

TACWAR # 192

14 June 76

THE UTILITY OF TACTICAL AIR STRATEGIES

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## 1.0 OBJECTIVE

To develop methodology suitable for evaluating the relative worth of varying depths of penetration in Tactical Air operations; and to demonstrate the utility of the methodology developed by comparing stand-off and conventional (aircraft with penetration aids) concepts for Interdiction in a European scenario.

## 2.0 PROBLEM

The proliferation of effective ground-based defenses makes penetration of enemy airspace substantially more hazardous than in previous conflicts. As a result of this higher cost the tactical value of penetration needs to be re-examined and the relative value of close support, interdiction, and deep strike operations re-evaluated in the light of new technological means such as stand-off missiles, remotely piloted vehicles (RPV's), and cruise missiles.

Although many technical concepts have been put forth for future applications of air power, there has been no credible method or rational basis for evaluating the relative merits of the sometimes disparate concepts.

In the broadest form then a methodology is needed to develop evidence on which a DoD Investment Strategy can be based. Concentrating first on Tactical Air, one would like to evaluate the utility of penetration for three bands beyond the FEBA, characterized by 1) Close Air Support, 2) Interdiction, and 3) Air Superiority / Deep Strike Functions. Then to compare the relative worth of air penetration concepts such as (1) aircraft employing conventional tactics and penetration aids, (2) Stand-off Air Power, (3) RPV's/Cruise missiles, (4) etc.

### 3.0 GENERAL APPROACH

#### 3.1 Value Aspects

In the broadest form there are four aspects of value that should be examined. These are the value of:

- a. Target Destruction
- b. Suppressive Effect
- c. Leverage
- d. Intelligence

##### 3.1.1 Target Destruction

Potential targets should be described as to Value, Signature, and Vulnerability. The inventory of potential targets should be drawn from a complete description of Red Order of Battle and Strategy. Values can be assigned by our valuing methods.

Signature establishes the probability that a target will be acquired under circumstances which permit useful attack.

Vulnerability is of importance, particularly in the case of such targets as airfields. The objective of an airfield attack should be either to deny operations for an appreciable period or to trade aircraft at a better ratio than can be attained in aerial combat. The high recuperability of airfield facilities, and the effectiveness of terminal defenses make such an objective very difficult.

##### 3.1.2 Suppressive Effects

The potential of aircraft to destroy targets may have a wide-spread suppressive effect on enemy operations. This will be true if the aircraft can "loiter" beyond the FEBA reaching for targets of opportunity. This in turn implies attaining at least a local and temporary superiority over air defense means.

### 3.1.3 Leverage

Because of the mobility and initiative possessed by strike aircraft it is very possible to cause Red to invest disproportionately in air defense. This will occur when Blue has a broad capability for penetration to various depths, and employs that capability with a flexible strategy.

### 3.1.4 Intelligence

It may well turn out that in the presence of dense anti-air defenses, Blue will be well-advised to attack deep targets by means other than strike aircraft. However, aerial reconnaissance may still be a major factor in obtaining information on enemy strategic and tactical capabilities.

## 3.2 Scenario Development

The design of a weapon is dependent on the targets and conditions with which it must cope; in other words, on elements of the scenario in which it must function. "Scenario dependence" is inescapable with refined and particularized design.

If we design for the wrong scenarios, national defense will be less effective than otherwise. However, unless the U.S. takes the initiative in tactical warfare (becomes the "aggressor") the scenario for which we are best designed will be the "wrong" scenario. The opponent will naturally take advantage of any weakness, rather than confronting strength.

For the above reason it is necessary to evaluate any weapon in the context of several different scenarios covering a spectrum of credible military involvements. These scenarios need not be "probable" or "predicted" - merely credible.

The major components of any scenario are four classes of information:

- (1) Red (Enemy) Force and Objectives
- (2) Blue (Friendly) Force and Objectives
- (3) Natural Environment (Terrain and Weather)
- (4) Political Constraints

It is necessary that the two forces be presented as balanced, both internally and in comparison with each other. Although battles and wars against overwhelming odds have been won, such an outcome is infrequent, especially in modern times. To study a situation in which Red possesses a superiority of greater than 3 to 1, or is pictured as investing a disproportionate effort in any one functional field, will probably lead to distorted and erroneous conclusions. Within such limits, however, there should be investigations of the effect of differing Red force structures. These should probably range from a generously-equipped force (like the USSR in Central Europe) down to one which relies more heavily on manpower and unconventional tactics (like Southeast Asia). One that is in between (like the Middle East) should provide a reasonable balance.

### 3.3 Study Limitations

- a. For the initial effort, it is proposed that the study be constrained to first investigate the European Scenario. It should be extended in subsequent efforts to consider the alternate scenarios which would have markedly different characteristics.
- b. It is also proposed to exclude investigation of the value of Intelligence in this initial effort. The methods proposed permit examination of the value of Intelligence, but the effort involved would undoubtedly be large with respect to that required to examine the values of Target Destruction, Suppressive Effects, and Leverage.
- c. This effort should be limited to a study of conventional, non-nuclear weapons because of anticipated difficulties in establishing political constraints.

#### 4.0 WORK STATEMENT

- Environment Definition will establish the ground rules, necessary assumptions, and the input requirements. The design of the analysis will be based on the principles developed in our descriptive model of combat.<sup>1</sup> The breadth of the analysis will define the conflicts to be considered; the scope will define the environmental interfaces; and the depth of the analysis will identify the processes and events to be included.
- Methodology Definition will provide development of a computational methodology and establish the Measures of Worth that will be utilized in the analysis. Suitable algorithms will be developed to express the processes and all variables will be identified. Limited input data, based as much as possible on credible experience data, will be acquired and a computational program conducted sufficient to check-out the model operation.
- Assess the utility or value of tactical air penetration beyond the FEBA.
- Provide descriptions of aircraft with conventional penetration aids, Stand-off Missiles, and RPV/Cruise Missile concepts and tactics including representative performance characteristics and limitations.
- Using the methodology and values developed, demonstrate the utility of the method by comparing the relative merits of two concepts.

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<sup>1</sup> *The Anatomy Of Combat* , 1996. See [www.AnatomyOfCombat.com](http://www.AnatomyOfCombat.com).

## 5.0 QUALIFICATIONS

The Descriptive Model of Combat is available and can be adapted to develop the computational methodology required.

Our approach<sup>2</sup> differs in several ways from methodology currently in use; for example:

1. A simple method of valuing targets has been hypothesized and applied.
2. The descriptive model of combat provides an understanding of the time and situation factors in the combat phase selected for analysis. This is aided by recognition of three separate levels of system performance and that the planning process of Command can be represented as a continuous generation of a decision matrix and identification of suitable courses of action.

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<sup>2</sup> See TACWAR #197, *The Crux of the Anatomy of Combat Analytic Approach..*