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COMMAND AND STAFF COLLEGE

2nd COMMAND CLASS

ANALYTICAL STUDY

THE STRUCTURE OF THE TACTICAL AIR FORCE

24 June 1946

Committee No. 21

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ANALYTICAL STUDY

~~RESTRICTED~~THE STRUCTURE OF THE TACTICAL AIR FORCE**UNCLASSIFIED**

	<u>Page</u>
The Problem	1
Facts Bearing on the Problem	1
Conclusions	1
Recommendations	1-2

Appendix A - Analysis of Problem

Annex I --Chart: Tactical Air Force

Annex II--Chart: TAF Engineer Command

Annex III-Chart: TAF Service Command

Appendix B - Bibliography

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24 June 1946

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1. To study and analyze the proportion of tactical air units to ground units, Training Circular No. 30 (19 June 1945), and Field Manual 100-20 (21 July 1943). From this study, to evolve a yardstick for future planning whereby staff planners may draw up a troop basis of Air Force units for a Task Force, and a doctrine for the relationship of air and ground units using weapons of the immediate future.

FACTS BEARING ON THE PROBLEM

2. In various ways in different theaters, there was developed what has come to be known as a Tactical Air Force, and this organization was essentially the same in all theaters.

3. All supporting troops such as AAA, Engineer, service, etc., are an integral part of the Tactical Air Force.

4. The control of friendly aircraft in the air, the detection of enemy aircraft, and the subject of air defense as a whole are all parts of the same problem, and this problem has been solved by the use of the Tactical Control Group.

5. TC-30 and FM 100-20 were published and in effect prior to the end of hostilities in Europe.

6. The Tactical Air Force-Army Group and Tactical Air Command-Army relationship grew up during the present war as a result of experience in all theaters.

CONCLUSIONS

7. The doctrine set forth in FM 100-20 is sound.

8. TC-30 is sound with the following exceptions:

a. Part I, paragraph 3, does not include as a principal component of a TAF an Air Defense Command.

b. Part II, Section 1, paragraph 10, includes the assignment of Photo Reconnaissance units to the Tactical Air Command.

9. The TAF-Army Group and TAC-Army relationship is sound.

10. There can be no set yardstick for planning purposes in developing the air complement of a task force other than in the broadest general terms. Detailed planning for units below the level of the major commands of the Tactical Air Force is only possible when the ultimate aim of the task force has been set forth and the size of such task force has been decided. In any planning the framework of the TAF must be provided for in order to permit a later proper development of air effort.

RECOMMENDATIONS

11. That FM 100-20 be retained as is.

12. That TC-30 be retained, amended as follows:

a. Part I, paragraph 3c, include as a principal component of a TAF an Air Defense Command which is responsible for the active and passive defense of the entire TAF-Army Group area.

b. Part II, Section 1, paragraph 10 c, be revised to provide for Photo Reconnaissance units to be assigned

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directly under TAF and only Tactical Reconnaissance units be assigned to TAC.

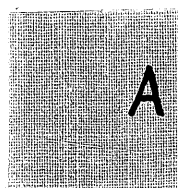
13. That planning staffs be thoroughly indoctrinated in the structure and functions of the Tactical Air Force in order to insure an adequate and well balanced air complement of the task force.

S.B. Mack

S. B. MACK
Colonel, AC
Chairman

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to

ANALYTICAL STUDY
- - -THE STRUCTURE OF THE TACTICAL AIR FORCE
- - - - -ANALYSIS OF PROBLEM

	<u>Page</u>
I. Introduction	1
II. Composition	1
III. Tactical Air Command	2
IV. Other Components of TAF	3
V. Ground Air Defense	3
VI. Engineer Units	5
VII. Service and Supply Units	6

ANNEXES:

- I - Chart: Typical TAF
- II - Chart: Typical TAF Engineer Command
- III - Chart: Typical TAF Service Command

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APPENDIX A
to
ANALYTICAL STUDY

~~RESTRICTED~~

THE STRUCTURE OF THE TACTICAL AIR FORCE

ANALYSIS OF PROBLEM

I. INTRODUCTION

1. In order to evaluate properly the Tactical Air Force, there must be set up what is generally regarded to be a type or typical Tactical Air Force. Evolution and development during the last war has produced such a type air force, and the committee has herein attempted to picture what such a type Tactical Air Force is, with a view toward studying (1) the proportion of tactical units to ground units, (2) TC 30 and (3) FM 100-20. Further, from the above study an attempt will be made to evolve first, a yardstick for future planning whereby staff planners may draw up a troop basis of Air Force units for a task force, and second, a doctrine for the relationship of air and ground units; i.e., Is the TAC-Army correct, or should it be TAF-Army or Wing-Army, using the weapons of the immediate future?

