

TACWAR # 2

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TACTICAL WARFARE STUDIES

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(Recommended to USAF/ASD and incorporated in ASD
long range plan for ASM-X and Close Air Support Missile [CASM])

1. OVERALL OBJECTIVE

Determine requirements for and evaluate capabilities of weapons to accomplish support fire, interdiction fire, and air superiority missions in a largely non-nuclear limited war.

2. INTRODUCTION

In the study of the tactical war, the number of variables is so large, even for very limited engagements, that only superficial results are possible if the entire problem is addressed directly. Hence, it is incumbent to break the overall problem into its elements for purposes of analysis.

The "whole" tactical war is usually composed of at least two of the following:

GROUND WARFARE

AIR WARFARE

SEA WARFARE

in each of which two or more services are involved. Unfortunately the number of variables in each of these topics is only slightly smaller than that for the "whole" war and leads too easily to studies that are specific service, or launch platform, oriented.

A sensible approach to general purpose missile requirements makes the studies target oriented, rather than launch platform oriented, which leads to studies of weapons to be used against:

LAND TARGETS
AERIAL TARGETS
SEA TARGETS

On this basis, the studies to be undertaken are combinations of the following elements

- A. Support Fire in the direct engagement zone within conventional artillery range (~25 n.mi.) of the Forward Edge of the Battle Area (FEBA).
- B. Interdiction Fire against surface targets for the purpose of degrading capability of committed forces. Generally beyond 25 n.mi. from the FEBA, and includes defense suppression as a corollary mission.
- C. Strategic Fire against surface targets for the purpose of degrading the hostile overall capability and the will to fight.
- D. Air Superiority Operations including engagement of both aerial and surface targets contributing to enemy's capability to deny our effective use of air space.
- E. Air Defense engagement of aerial targets directed against our forces.
- F. Control of the Seas operations to enable our use and prevent enemy use of navigable waters, both surface and sub-surface.
- G. Reconnaissance operations to develop targets and conditions for use of weapons in the above contexts.

Work statements for each of these studies are identified as sub-tasks which are functional in nature. As such, they relate to what the nation logically should do to provide an adequate future defense posture. These studies will provide a better U. S. Level of coordination and high-light system commonalties between services.

When substantive results are obtained from study of the pertinent sub-tasks, these elements will be drawn together and examined in the context of the whole tactical war to see if the conclusions drawn from the sub-studies really make sense.

Study of the areas mentioned briefly above is required to address the questions of immediate interest, which relate to Advanced Stand-Off and Close Air Support weapon requirements.

3. ADVANCED STAND-OFF WEAPON REQUIREMENTS

Examination of requirements for an Advanced Stand-Off Weapon necessarily includes study of Interdiction Fire, Strategic Fire, and Defense Suppression as a contribution to these missions, or to the air superiority mission. A fourth important field for investigation includes both the expected penetration environment as it affects weapon system requirements and the survivability and operability of the complete weapon system in the hostile environment. The end results to be expected of such studies are a specification of the general operational characteristics of an appropriate system (e.g.: range, warhead size, accuracy, reaction time).

Independent work is already underway on a study of Interdiction Fire and a suitable analytical methodology has been developed. The most critical factors bearing on weapon requirements definition have been identified as, (1) relative target values, (2) expected levels of aircraft attrition, and (3) target acquisition probabilities. An acceptable initial hypothesis as to target value has been developed and quantified; work is underway on prediction of attrition levels; methodology for analysis of target acquisition remains to be developed.

An initial program of computer runs utilizing this developed methodology will yield:

- A. A general appreciation of the value of interdiction fire in various scenarios and under varying battlefield conditions.
- B. An indication of required operational characteristics of suitable interdiction weapons.
- C. Identification of areas of sensitivity of above results to assumptions and input values.

A supplementary program of computer runs, based on revised and more detailed input, will further detail operational characteristics and explore those areas identified as sensitive.

Strategic fire has as an objective a relatively long-term erosion of the enemy's capability and will to conduct military operations. It will generally be addressed to fixed, hard, heavily defended targets - - those most demanding of a high-accuracy stand-off weapon. An initial effort in this field, considerably smaller than that devoted to Interdiction Fire but employing similar methodology and much of the same data base, will yield:

- A. A general appreciation of the value of strategic fire in various scenarios, and of the volume required for decisive results.
- B. An indication of required operational characteristics of suitable strategic fire weapons.

