction Net (TAD Net)(Charts 9 and 10):

(a) This net provides communication between aircraft assigned to offensive missions, the Tactical Air Coordinator Air-

borne and the controlling Tactical Air Control Center, Tactical Air Direction Center, or Tactical Air Control Party.

(b) The net is used for controlling aircraft in flight. It is used only for air-ground and air-air communication.

(c) Voice transmission on very high frequencies is used on this net.

(d) Normal frequency assignment is three very high frequencies per Tactical Air Command. The number of offensive air missions which can be executed simultaneously is dependent upon the number of frequencies allotted to this net.

(e) Tactical Air Control and Direction Centers require very high frequency equipment which will give a reliable range on this net of 200 miles with airborne equipment. Tactical Air Control Parties may use portable or vehicular, less powerful equipment.

(f) This net satisfies the requirements of paragraph 21 parts (2) and (3).

(3) Tactical Air Observation Net (TAO Net)(Chart 11):

(a) This net is used for communication between Tactical Air Control and Direction Centers and aircraft on reconnaissance missions. Division, corps, and Army headquarters may monitor this net to secure information directly from reconnaissance aircraft.

(b) It is used to transmit orders to and receive reports from reconnaissance aircraft.

(c) It is a very high frequency net using voice transmission.

(d) Separate frequencies are assigned to each Tactical Air Control and Direction Center.

(e) Ground or ship board equipment used on this net should have a reliable voice range with airborne equipment of 200 miles.

(f) This net satisfies the requirement of paragraph 21 part (4).

(4) Tactical Air Command Net (Tac Air Com Net)(Chart 12):

(a) This net provides communication between the Tactical Air Commander, the Tactical Air Control Center, Tactical Air Direction Centers and airbases and carriers furnishing aircraft for the Tactical Air Command.

(b) It is used only for operational traffic between the activities on the net.

(c) Two frequencies are assigned to the net, one very high frequency (frequency modulated) for local use and one high frequency for longer distances. Voice transmission is used on both frequencies.

(d) Frequencies are assigned on the basis of one high frequency and one very high frequency (frequency modulated) per Tactical Air Command.

(e) High frequency equipment must have a reliable range of 200 miles; the frequency modulated channel should provide reliable communication up to fifty (50) miles.

(f) This net partially satisfies the requirement of Paragraph 21, part (5).

(5) Tactical Air Administrative Net (TAA Net)(Chart 12):

(a) This net parallels the Tactical Air Command Net, linking the Tactical Air Commander, Tactical Air Control Center, Tactical Air Direction Centers, and airbases and carriers providing aircraft for the Tactical Air Commander.

(b) It is used for administrative traffic between the activities on the net.

(c) Two frequencies are assigned to the net, one very high frequency (frequency modulated) for local use using voice transmission and one high frequency for long distance communication using key or radio teletype transmission.

(d) Frequencies are assigned on the basis of one high frequency and one frequency modulated channel per Tactical Air Command.

(e) High frequency equipment must have a reliable range of 400 miles; the frequency modulated channel should provide reliable communication up to fifty (50) miles.

(f) This net together with the Tactical Air Command Net

satisfies the requirement of paragraph 21, part (5).

(6) Fighter Defense Net (FD Net)(Chart 13):

(a) This net provides direct communication between the Tactical Air Control Center, Tactical Air Direction Centers, and other Fighter Defense Directors.

(b) It is used for communication pertaining to air defense.

(c) Voice transmission is used on two frequencies, one very high frequency (frequency modulated) for local use, and one high frequency for greater distances.

(d) Frequencies are assigned on the basis of one high frequency and one frequency modulated channel per Tactical Air Command.

(e) High frequency equipment must provide reliable communication up to 200 miles; the frequency modulated channel should provide reliable communication up to fifty (50) miles.

(f) This net satisfies the requirement of paragraph 21, part (6a).

(7) Fighter Air Defense Net (FAD Net)(Chart 14 and 15):

(a) This net provides direct communication between aircraft in flight assigned to defensive missions and the Fighter Defense Controller and Directors.

(b) It is used only for air-air and air-ground communication for control of and receiving reports from aircraft.

(c) Voice transmission on very high frequencies is used on this net.