2. In any study involving the number of tactical air units as compared to ground units, only the broadest of generalities can be offered, and will be of little value from a comparative standpoint until a further analytical study can be made of the size, composition and mission of the specific task force of which the tactical air units are to be a part. The number of tactical units will also be dictated by our having or lacking air superiority, and having or lacking it, our ability to maintain or to gain it. Since the above is true the committee will attempt to show wherein certain general comparisons can be made in determining planning yardsticks and relational doctrine.

II. COMPOSITION

3. A typical Tactical Air Force will have in addition to the Air Force Headquarters, six major type subdivisions (see ANNEX I). These subdivisions are:

- a. Tactical Air Command.
- b. Tactical Bomber Command.
- c. Air Defense Command.
- d. Engineer Command.
- e. Air Service Command.
- f. Troop Carrier Command.

4. The TAC is an organization designed for the three-fold mission of gaining air superiority, isolation of the battlefield and direct cooperation with ground forces in the battle area.

5. The Tactical Bomber Command is a striking force of light and medium bombers designed to meet the requirements of concentrations on certain types of targets within their range where fighter-bombers cannot carry the required bomb weights

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and which do not justify the utilization of heavier strategic striking units.

6. The Air Defense Command is an organization designed as an active defense agency for protection of rear areas and installations. Like the Tactical Air Command it will have the essential aircraft and necessary radar aids in both detection and control of aircraft, and an active anti-aircraft defense complex operating as a part of it.

7. The Engineer Command plans, builds and maintains all necessary air installations, and renders such other assistance to the air effort as falls within its capabilities.

8. The Air Service Command is set up to perform those functions of supply, maintenance and transport for air force units which will permit them to accomplish their tactical mission. In addition, the Air Service Command performs certain liaison functions with other arms and services, which will insure close cooperation with the supply and service agencies of those organizations.

9. The Troop Carrier Command is designed to perform its primary function of transportation of airborne troops and its secondary mission of transporting supplies and materiel in furtherance of the overall objective of the TAF. It will have the necessary troop carrier units assigned.

10. From the factors outlined in the introduction, and further from considerations of the essentials of the structure of a TAF, it must be concluded that the components outlined above are requisites in building an air complement of any task force comparable to an Army effort or greater. Other factors will of necessity influence the numbers and types of smaller tactical and supporting units to be assigned. It is essential that the framework be established in planning, however, to permit the full utilization of all the resources of a TAF at the earliest moment.

III. TACTICAL AIR COMMAND

11. Tactical Control Group. The TAC will include a Tactical Control Group composed of four or more squadrons and a Group Headquarters. One squadron should operate a Tactical Control Center; two or more squadrons should be equipped with heavy type radar, micro-wave early warning (MEW) or V-beam radar for operation of Forward Direction Posts (FDP) and auxiliary control units, light warning units, ground observer posts and such other detection devices and controls for aircraft in flight as may be necessary. In addition to the above squadrons, there should be a communications squadron within the Tactical Control Group to install and maintain group communications facilities. The organization of the Tactical Control Group is cellular in structure to facilitate ease and economy of operation. The Tactical Control Center should be equipped with duplicate operations rooms and communications facilities to permit rapid and uninterrupted movement of the center to conform with ground movements. With the above, the TAC is capable of handling the air defense of the immediate battle area, of controlling friendly aircraft on offensive tactical missions and of offering assistance to our own air units. In planning, the minimum of a Tactical Control Center, a communications squadron and one tactical control squadron are considered necessary for an Army or smaller Task Force.

12. Signal Battalion. In order to complete the communications requirements of the TAC, a Signal Battalion, Separate, TAC, is necessary. This Battalion installs, operates and maintains all communications facilities at TAC headquarters,

and installs and maintains wire lines from TAC headquarters to operational elements of the command. The Battalion should have in addition to a Hq & Hq Detachment, one Hq Operations Company, one Outpost Operations Company, and two Light Construction Companies. These units may be augmented by assignment of cellular teams from T/O & E 11-500, as the tactical situation requires. The above organization applies when the entire TAC is employed, and may be as flexible as necessary to fulfill its mission. During the initial phases of a task force operation, or in planning the air complement of a task force smaller than the army, part or all of the functions of the Signal Battalion, Separate, TAC, may be performed by the Tactical Control Group.