Temporary or long-term suppression of surface-to-air defenses is a necessary adjunct to most strike missions. Stand-off missiles may be applicable in this role. The utility of temporary defense suppression will be appraised in the Interdiction Fire Study described above; tactics and weapons for defense suppression will be examined in the penetration studies.

Penetration studies will be performed with a methodology already substantially developed, but subject to further improvement, and will produce the following results:

- A. Relative survival probabilities for aircraft and missiles as a function of: defense type and disposition, defense doctrine, depth of penetration beyond FEBA, and offense tactics.
- B. Defense weapon performance parameters adjusted for mutual consistency and projected for state-of-the-art development.
- C. Projection of likely air-defense levels and deployments in various scenarios, based on hostile force-mix studies.
- D. Impact of attrition on capability of friendly force mix with comment on "acceptable" levels by aircraft type.

4. CLOSE AIR SUPPORT WEAPON REQUIREMENTS

Examination of requirements for and on CAS weapons can be accomplished by a Support Fire Study at a level of effort similar to that contemplated for the Interdiction Fire Study. The developed methodology has already been used for study of CAS weapons cooperating with ground-based fire means, and it will be applied as described above for the Interdiction Fire Study. The target valuing rationale will be modified to reflect the lack of a time lag factor in results of weapon application.

Mix studies will, of course, include all methods of delivering support fire, surface as well as air launch. In addition, sub-study attention will be devoted to the difficult problems of air-ground coordination and limitation of collateral damage.

5. TARGET ACQUISITION

Reconnaissance and target acquisition in day/night and all weather has been the perennially unresolved problem of tactical warfare and without doubt will remain so for some time to come. A comprehensive study of this problem is warranted; however, considerable thought will have to be devoted to the problem of what to study before it can be undertaken.

For the moment, the problems will be reviewed in order to arrive at reasonable values of target acquisition probabilities for use as inputs to the capability model computer program for the fire studies contemplated. The parametric effects of target acquisition on target selection and attack feasibility will be investigated. The sensitivity of weapon requirements (e.g., reaction time) to target acquisition probabilities will also be investigated. These considerations lead to a reasonable approach to the broader study.

6. INTERRELATIONSHIPS

The total requirements in terms of type and quantity of Close Air Support and Advanced Standoff Weapons cannot be established without consideration of the air war as a whole (See Fig. 1). The remaining elements of the air war, not already mentioned above, are the primary mission of Air Superiority and the supporting missions in Air Defense and Control of the Seas. Each of these elements will be considered to the necessary level. The concurrent requirement to be able to shift to use of nuclear weapons while engaged in non-nuclear tactical war will be investigated.

