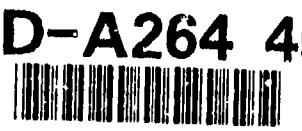

CORRELATION OF FORCES: THE QUEST FOR A STANDARDIZED MODEL

A Monograph
by
Major David R. Hogg
Armor

School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

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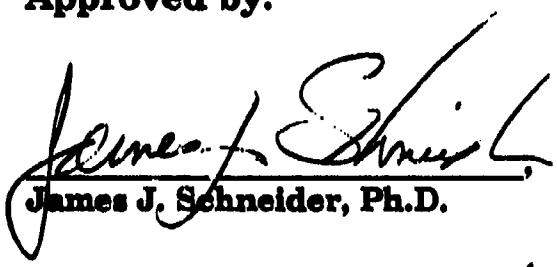

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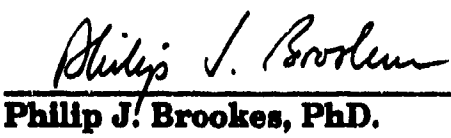

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ABSTRACT

CORRELATION OF FORCES: A QUEST FOR A STANDARDIZED MODEL by MAJ. David R. Hogg, USA, 96 pages.

Currently the United States Army does not have a standardized, realistic methodology for determining the correlation of forces (COF). This study investigates this issue by examining different methods currently being used to determine the COF.

The key to this study is the examination of how to measure combat power. The different methods to measure combat power range from a numerical count (bean count), to subjective and objective analysis of individual weapon systems and/or units. The critical base to any COF model is the values associated with the weapon systems or units.

Four different COF models are examined using specific criteria. The models studied are the National Training Center Model, the Command and General Staff College (CGSC) Model, the Theater Analysis Model (TAM), and the Historical Evaluation and Research Organization Model (HERO). The criteria applied to each of these models are flexibility, simplicity, definable values, and the ability to provide at least a 90% solution.

The conclusion of this study is that a standardized model is needed, that the model should be based on individual weapon system values (using Operational Lethality Index (OLI) factors), and that TRADOC, specifically Fort Leavenworth, should be the lead agency to establish this standardization.

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I. Introduction

The Nature Of The Problem

In developing a military course of action, one of the first things a commander and his staff will do is array friendly and enemy forces.[1] A staff arrays forces to produce a force ratio, which gives a visual picture to the commander of what forces he physically has, as compared to his opponent. From this point the commander and his staff adjust plans and task organizations to give the friendly forces as much of an advantage as possible.

War is not a 100% quantifiable event. In weighing the situation and the courses of actions, the commander must consider factors such as terrain, weather, morale, leadership, etc. Objective measurement of these values is not always possible. Subjectively they can be analyzed so that the commander has a solid feel for his chances of mission accomplishment.

The purpose of this study is to establish a quantifiable base from which a commander and his staff can extrapolate the subjective variables of war. This base will neither foretell the future nor guarantee battlefield results. It will, however, give the commander and his staff a solid feel for their combat capability relative to their opponent's.

Direction Of Research Effort

The focus of this paper is to review, analyze, and identify the best method to use in determining the correlation of forces (COF) between two military opponents. I will analyze four different force ratio models, examine the feasibility of the different models based on a fixed criterion, offer a recommendation for the most appropriate method for

determining the correlation of forces, and discuss how to apply the model from start to finish.

Research Question

What would be the basis and structure for a practical, standardized model used to develop correlation of forces? This primary question lends itself to the following subsequent questions that will be addressed in this monograph:

1. How do you measure combat power? The base of any system used to evaluate force ratio is the values given to the weapon systems and/or units. Combat power can be measured with a numerical count of weapon systems/units or with relative values based on subjective analysis. The system could also use quantitative values based on objective analysis or a combination of all the above. This paper will look at the merits of each technique to identify the most reliable.

2. Is a standardized method needed? This study will show the need for a standardized model. I will examine the basis and structure of existing models and discern the most appropriate one.

3. What should be the structure for that model? A key step is the identification of the base of measurement (relative or quantitative values). The structure of the model is important, specifically as to the level of detail the model will go. For example, do you measure all pistols and bayonets or just tank killing systems?

4. What about the effects of the environment? The environment effects the capabilities of weapon systems. In determining a course of action, terrain, weather, and temperatures are factors that could influence the outcome of a battle. Other relevant factors, such as

troop morale, leadership, and experience must also be explored. How to measure the effects of these factors becomes a problem, especially when trying to apply them in a simplified, yet effective model.

5. How do you use the model once it is identified? How do you package the above information into a usable, flexible model? There are many different techniques that can be used. This study will attempt to identify the best methods or combination of methods to produce a standardized force ratio model that can be used by any unit, at any level, and in any conventional situation.

Problems Associated With The Research

Standardization is always a problem. There are diverse ideas on what a standard model should be. Identifying a simple standardized model that gives realistic results is difficult because no one agrees on the bases of measurement.[2] U.S. planners consider the use of "hard" numbers, as used by the Soviets, to have too much detail or to be too complex.[3] The use of purely "subjective" data varies too much from method to method, depending on the use of either relative unit values or relative weapon system values.

This research effort will attempt to cut through the confusion and identify the best methodology to provide a realistic, 90% solution for the computation of force ratios.

Assumptions

The major assumption used throughout this study focuses around the force ratio needed for success in a given mission. Figure 1 shows the accepted force ratios needed to give a unit at least a 50% chance of mission success.[4]

FORCE RATIOS BY MISSION	
BLUEFOR MISSION	***BLUEFOR:OPFOR***
Deliberate attack	3.0 : 1.0
Hasty Attack	2.5 : 1.0
Movement To Contact	1.0 : 1.0
Deliberate Defense	1.0 : 3.0
Hasty Defense	1.0 : 2.5
Delay	6.0 : 1.0
Counterattack (flank)	1.0 : 1.0

These force ratios are based on mission type and will give a unit a 50% chance of success. The percentage of success can be increased based on the adjustment of forces, such as concentrating at the point of contact, piling on an isolated unit, or exploiting a flank.

Figure 1 - Force Ratios By Mission

Significance Of The Study

The arraying of forces and their corresponding force ratio is used to develop and evaluate different courses of actions.[5] It is the underpinning of what will eventually become an operations order or plan.[6] Because of the importance of this initial step in the decision making process, it is important to develop a solid base. Consequently, there is a need for a standardized method that does not rely solely on subjective analysis.

The method taught by the Command and General Staff College (CGSC) is purely subjective and based on a single, Soviet threat. The CGSC model does not really teach the future staff officer *how to* develop a correlation of forces model. It just states that you must establish a relative relationship between units.[7]

There exists a need in teaching a practical, systematic method of constructing a correlation of forces model that is flexible enough to accommodate any conventional threat, not just a Soviet one. This monograph will examine the various methods of measuring the correlation of forces and, by using specific criteria, illustrate which model is the most simple and effective to use.

To reiterate, this paper will not attempt to foretell the future. It will not guarantee success to the commander and it will not provide the 100% solution for force ratios. Instead, it will answer one of the basic questions in war gaming, i.e., what is the force ratio?

II. How To Measure Combat Power

Combat power is a numeric measure of the combat strength of a unit or combination of units.[8] "It measures the effect created by combining maneuver, firepower, protection, and leadership in combat actions against an enemy in war."[9] Combat power is also called combat potential (CP). When the CP of two forces are compared, it becomes the correlation of forces (COF) or force ratio. The COF or force ratio is the relative measure of strength between the two forces.

An example of a measurement of COF or force ratio is a blue force defending against a red force. The blue force has a combat power of 2 and the attacking red force has a combat power of 6. The correlation of forces or force ratio is 1:3 in favor of the red force. The COF or force ratio is only an expression of the relationship between the combat power of two forces. It does not specify or distinguish the method in which that combat power was measured.