13. Tactical Units. Tactical units of the TAC are composed of fighter-bomber type aircraft. These units may be organized into Wings to facilitate control, activity or administration, as required. For special purposes, light or medium bombardment aircraft may be assigned to the TAC. This flexibility provides for a well balanced tactical force for initial phases of task force operations, as well as for planning a balanced air complement to a task force smaller than the army.

IV. OTHER AIR COMPONENTS OF TACTICAL AIR FORCE

14. Air Defense. The air defense of the battle area is normally the immediate responsibility of the TAC, while the Air Defense Command of the TAF is responsible for the defense of the entire TAF-Army Group area.* Both organizations will contain fighter aircraft, antiaircraft artillery and necessary warning, detection and control equipment. A discussion of the employment of AAA in both the TAC and the Air Defense Command will be made later.

15. Reconnaissance. A very important and vital component of the TAF is its reconnaissance units. These are divided into two main types, photo reconnaissance and tactical reconnaissance. Photo reconnaissance and accompanying photo technical units must be retained at the TAF level in order to secure maximum utilization of their capabilities.* These units fulfill high and medium altitude photographic requirements of the TAF and the corresponding ground force headquarters. Normally, one photo reconnaissance group can fulfill these requirements. Tactical reconnaissance fulfills required low and medium altitude visual, photographic and electronic reconnaissance. These units are assigned to the TAC because they give primarily front line coverage as well as provide a means of adjusting artillery and naval gun fire. Normally, one tactical reconnaissance group can fulfill these requirements. For planning purposes, at least one tactical reconnaissance squadron must be moved into the task force area as soon as facilities can be made available.

V. GROUND AIR DEFENSE

16. Areas of responsibility. a. The air defense of the entire areas of both Army Group and the TAF is the responsibility of the TAF through its Air Defense Command. The Air Defense Command consists of an air warning system, fighter aircraft and AA artillery. Control of the ground-commanded AA units assigned or attached to ground forces is effected through the AAA radio net and the Air Warning radio net, as well as by staff coordination at the Army Group-TAF and the Army-TAC levels. Air Force AA units defending Air Force installations within the Army Group area are completely under the command and control of the Air Defense Command.

b. While air defense as a whole is the responsibility of the Air Defense Command, it is essential that ground force units have AAA under their command and control to defend their own installations. Such AAA units are in fact commanded,

emplaced and controlled by ground force commanders and are utilized to supplement the means of the Air Defense Command. In order to attain coordination however, and to prevent them from firing on friendly aircraft, they are tied into the Air Defense Command warning and control systems, and that headquarters has authority to restrict fire and illumination. This system gives the ground units active protection under their own control, provides for the use of AAA against ground targets where desirable, and at the same time insures coordination and the safety of friendly aircraft.

c. TAF is teamed with Army Group, and if the latter moves, the former follows. Eventually the area of responsibility of the TAF becomes too extensive for proper air defense coverage. At this time Theater Air Force must take over the air defense of areas behind the capabilities of the TAF.

17. AAA Weapons. a. AA defense of small installations is performed by the 40 mm gun teamed with the M-51 quadruple .50 calibre machine gun, extremely mobile and effective weapons, while AA protection of large installations such as permanent air bases, air depots, etc., is performed by 90 mm guns. All such guns however, are so located that all fields, small and large, are supported by at least one 90 mm battery with its radar.

b. Barrage Balloon units provide protection for fields and installations against low flying enemy air and air missile attack.

c. Searchlights, while more efficient than ever before, have in part been supplanted by radar. No longer is the searchlight beam necessary to AA in hitting an enemy air target. In the recent war, about 65% of searchlight work was homing missions to guide aircraft back from combat. Until radar homing devices are further developed, we must retain searchlights.