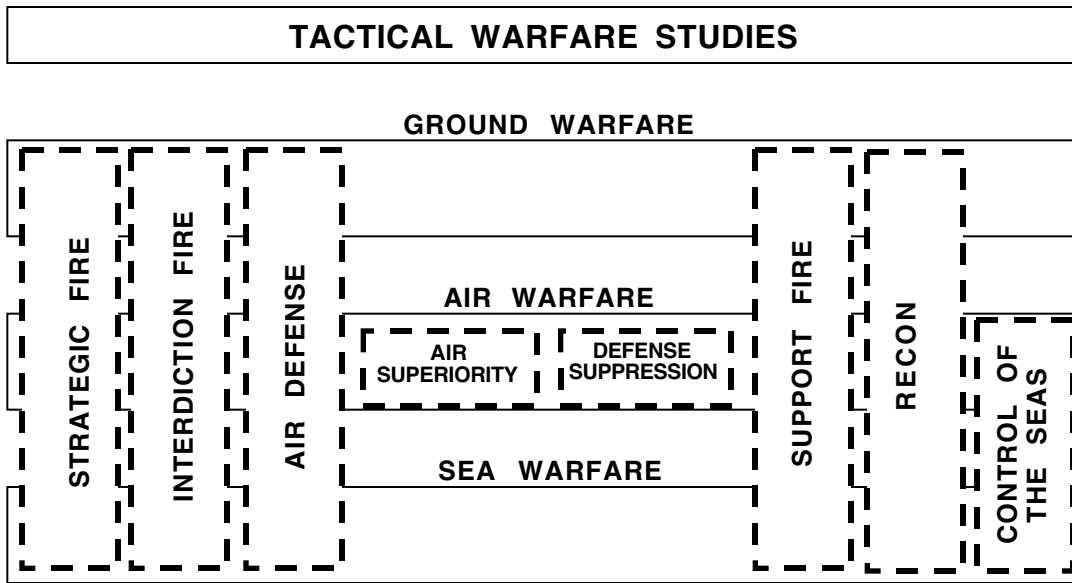


Figure 1 – Air Warfare Interaction with Tactical Warfare

7. ANTICIPATED RESULTS

The study plan presented will result in at least partial answers to the typical questions listed in Figure 2, and provide a bank of information that enables a logical approach to force mix requirements.

TYPICAL QUESTIONS

1. FIRE VOLUME REQUIRED TO BE MEANINGFUL IN COMBAT ZONE.
2. SENSITIVITY TO TARGET TYPE. (TARGET VALUE)
3. WEAPON REACTION TIME AND RANGE REQUIREMENTS.
4. WARHEAD TYPES AND SIZES REQUIRED.
5. WEAPON VULNERABILITY VIS-À-VIS CAPABILITY.
6. ALL WEATHER ADVANTAGE
7. PROS & CONS OF SURFACE LAUNCHED VS. AIR LAUNCHED WEAPONS
8. PROS & CONS OF MODULAR VS. INDIVIDUALLY OPTIMIZED WEAPONS.
9. SIGNIFICANCE OF MISSILE COST.
10. TARGET RECONNAISSANCE REQUIREMENTS.
11. PROBABILITY OF TARGET (AIM POINT) ACQUISITION. (THRESHOLDS)
12. MISSION SENSITIVITY TO RECONNAISSANCE LACUNAE.
END OBJECTIVE
13. WEAPON REQUIREMENTS

Figure 2 - Typical Questions

8. PROGRAM PLAN & FUNDING LEVEL

A series of functional studies is to be undertaken on a continuing basis with the overall objective of establishing future weapon type and mix requirements. The initial objective of these interrelated studies will be directed to definition of Advanced Stand-Off and Close Air Support weapon requirements. This, in turn, defines the order in which specific investigations will be undertaken during the next 12 months. See Figure 3.

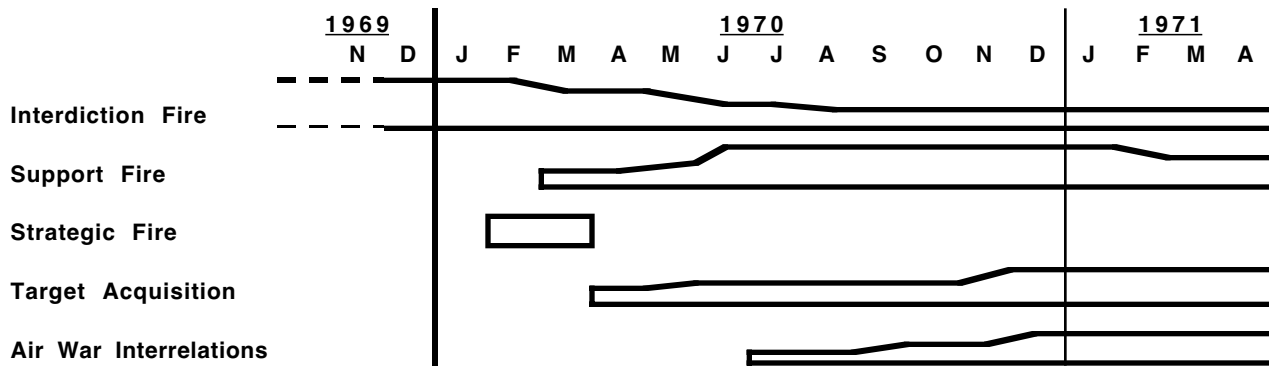


Figure 3 - Program plan

Estimated Annual Price Level is \$ 670,000 (1969 dollars) with no "what if" contingency plus Air Force Management funding. A suitable contract arrangement would be a continuing level of effort contract funded on a yearly basis and renewable. Monthly informal meetings will review progress, discuss problems encountered, and verify the plan for the next period. Aperiodic technical reports will be issued as warranted by results. This arrangement provides the long term benefits derived from continuity of competent personnel and an available capability to address "what if" questions of immediate interest.