When external factors such as surprise, morale, terrain, weather, leadership, etc.[10] are taken into effect, then the COF becomes the correlation of forces and means (COFM). The only difference between COF and COFM is that the measurement of combat power in COFM includes external factors that could effect the combat power of a unit.

There are several methods to measure combat power. The most common forms include the: bean count, subjective values, and objective values.

The bean count is a simplified method of expressing the combat power of a unit. In conducting a bean count, like weapon systems or units are considered equal.[11] An example would be the counting of ten US M1A1 tanks and ten Russian T-34 tanks. The combat power of the M1A1 tanks is ten and the combat power of the T-34 tanks is ten. The bean count would produce a COF or force ratio of 1:1. The inherent problems of using a bean count to determine COF is that it does not take into consideration the technological capabilities of the equipment or unit. Instead, all equipment and unit types are considered equal.

Another method of determining the CP of a weapon system or unit is through the use of subjective, relative values. In this method, combat power is measured against a weapon system or unit that is normalized. Normalizing is nothing more than establishing the base unit from which all other equipment of units will be evaluated. This base unit is given a value, normally 1.00. From this base unit CPs are assigned to the individual equipment or units. This provides a relative relationship based on the subjective evaluation of the equipment or unit being compared to the base unit. Once the CPs are assigned, the

determination of the COF is simply a matter of multiplication, addition and subtraction. The problem with subjective evaluation is that it does not necessarily give an accurate picture of the quantitative "worth" or CP of a weapon system or unit. These values will also vary in value depending on who is doing the subjective analysis.

The last method of determining the CP of a weapon system or unit is the use of quantitative values. Quantitative values provide a realistic measure on the "worth" or CP of a weapon system's technological capabilities. Quantitative values use either relative comparisons between like weapon systems, or individual values based on pure quantitative values.

The standard units of armament (SUA) is a objective method used to determine the CP of a weapon. "Each weapon is compared to a base weapon that, based on its technical characteristics, has been assigned a weight of 1."[12] From this the other weapons are given values relative to the base weapon. SUA uses objective values to determine the "worth" of a weapon system. The objective values observed at for a weapon systems are, range, rate of fire, reload time, probability of hit, probability of kill, speed, armor thickness, bursting radius of a projectile, fuel consumption, combat radius and central error probability.[13] There are two main problems with SUAs. The first is that SUA still reflects a subjective relative value, versus a straight objective value. The second problem is that you cannot find an agreement on what the SUA should be for a given weapon system.[14]

A method similar to SUA is the weapons equivalent weight values (WEWV). Like SUA, the WEWV is a value assigned to a weapon system

based on the weapon's technological capabilities, and it also used relative values to measure like weapon systems' combat power. The WEWV originated in the early 1970 by the Concept Analysis Agency (CAA).[15] These values, however, are no longer used or recognized as an acceptable means to measure a weapons system's combat effectiveness.[16]

A final objective method to measure combat power is the use of pure objective data based on equipment testing. This measurement provides an individual value for each weapon system and does not rely on any type of subjective comparisons or use of relative values. Instead, each weapon system is given a value based on technical capabilities similar to the SUA and WEWV, but without the subjective analysis.

There are many ways to measure the combat power or CP of a unit. As it is this measurement that allows the commander and staff to determine the COF for an engagement, the necessity for a solid value or base from which to compare the CP of two forces is imperative. This study will look at the different methods of measuring the CP of units and will provide an insight as to the most reliable, accurate and expeditious form of measurement.

III. Methodology

The methodology for this study is broken down into five steps. The first step is to identify to the reader that there is a need to standardize the method used in determining the correlation of forces. This will be done by giving a generic scenario and using four different methods to determine the force ratio. The results of this example will show the need for some type of standardization.

The second step will describe the major models being used today. The models that will be described are: the National Training Center (NTC) model; the Command and General Staff College (CGSC) model; the Theater Analysis Model (TAM); and the Historical Evaluation and Research Organization (HERO) Model.

The third step will establish a conventional mission scenario using two opposing forces. The scenario will have enough detail in it so that any of the models can be used. Some models will use all of the information provided, while others will use only bits and pieces.

The fourth step will analyze each model against the common mission scenario using the following criteria:

1. Flexible. For a model to be flexible, it must be able to be used against any threat. In addition, it must be able to adjust to any changes to the US Army Table of Organization and Equipment (TO&E).

2. Simple. Simplicity in a model is vital, But not so simple that the results are invalid. The model must be able to be applied by staffs at all levels, without computer assistance. This does not mean a model could not be developed that uses a computer, it just means that the staff officer must be able to compute the values with little more than a calculator, pencil and paper.

3. Uses Definable Values. The model must give objective, "hard" values to the different variables. These values must be based on either a relative, quantitative, relationship or straight, hard facts based on history, weapons testing or other such means. Guessing for the sake of guessing, or using a DELPHI technique[17] to gather data and determine values will not be considered in this study.

4. Provides a 90% Solution. The model must give a 90% solution in assessing combat power. The determination of the COF(M) does not need to be exact. As previously explained, this study does not attempt to predict the outcome of battle. It is attempting to give a commander and staff a solid base from which to extrapolate and plan. Therefore, the model must give at least a 90% solution to provide an accurate assessment of combat power.

After each model is analyzed using the criteria, a short synopsis will point out the advantages and disadvantages of each model. This will be followed by a short conclusion.

The fifth and final step will use a decision matrix to determine the best model and parts of the models that best supports each of the criteria. From these conclusions, analysis will determine if the best parts of the models can be combined to make a more effective model in determining the correlation of forces.

IV. Is A Standardized Model Needed?

The question of whether or not a standardized model or method for determining correlation of force is needed is a valid initial question. Currently, different organization use different models. The Combat Training Centers use one method, CGSC, and FM 100-15-1 (Draft) use another method, and, depending on what unit you are assigned to, you may use a totally different method altogether. So what? What is the impact of the lack of standardization? The following scenario will provide some insight to this question.

A U.S. armored (balanced) task force is conducting a deliberate attack to destroy a Krasnovian motorized rifle battalion(-) in a deliberate defense. The terrain is rocky desert, the temperature is hot/dry, and the attack is to be conducted at first light.

Figure 2 provides a synopsis of the organization of each unit (a percentage in parenthesis means that unit is at the percentage strength noted). (For a more detailed breakdown of the equipment in the organization and the details of the computation used for the different methods, see appendix A.)

Battalion Task Force	Krasnovian MRB(-)
Artillery	*Artillery*
1 - 155mm Bn (DS) - 24 Tubes	2-122mm Bn - 24 Tubes (75%)
1 - 4.2' Mtrs Plt - 6 Tubes	2-152mm Bn - 28 Tubes (65%)
	3-120mm Mtrs (40%)
Attack Helicopters	*Attack Helicopters*
None	1 ATK Sqdn - 4 hinds (60%)
Ground Forces	*Ground Forces*
Balanced Armor Task Force	MRB(-)
30 - M60A3s	4-T-72s
31 - M113s	13 - BMPs
3 - ITVs	3 - AT-5s On BRDMs

Figure 2 - Order of Battle

Figure 3 shows the results of the computations based on different methods of assessing correlation of forces. As you can see from the

figure 3, four different methods were used to compute the correlation of forces and four different answers resulted.

METHOD	COF RESULTS
A	1.21:1.00 (BLUEFOR)
B	2.38:1.00 (OPFOR)
C	2.11:1.00 (BLUEFOR)
D	1.30:1.00 (BLUEFOR)

Figure 3 - COF

The worst case was method B which gave the OPFOR a 2.38:1.00 advantage over the BLUEFOR. As a task force commander, you would be hard pressed to tell your people or your boss that you could accomplish this mission with these ratios. The minimum COF needed in this scenario is 3:1 based on the assumptions made earlier.