18. AAA Organization and Operation. a. The Air Defense Command, through its AAA Headquarters performs the command, staff and planning functions of all AAA defense of the area as outlined in par 16 a, above.

b. As a basis for planning, one AA Brigade may be assigned to the Air Defense Command for each TAC in the TAF.

c. Automatic Weapons Battalions (AW) consisting of 40 mm guns and M-51 machine guns, may be assigned to the AA Brigades on the basis of one per two tactical groups in the TAF. This affords a ratio of one-half battalion (two batteries) per air field.

d. AA Gun Battalions (90 mm) may be assigned to the Brigades on a ratio of one per two AW Battalions, to permit protection of airfields on the basis of one battery per field.

e. One Barrage Balloon Battalion may be assigned to each AA Brigade for such use as deemed necessary at locations requiring such protection against aircraft or missiles.

f. Searchlight units may likewise be assigned to the Brigade on the basis of one battalion per three tactical groups in the TAF, to provide one-third battalion, or one battery, per air field.

g. All above ratios of AAA units are considered minimum and will be increased when necessary, depending on the enemy air capabilities, the size of the area defended and the terrain surrounding the airfields and other defended points.

h. If facilities permit, the Tactical Control Center

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will contain an AA Operations Room, with control boards kept up to date from the main control room's filter board. Operating in the AA room will be staff controllers of AA artillery, barrage balloons and searchlights. If space does not permit a separate room at the Tactical Control Center, this AA Operations Room will be set up at a separate location but will maintain liaison officers at the filter or control boards.

19. Units for Task Force. a. Based upon the above ratios, and assuming a typical Army Task Force, TAF units which will be with that task force will include ont TAC. With the latter will be included one AAA Brigade from the Air Defense Command. This Brigade will command and control all AA units of the Air Force assigned to the task force, under the overall command and the operational control of the Task Force Air Defense Command. Likewise, operational control will be maintained by the Task Force Air Defense Command over the ground-commanded AA units assigned or attached to ground elements of the taskforce. The Task Force Air Defense Command, whose headquarters comes from the Air Defense Command of the TAF, and which operates under the TAC assigned to the task force, will furnish the air warning service and fighter support necessary to air defense in the manner described in previous paragraphs.

b. Anti-aircraft artillery units--AW, Gun, Barrage Balloon and Searchlight--will be assigned to the Brigade on the basis given in par 18, above, as a minimum. Under no circumstances, however, should the AA Brigade with the air units of this task force have less than five (5) AW Battalions, three (3) 90 mm Gun Battalions, one (1) Barrage Balloon Battalion and two (2) Searchlight Battalions.

c. For smoke screening, if the task force's mission requires it, there will be assigned to the task force Air Defense Command, one (1) Chemical Smoke Generating Company.

VI. ENGINEER UNITS

20. a. The mission of the engineer components of the Air Force is to build and maintain airfields and such other structures and projects as will facilitate the accomplishment of the mission of the Air Force.

b. The overall direction and command of the engineer troops and engineer effort is vested in the Engineer Command; an agency operating directly under the TAF. The Commanding General of this organization will normally double as the staff engineer of the TAF itself.

21. a. Basically the Engineer Command is built upon the Aviation Engineer Battalion, organized into regiments (or groups) of three to four battalions each, and where necessary into brigades of three to four regiments. This Battalion is a compact unit which is self sufficient administratively and which is very nearly so technically. It is especially designed and organized for the construction, repair and maintenance of air fields, but it can also function in any general construction project.

b. In addition to the Aviation Engineer Battalion there are several smaller supporting types of unit which the Command will need. The maintenance company performs third and fourth echelon maintenance on the specialized construction equipment with which the battalions and regiments are equipped. Experience has shown that one such company can in ordinary circumstances support a force of about nine battalions. The dump truck company as the name implies supports the aviation battalions on projects where large quantities of earth and rock are to be moved--a common occurrence in airfield construction. Ordinarily one such company per three to four battalions is

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considered adequate. If the enemy possesses any air power worthy of the name, camouflage will be an important consideration in all airfield construction. For this purpose the Camouflage Battalion is provided. It is not properly speaking an operating unit, but is capable of being broken down into small operating and advisory detachments, and as such can handle numerous installations. A signal company to handle the widespread communications necessary and one or more MP companies to handle prisoner of war labor, complete the organization of the Engineer Command. A chart (ANNEX II) showing a typical organization is attached.

22. The structure of the Engineer Command discussed above is designed to provide engineer and construction service to a TAF operating in the area of and with an Army Group. In the formation of a task force of smaller size, e.g., an Army or equivalent, obviously the TAF component will need engineer support from the earliest stages. The exact structure of the force providing this support will depend too greatly upon the terrain and the existence or non-existence of developed airfields in the area to be seized to allow the setting up of a planning yardstick in any but the broadest general terms. The planning of the base development as a whole will include air field construction and/or rehabilitation, and in practically every case the shipping requirements will limit the engineer strength available to the task force. It is believed however, that one regiment of three to four battalions will be the minimum that should be considered as initial engineer support to the air element of a task force approximating army size.