(d) Normal frequency assignment is three very high frequencies per Tactical Air Command.

(e) Ground or shipboard equipment used on this net should have a reliable voice range with airborne equipment of 200 miles.

(f) This net satisfies the requirement of paragraph 21, part (6b).

(8) Anti-Aircraft Artillery Command Net (AAC Net)(Chart 16):

(a) This net provides communication from the Anti-Aircraft Artillery Liaison Officers at Tactical Air Control or Direction Centers to the Anti-Aircraft Artillery Operations Room. Prior to the establishment of the Anti-Aircraft Artillery Operations Room, this net may be used for direct communication from the liaison officers at Tactical Air Control or Direction Centers to anti-aircraft artillery batteries or battalions, as appropriate. When control of aircraft is vested in a shore based Tactical Air Control Center, the net is also used for communication from the Naval Anti-Aircraft Liaison Officer with the TACC to the Senior Officer Present Afloat.

(b) It is used for control of anti-aircraft fire, searchlights, barrage balloons, and smoke generators.

(c) Voice transmission on a high frequency is used.

(d) Frequencies are assigned on the basis of one per Tactical Air Command.

(e) Equipment used on this net should have a reliable voice range of 200 miles.

(f) This net satisfies the requirement of paragraph 21 part (6c).

(9) Tactical Alert Net (TA Net)(Chart 17):

(a) This net provides communication between Tactical Air Control and Direction Centers and the Tactical Air Commander. It will be used for broadcasting information to interested commands. When control of aircraft is vested in a shore-based Tactical Air Control Center, the net is also used for communication to the Senior Officer Present Afloat.

(b) It is used for the transmission of information and orders pertaining to actual or imminent enemy attack.

(c) Voice transmission on high frequency is used.

(d) Frequency assignment is made on the basis of one high frequency per Tactical Air Command.

(e) High frequency equipment should have a reliable voice range of 200 miles.

(f) This net satisfies the requirement of paragraph 21 part (6d).

(10) General Air Warning Net (GAW Net)(Chart 18):

(a) This net provides communication between adjacent Tactical Air Control or Direction Centers and other forces in the same general area.

(b) It is used primarily for exchanging operational information and intelligence between a Tactical Air Command and other activities in the same general area.

(c) Voice transmission on a high frequency is used.

(d) Frequency assignment is on the basis of one per theatre.

(e) Equipment used on this net must have a reliable voice range of 300 miles.

(f) This net satisfies the requirement of paragraph 21, part (6e).

(11) Air-Ground Officers Net (AGO Net)(Chart 19):

(a) This net provides direct communication between the Air-Ground Information Center and the Air-Ground Officers of divisions and corps.

(b) It is used for requesting pre-planned and call air missions and for disseminating air-ground information.

(c) Key transmission on high frequency is used.

(d) Frequencies are assigned on the basis of one per corps.

(e) Equipment used must provide reliable communication up to 200 miles over unfavorable terrain.

(f) This net satisfies the requirement of paragraph 21, part (7) and (8).

(12) Ground Liaison Officers Net (GLO Net)(Chart 20):

(a) This net provides direct communication between the Air-Ground Information Center and the Ground Liaison Officers at the various carriers and bases.

(b) It is used for interchanging information as to the ground situation and pilots observations.

(c) Key transmission on high frequency is used.

(d) Frequencies are assigned on the basis of one per each, four airbases or carriers.

(e) Equipment used must provide reliable communication up to 200 miles.

(f) This net satisfies the requirement of paragraph 21, part (9).

(13) Air-Sea Rescue Net (ASR Net)(Chart 21):

(a) This net is used for communication between Tactical Air Control and Direction Centers, rescue facilities, and aircraft in distress.

(b) It is used only for communication pertaining to aircraft in distress and for directing surface and air rescue craft.

(c) Voice transmission on a very high frequency is used.

(d) Frequency assignment is on the basis of one per theatre.

(e) Ground and surface equipment must give a reliable voice range of 200 miles with airborne equipment.

(f) This net satisfies the requirement of paragraph 21, part (10).

(14) Anti-Submarine Warfare Net (ASW Net)(Chart 22):

(a) This net is used for communication between Tactical Air Control and Direction Centers and surface and aircraft engaged in anti-submarine warfare.