The best case scenario was method C, which gave the BLUEFOR a 2.11:1.00 advantage over the OPFOR. At first glance, the odds are indeed in the favor of the BLUEFOR, and is close enough to the 3:1 criteria that with a little adjustment in the plan, a narrower attack, etc., the COF could be increased. Unfortunately, what is not counted in Method C is the artillery and attack helicopters. Method C ignores these important combat multipliers in computing force ratios.

Why have a standard method for computing COF? Consider the fact that the above scenario was an actual mission given to a unit during

their rotation to the National Training Center.[16] The actual force ratio computed using the old NTC "meatball" method[19] was 2.5:1.0 in favor of the BLUEFOR. Once the regimental reserve and AT reserve were committed, the COF would drop to 1.65:1.00. These COFs do not include artillery or attack helicopters assets. The only systems the "meatball" method took into consideration was armor killing systems, AT5/TOW and above.

This example illustrates the wide difference among the different methods of determining the COF. Depending on the COF, a unit commander will modify his plans, ask for more assets and accept risk where he feels he can afford it. With the wide variation in the COF in the above example, using the COFs as a base tool to a plan appears to be dangerous.

If we can standardize the methodology of determining COFs, than all commanders and their staffs will have a more solid feel for what the COF really means. Everyone will be "on the same sheet of music." This is why we as an institution need to establish a sound, standardized method for the computation of the correlation of forces. The rest of this paper will devote its attention in determining just what methodology offers the best, consistent solution to determining correlation of forces.

V. Current Correlation of Forces Models

This section will explain the some of the different models used to determine force ratios. The advantages and disadvantages of each model will not be discussed at this time. The models that will be examined are the ones used at the National Training Center (NTC), the Command and General Staff College (CGSC), the Theater Army Model (TAM), and the Historical Evaluation and Research Organization (HERO).

NTC Model: The National Training Center has used a variety of methods to compute correlation of forces in the development of scenarios for the training of battalion and brigade size units. One of the methods used in the past was based on a bean count of only tank killing systems. These systems did not include weapons smaller than the AT-5 or TOW, and it did not include artillery or close air support (CAS).

The current model is based on relative values, with the M2/M3/BMP2 with a base value of 1.00. The relative weight's of the other weapon systems are based on lethality of the weapon system, according to NTC data. Figure 4 shows the relative values assigned to the weapons systems that are counted in determining force ratios. The

NTC CP VALUES

WEAPON	*VALUE*	*WEAPON*	*VALUE*
M1A1	1.4	AT5/TOW	0.8
T80	1.3	BMP1	0.7
M1/T72M1	1.2	AH64	0.7
M2/M3/BMP2	1.1	AH1/HIND	0.4
BMP1IP	0.9	MT12	0.3

Figure 4 - NTC Weapon CP Values

NTC model still does not take into consideration the effects of artillery or close air support.

To use the NTC model, the weapon systems of each unit is added up and multiplied by the appropriate CP value. The values are then added together to get an overall unit CP value. This value is then divided into the opponent's value to get the actual COF.

CGSC Model: The correlation of forces model taught at the Command and General Staff College is based on subjective, relative unit values. The model establishes a base unit (in ST 100-9 specifically, the BTR battalion) as a value of 1.00. All other units are then given relative weights based on a subjective comparison with the base unit.

Figure 5 shows the values assigned to specific units in relation to the BTR unit.[20] The Krasnovian forces are a fictitious force based on a Soviet organization. The Student Text cautions the potential staff officer that the values shown are for instructional use only. The Student Text states that the actual force comparisons are classified information and must be developed based on actual threat units and intelligence.[21]

To use the CGSC model, the staff officer first establishes the relative weights of units two levels down. Division would look at battalions and brigades at companies, etc.. The staff officer would then count up the number of units and multiply that number by its relative value. The totals are added up to give a unit value. The force ratio is determined by dividing one of the two forces into the other.

Theater Analysis Model (TAM): The TAM model is a computer based system which provides "sophisticated combat results . . . [while providing a] framework and mechanisms to simulate the effects of a

CGSC RELATIVE UNIT CP VALUES			
US Forces		**Krasnovian Forces**	
MANEUVER			
Lt. Inf Bn	0.50	AASLT Bn	0.60
AASLT Bn	0.60	BTR Bn	1.00
M113A3 Bn	1.50	BMP 1 Bn	1.50
M2 Bn	2.00	BMP 2 Bn	1.80
Sep AA Bn	1.00	AT Bn	1.00
M60A3 Bn	2.25	T64 Bn	1.45
M1 Bn	3.00	T72 Bn	1.20
M1A1 Bn	3.15	T80 Bn	1.56
Cav Sqd (Hvy Div)	1.50	Recon Bn	1.60
Cav Sqd (ACR)	4.00		
ACR	16.00		
Atk Hel Bn (AH-1J)	3.00	Atk Hel Sqd (HIND)	3.00
Atk Hel Bn (AH-64)	4.00		
ARTILLERY			
FA Bn (105mm, T)	0.75	2S1 Bn (122, SP)	2.00
FA Bn (155mm, T)	1.20	D30 Bn (122, SP)	0.80
FA Bn (155mm, SP)	2.50	2S3 Bn (152, SP)	2.25
FA Bn (203mm, SP)	2.75		
MLRS Bty	2.60	MRL Bty	2.50
MLRS Bn (Corps)	6.00	MRL Bn	5.00

Figure 5 - CGSC Unit CP Values

wide range of operational decisions."[22] The specific aspects of the TAM that this study will focus on is the calculation of the correlation of forces as adapted by Tradoc Analysis Command (TRAC), Ft. Leavenworth, Kansas.[23]

TAM measures the relative values of weapon systems by two standards, strength and fire power. Strength is the number of systems and Fire Power is the "unit's combat utility."[24] These two factors are

adjusted or modified based on the battlefield factors of terrain and mission.

The base unit of TAM is the system. TAM defines system as "a crew served weapon, a vehicle, or - in the case of infantry systems - a squad equivalent."[25] TAM looks at five major system categories in its evaluation of combat potential. Those categories are:

1. Armor Systems: "Any armored ground vehicle that is capable of firing a large caliber and/or rapid fire weapon while either on the move or stationary."[26]

2. Antitank Systems: "Any system whose primary objective is specifically to destroy armor."[27]

3. Artillery Systems: "Any system, towed or self-propelled, that is capable of indirect fire from stand off ranges."[28]

4. Infantry Systems: "Infantry is measured in squad equivalents rather than systems. A squad equivalent represents 10-12 men armed with the normal complement of personal weapons and light crew served weapons."[29]

TRAC's methodology assigns relative values to the individual weapon systems. The method assigns a base weapon system the value of 1.0. All other systems within the system's category is than assigned a relative weight based on the base value. For example, the M-1 tank is given the base value of 1.0. The user then subjectively determines that the M-60 tank has a value of .75, because the user feels the M-60 is only 75% as good at the M1. This process is done for all weapons in each of the major system categories (see figure 6).