VII. SERVICE AND SUPPLY UNITS

23. a. Within the TAF, service is provided by two general types of units; the Air Service Groups which are in the command chain and operate directly with the tactical groups, and the units of the Air Force Service Command. The first type provides supply maintenance and transportation services to the limit of its ability, operates on the same airdrome as the supported tactical group, and in fact is a part of that Tactical Group.

b. The Air Force Service Command is an agency of the TAF and its mission is to support and supplement the activities of the service groups. It exercises technical supervision over these units and performs maintenance, supply and transportation services which are beyond their capabilities. The Service Command's operating agencies are depots both base and general which include maintenance and supply units of all types, and transport units.

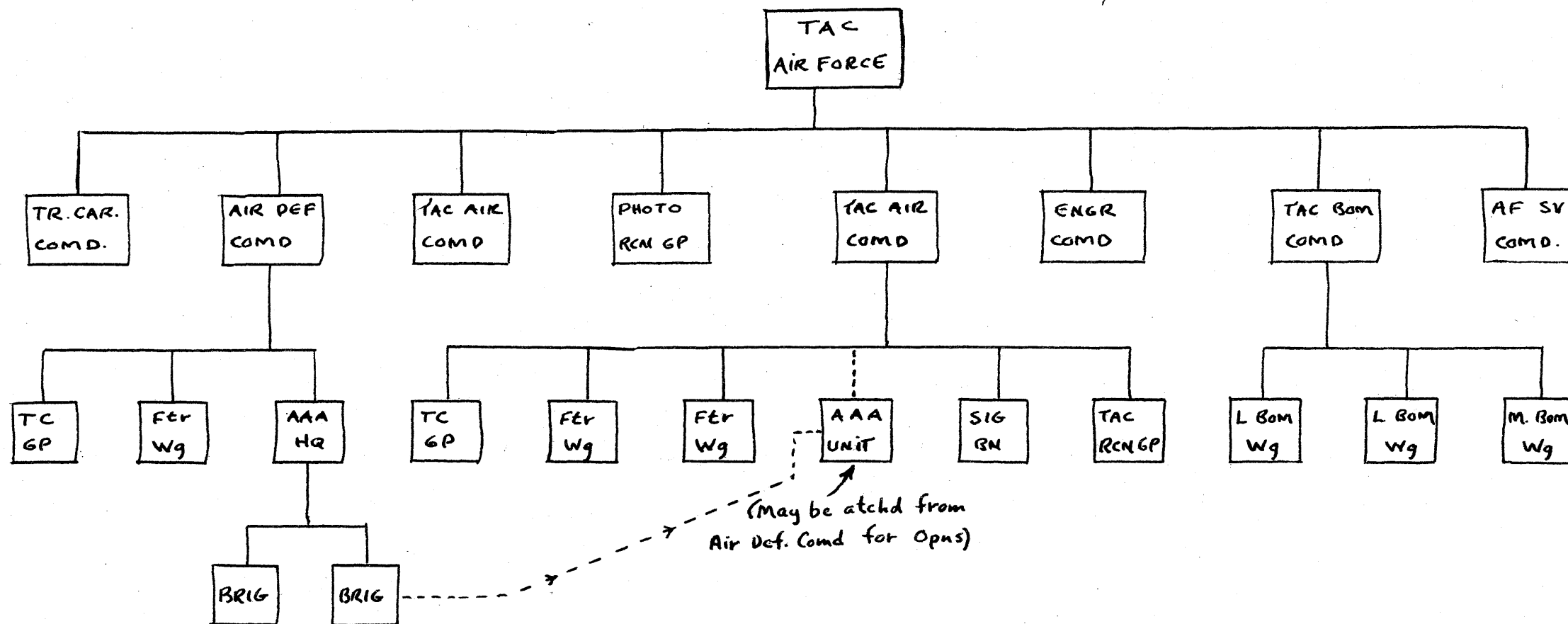
c. Wherever and whenever ground force and/or Com Z installations are available to the using TAF units, these are utilized for all supplies and services common to both ground and air units, and air force depots will handle only supplies peculiar to the air forces.