(b) It is used for conducting anti-submarine warfare, including hunter-killer operations.

(c) Voice transmission on a very high frequency is used.

(d) Frequency assignment is on the basis of one per Tactical Air Command.

(e) Ground and surface equipment used on this net must give reliable voice range of 200 miles with airborne equipment.

(f) This net satisfies the requirement of paragraph 21, part (11).

(15) Itinerant Air Traffic Net (IAT Net)(Chart 23):

(a) This net is used for communication from Tactical Air Control and Direction Centers to itinerant aircraft entering the area of their responsibility.

(b) It is used only for air-ground communication for control of itinerant air traffic.

(c) Voice transmission on a very high frequency is used.

(d) Frequency assignment is on the basis of one per theatre.

(e) Ground and shipboard equipment used on this net must give a reliable voice range of 200 miles with airborne equipment.

(f) This net satisfies the requirement of paragraph 21, part (12).

(16) Reconnaissance Broadcast Net (RBC Net)(Chart 24):

(a) This net is used to broadcast from the airdromes used by reconnaissance aircraft or in amphibious operations from the amphibious force flagship to the headquarters of Army, corps, and divisions.

(b) It is used to broadcast complete information compiled from the observation of pilots of reconnaissance aircraft.

(c) Voice transmission in a high frequency is used.

(d) The basis for frequency assignment is one per Army.

(e) Equipment used on this net must have a reliable voice range of 200 miles.

(f) This net satisfies the requirement of paragraph 21, part (13).

SECTION III

24. WIRE COMMUNICATION:

(1) Wire communication should be used in lieu of radio communication whenever and wherever its installation is practicable. Both teletypewriter and telephone circuits are used in order to most efficiently provide the necessary services to satisfy the requirements of paragraph 21 above.

(2) The wire system will include in general a main telephone and teletype system of interconnected switchboards with necessary locals, tied into the ground force wire system, and direct lines for rapid operational requirements.

(3) Wire installations and construction must conform to currently accepted standards. Telephone and telegraph carrier equipment, with or without radio relay provides, in effect, the equivalent of normal wire circuits, and should be employed when and where desirable.

## SECTION IV

25. VISUAL COMMUNICATION:

(1) In addition to the principal communication requirements listed in paragraph 21 above, there are certain supplementary visual requirements for the close coordination of ground and air power:

(a) Marking of front lines to coordinate air strikes and reconnaissance near the front lines.

(b) Target designation by visual means.

(c) ~~Location~~ MARKING of dropping areas for air supply.

(d) Identification.

(e) Indication of completion of air strike.

(2) (a) To accomplish the above ground units are furnished panels and pyrotechnics including smoke grenades. In addition

distinctive bursts of artillery, mortar, or other fire may be used for target designation.

(b) Airplanes are equipped with pyrotechnics.

(3) (a) Front lines may be marked by panels, pyrotechnics, or electronic means.

(b) Target designation may be accomplished by distinctive fire from artillery, mortars, or other weapons, or by panel arrangements.

(c) Dropping areas may be designated by panels, pyrotechnics, or electronic means.

(d) Special panel or pyrotechnic signals may be prescribed for identification.

(e) Completion of a strike near friendly troops may be indicated by a prescribed pyrotechnic signal.

## SECTION V

28. SUPPLEMENTARY COMMUNICATION REQUIREMENTS:

(1) All ground and shipboard radio equipment must be equipped with efficient remote control systems to permit operation independently of the location of the equipment.

(2) Tactical Air Control Parties must be equipped with light wire, telephones and portable radios to permit intra-party communication.

(3) Land based Tactical Air Control and Direction Centers must be completely equipped with a primary and secondary radio set for each frequency which must be guarded. Secondary sets may be less powerful than the normal requirement for the net to give increased mobility. This allows for routine and emergency maintenance of equipment, displacement by echelon, and moving into relatively unaccessible locations.

(4) Tactical Air Control Parties require essentially two radio sets, one high frequency, and one very high frequency for the Tactical Air Request Net and the Tactical Air Direction Net, respectively. For land warfare, it is desirable that both sets be mounted in one vehicle, of a type adapted to the situation and terrain. For amphibious operations, it is necessary that portable equipment be provided.