TAM WEAPON CP VALUES										
Armor Systems		Anti-Tank Systems		Artillery Systems		Infantry Systems		ADA Systems	
M1A1	1.20	NLOS-AT	2.00	MLRS	3.00	US SQD	1.00	PATBAT	1.00
M1	1.00	AMS-H	1.20	BM21	1.50	WP SQD	0.70	SA7 BAT	0.80
T80	0.90	TOW	1.00	155MM	0.90	LANT SQD	0.60	HAWK BAT	0.80
T72	0.80	MILAN	0.90	122MM	0.70			SA6 BAT	0.30
T62B	0.75	AT6	0.70	105MM	0.50			PMS	0.12
M60	0.70	LOS-AT	0.60	4.2" MTR	0.30			STINGER	0.10
T55 MOD	0.65	AAWS-M	0.50	120MM MTR	0.30			SA13	0.05
T62A	0.60	SPG-9	0.50	81MM MTR	0.15			NLOS-AD	0.04
M2	0.60	T12	0.40	60MM MTR	0.10			LOS-F-H	0.04
M3	0.60	RPG16	0.30					SA16	0.04
T54/55	0.40	LAW	0.30					ZSU 23-4	0.02
BMP-2	0.30							ZSU 57	0.01
M113	0.05								
BTR60	0.05								
BRDM	0.05								

Figure 6 - TAM Relative CP Values

The next step in TRAC's utilization of the TAM's system is to determine the unit strength. This is nothing more than finding out the number of each weapon system a unit has based on its TO&E, and then multiplying the relative Firepower value of each system by the number of total number of systems. These system values are added together by category to get a system total. From this point the system totals are multiplied by terrain (clear, forest urban, hills) and mission (hasty attack, deliberate attack, hasty defense and deliberate defense) values to get an overall combat potential score (see figure 7). This process is done to both side to determine the combat power for a given situation.

Historical Evaluation And Research Organization (HERO) Model: HERO has established a system for evaluating and predicting the outcome of battles. This system is called the Quantified

TAM MISSION MULTIPLIERS				
TYPE MISSION	Armor Systems	Anti-Tank Systems	Artillery Systems	Infantry Systems
Hasty ATK	0.75	0.50	1.50	0.75
Delib. ATK	1.00	0.70	1.75	1.00
Hasty Def	0.75	0.70	1.50	1.00
Delib. Def	1.00	1.00	2.00	1.75
TAM TERRAIN MULTIPLIERS				
TYPE TERRAIN	Hasty Atk	Delib Atk	Hasty Def	Delib Def
Clear	1.00	1.00	0.90	0.80
Forest	0.50	0.70	1.25	1.50
Urban	0.40	0.60	2.00	3.00
Hills	0.50	0.70	1.50	2.00

Figure 7 - TAM External Factors

Judgment Method of Analysis (QJMA.) QJMA was developed by the Historical Evaluation and Research Organization, in collaboration with T.N. Dupuy Associates, Inc., as a means to measure and assess relative combat power.[30] It was also developed for determining the influences of different variables on the outcome of battle, outside of just the weapon systems themselves. In short, the QJMA is a war gaming model that replicates the effects of weapons and external factors to arrive at combat results. The major piece of the QJMA that this study addresses is the objective values assigned to combat weapon systems.

The base for the QJMA is the quantification of individual weapon systems' lethality or Theoretical Lethality Index (TLI).[31] The TLI is a strictly quantitative approach to assigning a value to a weapon system in order to determine the combat potential or power of a unit. The TLI takes into consideration the following weapon system factors: rate of fire, targets per strike, relative effect, range factor, accuracy, reliability,

mobility factor, radius of action factor, punishment factor, rapidity of fire effect, fire control effect, ammunition supply (basic load), ceiling effect. These values, when combined and computed, determine the TLI of a weapon system under ideal or laboratory conditions. The TLI for a non-mobile weapon system is determined by the following formula:

TLI=rate of fire x targets per strike x relative effect x range factor x accuracy x reliability

For a weapon system that has some form of mobility, the TLI is determined by:

TLI=[(rate of fire x targets per strike x relative effect x range factor x accuracy x reliability x speed x radius of action) + the punishment factor)] x (rapidity of fire effect x fire control effect x ammunition supply effect x ceiling effect)

Once the TLI for a weapon system is computed, the value is converted to an Operational Lethality Index (OLI).[32] The OLI value replicates the weapon system's lethality on the battlefield. The OLI is determined by dividing each TLI by a battlefield dispersion factor. The use of the dispersion factor changes the TLI value to an OLI value that realistically portray the weapons system's "proving ground value for weapon's effect."[33] In research conducted by the Historical Evaluation And Research Organization (HERO), they determined that there was a "historical, dynamic relationship involving firepower, mobility, and dispersion."[34] An increase in a weapon system's lethality required an increase in dispersion, which was adjusted for by an increase in the reliance of tactical mobility.[35]

The current dispersion factor is 5000, however, that value is currently being examined based on the results of Desert Storm. The dispersion factor for the coalition forces during Desert Storm was

determined to be 20,000 while the Iraqi forces fell in closer to 5000.[36]

To use the HERO model, the number and type of weapon systems for each unit (order of battle) must be determined. The model breaks down the weapon systems into the following categories: armored weapons, infantry weapons, artillery weapons, air defense, close air support, and antitank weapons. Once the number and type of weapons are determined, the user simply multiplies the OLI factor for each weapon system by the total number of that weapon system the unit has. Once the total number of weapon systems are converted to OLI, the total values are added up and the overall combat power of a unit is determined.

In addition to the OLI values, the HERO model is also capable of computing 73 different external variables to account for environmental and operational factors. This will be discussed in more detail later in this study. For now, the only concern of this study is the OLI values. The main point to remember about the QJMA model is that it is designed for war gaming on a computer to determine the outcome of battles or engagements. This study only deals with the specific aspect of computing the COF of two opposing forces.

VI. The Scenario

For the purpose of evaluating and comparing the different methods of computing COF, I will use a generic scenario with the following situation and units:

A US. Army brigade is conducting a movement to contact against a Samaran brigade[37] estimated to be at 100% strength. The terrain is

rock desert. The weather is wet, temperature mild, visibility clear. Neither side has air superiority, and the element of surprise is the same for both sides. Figure 8 show the general order of battle. Appendix C provides more detailed breakdown of the numbers and type of equipment for each unit.

GENERAL ORDER OF BATTLE	
U.S Army Heavy Brigade	**Samaran 754th Mech Bde**
Artillery	***Artillery***
155mm SP Bn (DS)	2S3 - 152mm Regt (DS)
155mm SP Bn (GS)	2S3 - 152mm Regt (GS)
	Lt. Arty Btry - 120mm Mtrs (DS)
Attack Helicopters	***Attack Helicopters***
None	None
Ground Forces	***Ground Forces***
2 - Armor Battalions (M1A1)	3-MechBatalions(BMP)
2 - Mech Battaions (M2)	1-Tank Regiment (T-72)
	1- Commando Company

Figure 8 - General Order of Battle

VII. Application Of The Models

This section will take each of the models previously described and apply them to the scenario. Each model will then be evaluated against the established criteria. An analysis will be made on the advantages and disadvantages of each model. All of the models will be compared using a matrix to determine the overall best.

The NTC Model

Figure 9 shows the values and the COF for the scenario using the NTC COF model.

NTC COMPUTATION OF COF(M)

U.S. HEAVY BRIGADE				SAMARAN MECH BRIGADE			
VEHICLE	*QUANTITY*	*VALUE*	*TOTAL*	*VEHICLE*	*QUANTITY*	*VALUE*	*TOTAL*
M1A1	116	1.4	162.4	T-72	35	1.1	38.5
M3	24	1	24	BMP1	117	0.7	81.9
M2	108	1	108	AT5	12	0.8	9.6
ITV (TOW)	24	0.8	19.2				
TOTAL VALUE =			313.6	TOTAL VALUE =			130

FINAL COF(M) VALUE IS 2.41:1.00 IN FAVOR OF U.S. BRIGADE

Figure 9 - NTC Computations

Application of Criteria For A Standardized Model

Flexible: The NTC model provides flexibility in that it assesses a value for each weapon system. This provides the user the ability to compute any force ratio for any given situation.