24. The structure of the Air Force Service Command as to numbers of units, i.e., depots, transport units, etc., will depend largely on the physical extent of the area in which the TAF is operating, the communications net available and the extent to which ground force and/or Com Z facilities can be utilized, as well as the overall size of the TAF. Generally one Air Force General Depot operating in the area of each TAC or similar tactical unit is considered normal, while transport should be available to lift an average day's supply from the appropriate depots to the using airfields in one trip. A typical Tactical Air Force Service Command is shown on the attached chart (ANNEX III).

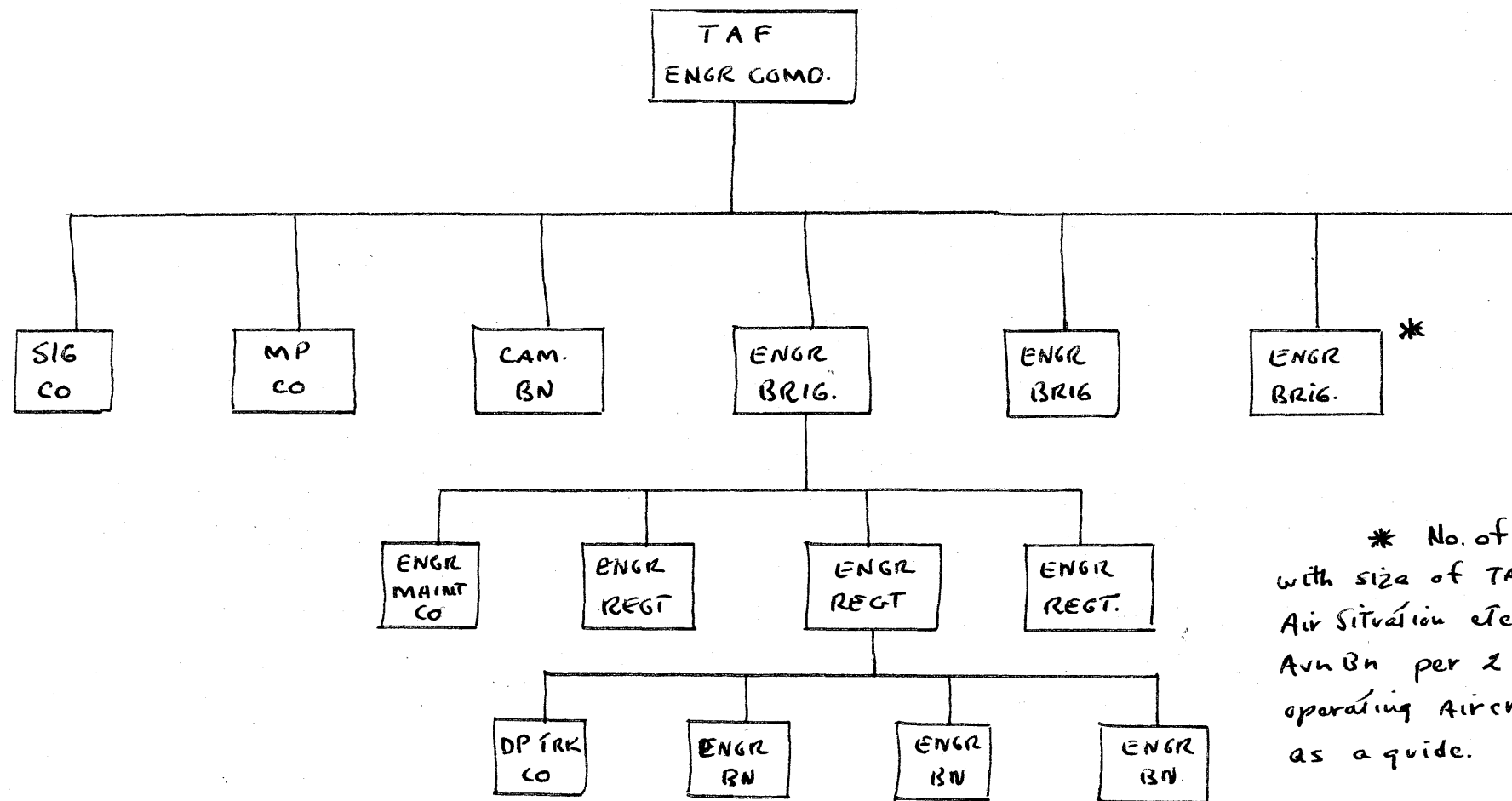
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25. Regarding the service elements of the air component of a task force approximating army size, it is probable that one Air Force General Depot handling only supplies peculiar to the air forces will suffice in the early stages. It is certain that common supplies can and will be made available by ASCOM or other comparable units, though transport on the same basis as discussed above should be available to the Air Force units.