Simple: The NTC model is simple in that all that is required is the number and type equipment of a unit. From this point on it is a straight matter of simple math to determine the COF. The fact that the NTC model ignores artillery and close air support, seems to indicate that the model may be too simple in that it neglects the effects of key combat multipliers.

Definable Values: The NTC model has established values based on a relative relationship between key weapon systems. The list of weapons used is very limited and does not include artillery or close air support (CAS) weapon systems. The base for this model is a subjective,

relative relationships between all the key weapon systems on the NTC battlefield (minus artillery and CAS). All of these key weapon systems are compared to the BMP2/M2/M3. This means that tanks and attack helicopters are being compared to an infantry fighting vehicle. Each of these weapon systems have a specific purpose and use on the battlefield. Each one is different, yet they are being subjectively compared to one another. This is one of the biggest flaws with the values assigned to the weapon systems of the NTC model.

90% Solution: Looking at the overall scenario, the NTC model violates the 90% solution, because it ignores artillery systems completely. The model also does not provide an accurate portrayal of the lethality of the different systems because of the way it compares all weapon systems as if they were the same.

Analysis:

1. Advantages. The NTC model has one major advantage in that it is a flexible system because the model is based on individual weapon systems.

2. Disadvantage. The biggest disadvantages associated with the NTC model is that it does not include artillery or CAS weapon systems. This is a critical flaw in the model. Artillery is a major combat multiplier, and in fact the OPFOR's order of battle and tactics relies heavily on its use.[38] The NTC model fails the 90% solution criteria because its fails to consider artillery in the overall COF.

Conclusions:

The NTC model offers simplicity and flexibility, but it neglects key weapons systems, specifically artillery and CAS. The NTC model

does not pass the 90% solution because it does not consider these major combat multipliers. The data base is also subject to question because it is based on an NTC or MILES battlefield which is somewhat different than a real battlefield. The data base is also a relative comparison of all type of weapon systems regardless of their role on the battlefield. Because of these problems, the NTC model could not be standardized for use in the real world.

The CGSC Model

Figure 10 shows the values and the COF for the scenario using the CGSC COF model.

CGSC COMPUTATION OF COF(M)

U.S. HEAVY BRIGADE				SAMARAN MECH BRIGADE			
UNIT	*QUANTITY*	*VALUE*	*TOTAL*	*UNIT*	*QUANTITY*	*VALUE*	*TOTAL*
M1A1 BN	2	3.15	6.3	BMP BN	3	1.5	4.5
M2 BN	2	2	4	T-72 BN	1	1.2	1.2
155mm BN	2	2.5	5	2S3 BN	2	2.25	4.5
TOTAL VALUE =			15.3	TOTAL VALUE =			10.2

FINAL COF(M) VALUE IS 1.50:1.00 IN FAVOR OF U.S. BRIGADE

Figure 10 - CGSC Computations

Application of Criteria For A Standardized Model

Flexible: The CGSC model is only as flexible as the user's understanding of the model. The CGSC model is based on relative units. The example given in ST 100-9 is an example only and is based on a Krasnovian threat. The scenario being used is based on a Samaran threat, so the relative weights should be different, especially since the CGSC example uses the BTR unit as the base unit from which all other units are weighted. The CGSC model is not as flexible as those models

that look at individual weapon systems. It also has a problem when task organization at task force level or below is used. The relative values given as an example in ST 100-9, provides values only for pure units. The United States Army as well as other armies in the world, task organize. To accommodate this fact, fractions of the original values must be taken to get a precise value. This leads to further subjectivity, and subsequently a less than adequate value.

Simple: The model is usable, if the user has already established the relative weighting of units. Problems in simplicity arise when task organization occurs at the battalion level or lower. The user must then decide if whole battalion values should be divided by the number of companies to get a fractional relative value. These fractions must then be added up to determine the overall task organization unit value.

Definable Values: The unit values are all based on a pure subjective relative weighting. The results provided a more conservative COF than some of the other models.

90% Solution: The CGSC model does not pass the 90% solution because of its purely subjective relative weighting. Because the model relies on a subjective evaluation, the results can and will vary, depending on the evaluator.

Analysis:

Advantages. The CGSC model has no major advantages. The model is too simple to provide an accurate portrayal of combat power.

Disadvantage. The two biggest disadvantages associated with the CGSC model are:

(a) Inflexibility due to its use of unit values, versus individual weapon system values.

(b) Fails the 90% solution because of its pure subjective weighting of units. The subjective relative values are based on the user's evaluation. Because of this, these values will vary from unit to unit.

Conclusions:

The CGSC model is based on unit values which limit the overall flexibility of the model, especially when dealing with task organization at the battalion level. Another major problem with the CGSC model is that it depends on the individual user to establish the relative unit values. So, instead of having one consistent (although subjective, relative value) the possibility for every user to develop a different value exists. This can in fact result in either a gross exaggeration or an underestimation of combat power. This is not the making of a sound system for the establishment of standardized correlation of forces model.

TAM

Figure 11 shows the values and the COF for the scenario using the TAM model.

Application of Criteria For A Standardized Model

Flexible: The TAM model is flexible to the extent that the model takes into consideration individual weapon systems. This allows the commander and staff the ability to use this system regardless of the threat.

TAMS COMPUTATION OF COF(M)									
U.S. HEAVY BRIGADE					SAMARAN MECH BRIGADE				
WEAPON SYSTEM	*TOTAL QUANTITY*	*SYSTEM VALUE*	*MISSION x MTC/ATK*	*TOTAL VALUES*	*WEAPON SYSTEM*	*TOTAL QUANTITY*	*WEAPON VALUE*	*MISSION x MTC/HTAK*	*TOTAL VALUES*
ARMOR					ARMOR				
M1A1	116	1.00	0.75	87.00	T-72	35	0.80	0.75	21.00
M2/3	132	0.60	0.75	59.40	BMP 1	117	0.30	0.75	26.33
INF SQD	48	1.00	0.75	36.00	INF SQD	81	0.20	0.75	48.60
ARTY					ARTY				
155mm	48	0.90	1.50	64.80	152mm	36	0.80	1.50	43.20
4.2" Mtr	24	0.30	1.50	10.80	120mm	12	0.30	1.50	5.40
					82mm	18	0.15	1.50	4.05
					60mm	27	0.10	1.50	4.05
A-T					A-T				
ITV	24	1.00	0.50	12.00	AT-5	12	0.70	0.50	4.20
			TOTAL	270.00				TOTAL	156.83
			TERRAIN MULITIPLIER	1.00				*TERRAIN MULITIPLIER*	1.00
			ADJUSTED FIREPOWER TOTAL	270.00				ADJUSTED FIREPOWER TOTAL	156.83
FINAL COF(M) VALUE IS 1.72:1.00 IN FAVOR OF U.S. BRIGADE									

Figure 11 - TAM Computations

Simple: The TAM model is very simple to use, if you do not take into consideration the other aspects of the model. Specifically, TAM relies on a computer program to factor in variables such as weather, frontage, advance, advance limit, casualties, depth, cohesion, maintenance, and supply. All of these factors will effect the combat power of a unit and subsequently the COFM. Disregarding these computer assisted variables the only real tough calculations that need to be done is factoring in the mission type multiplier and the terrain multiplier, once weapon system values have been compiled.

Definable Values: The values currently being used by TAMs is based on relative weights, by weapon category. This provides a consistent evaluation of weapon system's values. The major problem with the TAM is that weapon system's databases do not currently cover enough

weapon systems to be truly useful. That problem, however, could be fixed with little effort, since it uses relative values. In addition to the values given to each weapon system category, the mission and terrain multipliers were also given straight forward, subjective values.

90% Solution: TAM uses subjective weighting of each weapon system category to determine the CP of a weapon system. These are relative weights based on subjective analysis. The expertise of the individual's assessment will determine how accurate these values are. Because of this, the 90% solution criteria is questionable.

Analysis:

1. Advantages. The TAM has two major advantages:

(a) It is flexible and fairly simple to use if you do not use the other variables available in the TAM computer program.

(b) TAM allows the commander and staff to put together a COFM, that is based on weapon systems categories. This methodology eliminates the need to get into unnecessary detail, such as counting all the individual pistols and bayonets.

2. Disadvantage. The two biggest disadvantages associated with TAM are:

(a) The Weapon System's Data Base is too shallow. Specifically there was not a value for 152mm Artillery, 82mm Mortar, AT-5 BRDM, BMP1 or BMP, to name just a few.

(b) The weapon system values depend on two levels of subjective analysis. This in itself may not provide the 90% solution that we are looking for.

Conclusions:

TAM has some very good points to it, specifically the way it categorizes the different weapon systems. The problem with TAM is that it relies on too much subjective analysis associated with relative values. The TAM can provide more detailed war gaming because it was designed to be a computer driven model. The use of a computer provides more detailed analysis of an engagement and takes into a variety of external factor. The main point is that because the criteria for a tactical COF model must be simple (i.e. requires no use of a computer), these additional factors provided by the TAM will not be evaluated.

HERO Model

Figure 12 shows the values and the COF for the scenario using the HERO COF model.

Application of Criteria For A Standardized Model

Flexible: The HERO model is very flexible because of its use of individual weapon systems values. This flexibility allows the user to adjust to any changes in current TO&Es as well as the ability to apply the model to any threat force.

Simple: The HERO model is not as simple as other models because of the need to use more than one chart to determine the COF. This however is still possible using a calculator, pencil and paper. The formulas used to determine the TLI and OLI are complicated, however, the user should not have to use the formulas, because HERO has already done this for over 1200 weapon systems (see appendix B). In addition, unit values based on the order of battle can be predetermined

with a little foresight and initiative. This in itself would decrease the amount of work needed to determine the CP of a unit.

HERO COMPUTATION OF COF(M)

U.S. HEAVY BRIGADE				SAMARAN MECH BRIGADE			
WEAPON	*QUANTITY*	*VALUE*	*TOTAL*	*WEAPON*	*QUANTITY*	*VALUE*	*TOTAL*
ARMOR				*ARMOR*			
M1A1	116	1049	121684	T-72	35	977	34195
M3	24	597	14328	BMP2	117	414	48438
M2	108	534	57672	*ARTILLERY*			
ARTILLERY				2S3	36	216	7776
155mm	48	202	9696	*INFANTRY*			
INFANTRY				120mm Mtr	12	83	996
4.2" Mtr	24	63	1512	82mm Mtr	18	77	1386
Dragon	72	34	2448	60mm Mtr	30	17	510
SAW	144	0.24	34.56	.50 Cal MG	40	1.03	41.2
M203	48	3.9	187.2	M60 MG	173	0.36	62.28
M16A2	240	0.39	93.6	AK-47	450	0.19	85.5
ANTI-TANK				RPK-74	90	0.17	15.3
ITV	24	205	4920	SVD	9	0.07	0.63
				ANTI-TANK			
				AT5	12	268	3216
				SPG-9	50	28	1400
				RPG-7	90	18	1620
TOTAL VALUE =			212575.36	TOTAL VALUE =			99741.91

FINAL COF(M) VALUE IS 2.13 : 1.00 IN FAVOR OF U.S. BRIGADE

Figure 12 - HERO Computations

Definable Values: The weapons system values used in the HERO model are based primarily on solid objective values of the actual weapon system capabilities. The values used to measure external factors were obtained through historical analysis and while solid numbers, they are too complicated to apply without the use of a computer. Because of this they were not used in this study.

90% Solution: The HERO model uses objective values to determine the capabilities of weapon systems. The objectivity was obtained

from actual testing and evaluation of the weapon system's capabilities. This eliminates the need to subjectively evaluate a weapon system or compare different weapon systems to each other. Because there is very little subjectivity used in this model, standardization between users is not a problem.

Analysis:

1. Advantages. The HERO model has two main advantages:

(a) The first and foremost advantage of the HERO model is the values associated with the weapon systems. These values are primarily objective in nature and do not rely on subjective analysis. This more than satisfies the 90% solution.

(b) The HERO model is a very flexible model because it uses individual weapons system values to compute the COF. This model can be used for any threat force and any changes to the overall organization.

2. Disadvantage. The biggest disadvantages associated with HERO model is that it is not as simple as other models to use. The user must first determine the enemy's order of battle, the type and number of equipment, and then the user must look up the appropriate OLI. After this it is simply a matter of multiplication and division to determine the COF. Regardless of this, the model is still very workable, using only a calculator, pencil and paper.

Conclusions:

The HERO model offers the user a solid basis for determining the COF. The values associated with the weapon systems functional and objective in nature. The major drawback to the model is the need to

know the enemy's order of battle, and the initial compiling of data. The other aspect of the model as used in this study, is the absence of the external variables. The point to remember is that the HERO QJMA model was designed as a full up war gaming, computer assisted program, similar to the TAM. What this study did was to take the initial element of the model, the proving ground values, to determine the correlation of forces. The external factors and their use will be discussed in a separate section of this study.

Final Analysis and Conclusions

Figure 13 provides an overview of the force ratio results from each of the models. The highest force ratio given was from the NTC model (2.41:1.00) and the lowest force ratio was from the CGSC model (1.50:1.00). One model appears to be overly optimistic and the other is ultra conservative. The other two models provide a conservative middle between the two extremes.

FORCE RATIO RESULTS

COF(M) MODEL	FORCE RATIO	IN FAVOR OF (Blue Or Red)
NTC	2.41 : 1.00	Blue
CGSC	1.50 : 1.00	Blue
TAM	1.72 : 1.00	Blue
HERO	2.13 : 1.00	Blue

Figure 13 - Force Ratio Results

The comparison matrix (figure 14) shows that the results of the application of the criteria to each COF(M) model. The overall best

model is the HERO model. The second best model is the TAM model. An interesting point is the fact that the two lowest rated models are the two models that currently have the greatest impact on the US. Army today, the CGSC and NTC models. Looking at the different values associated with the criteria, points out some a few of the finer points for the basis of a good COF(M) model.

COMPARISON MATRIX

CRITERIA	Weighted Values	NTC Model	CGSC Model	TAM Model	HERO Model
Flexible	1.5	5.25	1.5	5.25	5.25
Simple	1.5	7.5	1.5	4.5	4.5
Definable Values	1	1.5	1.5	4	5
90% Solution	3	4.5	4.5	12	15
Total Values		18.75	9	25.75	29.75

Note: The Model with the overall highest total value is the best model.

Figure 14 - Comparison Matrix

Flexible. The analysis shows that those models that have a base using weapon systems versus a base that uses whole units are more adaptable to a changing situation. From the individual weapons system base it is a relatively simple process of developing unit values against specific threats.

Simple. The simplest model is not necessarily the best model. In fact, the analysis shows that the simplest model, NTC, was one of the worst models. The data reflects that simplicity, being able to use only a calculator, pencil and paper, is consistent with all models. The key issue

is the use of environmental and operational variables. While this makes the user do a few more calculations, it is still a functional model.

Definable Values. All of the models used had definable values. The key difference was the amount of subjectivity versus objectivity used in the development of each value. The other factor on definable values is the use of environmental and operational variables. The TAM provided definable values for two external variables. The values the TAM model provides for the effects of terrain on the weapon systems and the multipliers associated with the different missions are based on a subjective evaluation and not historical or scientific fact.