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ANNEX I to APPENDIX "A"



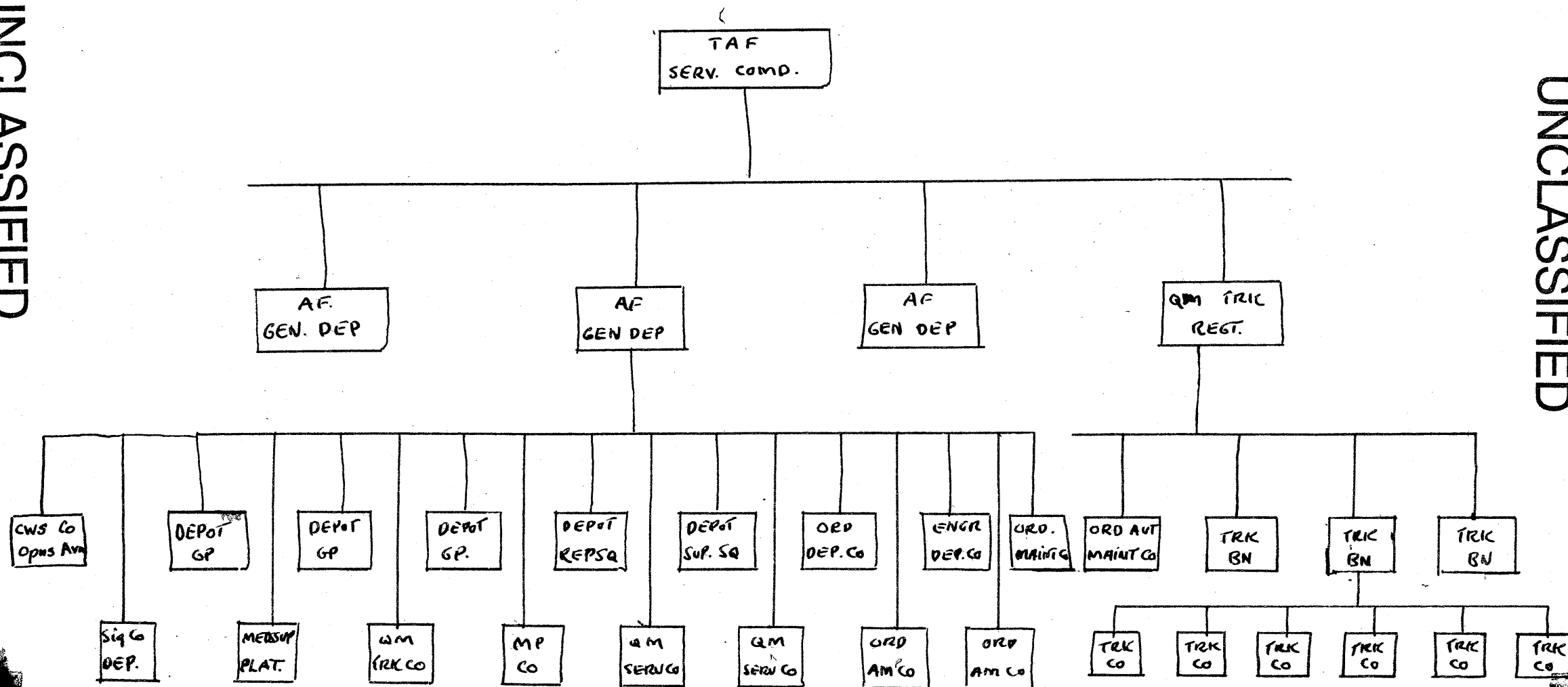
* No. of Brigades will vary with size of TAF, Terrain, Enemy Air Situation etc. Basically one Engr Avn Bn per 2 Tactical Groups operating Aircraft may be used as a guide.

ANNEX II to APPENDIX "A."

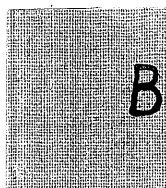


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ANNEX III to APPENDIX "A"



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APPENDIX B
to
ANALYTICAL STUDY
THE STRUCTURE OF THE TACTICAL AIR FORCE

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