90% Solution. Weighted the most, the 90% solution criteria is considered the most important, because without a solid base to start from, the overall product would be flawed. The model that provided the best, realistic values, had the most objectivity related to it. That was the HERO model. The model that was based on pure subjectivity was the CGSC model which was blatantly subjective. The NTC model also failed the 90% solution because it failed to recognize the importance of artillery on the battlefield.

VIII. External Factors

The question of whether or not external factors should be included in a correlation of forces model is a key question because the identification and quantification of all the external factors that effect the combat potential of a unit is a very complex problem. The ability to quantify the effect of these factors on the outcome of a battle is an age old question. Napoleon is credited with saying that "the morale is to the

physical three to one."[39] History has proven that the largest unit does not always win. In fact a study by HERO analyzed 42 battles. Of those battles 24 or 57% were won by units that "were numerically inferior."[40] This shows historically, that simple numeric numbers are not enough to win; external factors play a significant role in the success of a battle. The main question is whether or not, at the tactical and operational level, these factors should be quantified to determine the overall CP of a unit.

Very few models actually attempt to address this area. Of the four models analyzed, only one model (TAM) dealt with the factoring in of any external values, specifically terrain and mission type. This is perhaps an over simplification of the fact that the use of external factors can effect the CP of a unit. Only two external factors were used by TAM to compute the CP of a unit. Why not five , six or one hundred? Take for example, TAM's use of the mission factors, the hasty, deliberate attack and the hasty, deliberate defense. Missions not included were delay, movement to contact, or flank counterattack, all of which are variables of the attack and defend mission, but also with a unique method of execution. The terrain factors used in the TAM also are a simplification because they do not take into consideration the effects of weather on the terrain. A flat, wet terrain will effect a weapon system differently than flat, dry terrain. So the question is, how much detail is enough?

HERO's QJMA model takes into account 73 different operational and environmental variables (see Appendix D). The values associated with these variables are both objective and subjective in nature. The objective values were determined through historical analysis, and the

subjective values were based on the specific situation and evaluation by the commander and his staff. For the purpose of this study, the external factors provided by the QJMA (HERO) model were not used or discussed because the complexity of their use would require a computer and therefore violating the simplicity criteria.

At the tactical level, the best thing we can do for the commander and staff is to provide them with a solid, easy to use, quantitative model that looks specifically at the weapon systems involved in the battle. The external factors are those factors that the commander and staff must consider after the COF is determined, during the course of action development and war gaming process. The German army has a word for this process called "fingerspitzengefühle," a sense or feeling by the commander of what is right. Clausewitz would call this the "coup d'oeil"[41] of the commander, with perhaps a bit of genius[42] thrown in.

External factors are not to be ignored, but they are not a necessity for the initial determination of the CP of two opposing forces. The commander and staff must consider the effects of these external factors on their course of action. This should take place during the war gaming process and not in the initial determination of the COF.

IX. Is There a Better Method?

Looking at the different models, it is possible to put together a COF model that is simple but accurate by taking the best that each model or models have to offer. Consider the following:

1. Use as base values the OLI from the HERO model. This would provide accurate weapon system data and satisfy the criteria of flexibility, definable values, and the 90% solution.

2. Break down the weapon systems that would have to be measured into the following categories: Armor Weapons, Anti-Tank Weapons, Artillery Weapons, Infantry Weapons, Aircraft Weapons (to include attack helicopters), and Air Defense Weapons. This was a technique used by both the HERO and the TAM's methodology for looking at weapon systems. This satisfies the simplicity and flexibility of the model.

3. Do not use numeric values for external factors.

4. Follow these steps for the use of this combined model. (see Appendix E for an example.):

(a) Gather data on the order of battle for both sides. This includes the units, numbers and types of weapon systems. Record the main units on the Unit Value Worksheet. A general guide is to look at units two levels down and one level up.

(b) On the Combat Power Worksheet, list the unit(s), the type of equipment and amount of each type of equipment. Look up the OLI using the values found in Appendix B. Multiply the OLI by the total number of each type of equipment to get a total value, based on each weapon system. Add the total values from each weapon system category to get a total unit OLI value.

(c) Record the unit OLI value on the Unit Value worksheet. This now becomes a reference sheet for future operations.

(d) On the Computation of COF Worksheet, fill out the type unit, quantity of each type unit, percent strength and unit OLI value. Multiply these values together for each type of unit. Add the different units together to get the overall OLI value for both side (Blue and Red).

(e) Divide the larger OLI value by the smaller OLI value to determine the COF or force ratio.

This model could be shortened if the unit values were predetermined. If this was the case, then the only worksheet that would be filled out is the Computation of COF Worksheet.

X. Conclusions

The way the United States Army currently computes the correlation of forces is a travesty. It is a travesty because so much emphasis has been placed on determining force ratios using relative values, best guesses and a variety of other methods that have limited or no factual basis whatsoever. The fact that schools, training centers and unit organizations all determine the COF differently not only distracts from the legitimacy of our training, it could ultimately lead to soldiers getting killed. With our current technology and advancements in scientific and historical studies, we should have a better system.

Based on this study, the following recommendations and observations are made:

1. The unclassified, order of battles, generic (i.e. without specific unit designations - if this is a security classification problem) for key armies around the world (especially if the United States has a national

interest in that area of the world) need to be compiled and published, similar to FM 100-2-3 and the rescinded FM, FM 34-71.

These order of battles would include friendly as well as hostile nations. By establishing these orders of battles, US commanders and staffs could compute generic unit OLI values in advance. These order of battles would also provide professional study on the different equipment and organizations of armies around the world.

2. TRADOC, specifically Ft. Leavenworth, should become the lead agency in providing a standardize methodology in computing COF that is realistic, usable and based on quantifiable values. This in itself would be a drastic change from what is currently being taught at the Command and General Staff College.

3. The DMSi could provide the OLI values for future weapons systems as they are developed. In addition, TRAC could use a computer to determine new OLI factors for future weapon systems using the QJMA formulas.

4. The Army should seriously consider the use of the QJMA model for division and above war gaming. This model provides realistic combat results, while understanding that the human dimension of war cannot ever be perfectly replicated by a non-thinking, non-feeling machine. What the QJMA has to offer higher level organizations for war gaming contingency plans is far above what is currently being used, especially when compared to the TAM. The TAM is a good model, but the QJMA is better.

This study has shown that the two worst COF models, are the two models that have the greatest impact on our Army, the CGSC and the NTC models.

The CGSC model has already taught thousands of potential staff officers and commanders an inferior and inaccurate method for computing COF. Because of this, when it comes to the actual allocation of forces, in a combat situation, the facts surrounding the decision may be wrong. The corresponding results could lead to the needless death of soldiers, due to a commander and staff being unable to accurately portray or visualize the opponent's relative combat potential.

The NTC model provides a distinct advantage for the OPFOR. Due to its use of relative values, the model has a flawed data base and it ignores the effects of artillery and CAS. In today's environment, success at the combat training centers are critical to units, commanders and staffs. We owe it to the soldiers to provide a force ratio that gives the units a 50% chance of winning, depending on how well or how poorly they conduct their operations. As it stands now, most units are at a numerical disadvantage before the mission even begins.

The use of the OLI factors provides the best solution to quantifying the correlation of forces. The model that this study has recommended takes some of the best ideas from existing models and consolidate them into one workable solution. Appendix E provides details on how to develop a data base if the OLI of units do not exist or if they change. The ideal situation would be for TRADOC to develop the unit values for major military organizations around the world.

The last thing that should happen, is that the U.S. military should carefully consider what happened during Desert Storm, when we were faced against the fourth largest army in the world and we had no consolidated, unclassified information on how the Iraqis were organized and equipped. This could be prevented in the future by standardizing the COF model and putting together unclassified order of battles for various armies around the world. We owe it to our soldiers to do it right.

ENDNOTES

[1] U.S. Army Command and Generai Staff College, *The Command Estimate Process,* Student Text 100-9, (Fort Leavenworth, Kansas: Center For Army Tactics, 1 July 1992), 3-1.

[2] CGSC, The National Training Center, and The Historical Evaluation and Research Organization all use different methods to compute the correlation of forces.

[3] ST 100-9, 3-1.

[4] Ibid., 3-4.

[5] ST 100-9, Chapter 3.

[6] ST 100-9, Chapter 3.

[7] Ibid., 3-1 to 3-5.

[8] Cyrus E. Holliday, "Threat Assessment In The New World Order," Master's Thesis, (Georgia Institute Of Technology, June 1992, microfiche), 19.

[9] U.S. Department of the Army, *Operations,* Field Manual 100-5, (Washington, D.C.: Government Printing Office, July 1986), 11.

[10] United States Army Aviation Center, "A Survey Of Soviet Norms," (Directorate Of Combat Developments, Concepts And Studies Division, 27 November 1989) no page numbers given. Discussions on COFM is also found in T.N. Dupuy, Colonel (U.S. Army, Ret.), *Understanding War. History and Theory of Combat, (*New York, New York: Paragon House Publishers, 1987), 281.

[11] Holliday, "Threat Assessment In The New World Order," 18.

[12] Ibid., 19-20.

[13] Ibid., 20.

[14] Conversation with Maj. Cyrus E. Holliday.

[15] Letter from Mr. E.B. Vandiver III, Director U.S. Army Concept Analysis Agency (USACAA),, to Mr. Andrew W. Marshall, Director of Net Assessment, Dated 9 April 1992.

[16] Ibid.

[17] The DELPHI technique is a way to develop a histogram based on a survey of "area experts." In the community of ORSA and the statisticians of the world, this is an acceptable means to gather data and of determining norms. I chose not to use this methodology because it is possible to gather realistic values based on hard date, relative relationships and historical analysis.

[18] Author's Note: Because of the sensitivity of the units training at the NTC, this particular unit's name and the specific rotation number will not be mentioned. The challenge at the NTC is outstanding and the tougher the better. The purpose behind this particular illustration is to show the need to standardize the COF methodology so that everyone is on the same sheet of music. I know the above information, because I was a scenario writer at the NTC.

[19] Author's Note: The "meatball" method was used at the NTC to compute COF up until 1991. This method counted only tank killing systems, specifically AT5/TOW and above. It did not include artillery or attack helicopters.

[20] Ibid., 3-2.

[21] Ibid., 3-2.

[22] Allen & Hamilton Booz, Inc., "Theater Analysis Model (TAM) Airland Campaign Model User's Manual, v. 3.10," (Prepared for: Force Structure, Resource, And Assessment Directorate (J-8), Joint Staff, Politico-Military Assessment Division, 4 October 1990), 1.

[23] Reference September 1992 "Combat Planning Tools" developed by TRAC, TOD, Analysis Section.

[24] Allen & Hamilton Booz, Inc., "Theater Analysis Model (TAM) Airland Campaign Model User's Manual, v. 3.10," 1.

[25] Ibid., 1.

[26] Ibid., 2.

[27] Ibid., 2.

[28] Ibid., 2.

[29] Ibid., 2.

[30] T.N. Dupuy, Colonel (U.S. Army, Ret.), "Application Of The Quantified Judgment Method Of Analysis Of Historical Combat Data To Current Force Assessments," Brief Descriptive Summary, (Historical Evaluation And Research Organization. May 1974), 1.

[31] T.N. Dupuy, Colonel (U.S. Army, Ret.), . *Numbers, Predictions and War: Using History to Evaluate Combat Factors and Predict the Outcome of Battles*, (Fairfax, Virginia: Hero Books, 1985). 19-31.

[32] Dupuy, *Numbers, Predictions and War: Using History to Evaluate Combat Factors and Predict the Outcome of Battles*, 28 -31.

[33] Ibid., 30.

[34] Ibid., 30.

[35] Ibid., 30.

[36] Conversation with Mr. Charles F. Hawkins, President, DMSi, 21 October 1992.

[37] The Samaran Army is a generic Southwest Asian force developed and used by the National Training Center, Ft. Irwin, California. It was one of the base sources used for the later development of the Iraqi Handbook, FM 100-97.

[38] See Krasnovian and Samaran doctrine and tactics manuals, ST 100-3 and NTC ST 91-2 and 91-2.

[39] Dupuy, *Numbers, Predictions and War: Using History to Evaluate Combat Factors and Predict the Outcome of Battles*, 5.

[40] Ibid., 15.

[41] Carl Von Clausewitz, *On War*, Translated by Michael Howard and Peter Paret, (Princeton, New Jersey: Princeton University Press, 1976, Indexed Edition, 1984) 102.

[42] Ibid., 100 - 101.

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APPENDIX - A

WHY WE NEED A STANDARDIZE MODEL

This appendix provides the computations used to determine the force ratios for the generic Krasnovian used in illustrating the need for a standardized method or model in computing the correlation of forces. The models are listed as A, B, C, or D. A brief description of each model is given.

Model A: Model A uses a straight Bean Count to compute the correlation of forces. Based on the order of battle, the following applies:

Battalion Task Force	**Krasnovian MRB(-)**
Artillery = 30	Artillery = 55
Tanks = 30	Tanks = 4
M113s = 31	BMPs = 12
ITVs = 3	AT-5s = 3
Total = 94	Hind-Ds = 4
	Total = 78

Correlation of Forces = 94/78 = **1.21:1.00** In favor of the Battalion Task Force.

Model B: Model B uses relative unit values to compute the correlation of forces. Based on the order of battle, the following applies:

Battalion Task Force	**Krasnovian MRB(-)**
Artillery Bn = 1 X 2.5 = 2.5	Artillery Bn = 2 X 2.00 X 75% = 3
Tank Bn = 1 X 2.25 X 50% = 1.13	Artillery Bn = 2 X 2.25 X 65% = 2.93
M113s Bn = 1 X .5 X 40% = 0.02	BMP Bn = 1 X 1.5 X 33% = 0.5
Total = 3.65	T72 Bn = 1 X 1.20 X 11% = 0.13
	AT-5 Bn = 1 X 1.00 X 11% = 0.11
	Atk Hel Sqd = 1 X 3.00 X 60% = 1.8
	Total = 8.69

Correlation of Forces = 8.69/3.83 = **1.00:2.38** In favor of the MRB(-).

A major problem with Model B is that percentages must be taken of the unit values to account for the task organization of the Task Force and the MRB(-).

Model C: Model C uses relative weapon system values to compute the correlation of forces. This model, however, does not take into consideration artillery systems. Based on the order of battle, the following applies:

Battalion Task Force	**Krasnovian MRB(-)**
M60A3= 30 X 1.1 = 33	T-72 = 4 X 1.1 = 4.4
ITVs = 3 X 0.8 = 2.4	BMPs = 12 X 0.7 = 8.4
Total = 35.4	AT-5s = 3 X 0.8 = 2.4
	Hind-Ds = 4 X 0.4 = 1.6
	Total = 16.8

Correlation of Forces = 94/78 = **2.11:1.00** In favor of the Battalion Task Force.

Model D: Model D uses quantitative individual weapon system values to compute the correlation of forces. Based on the order of battle, the following applies:

Battalion Task Force	**Krasnovian MRB(-)**
155 SP = 24 X 223 = 5352	122mm SP = 24 X 192 =4608
4.2" Mtr = 6 X 79 = 474	152mm SP = 28 X 216 = 6048
M60A3 = 30 X 650 = 19500	120mm Mtr = 3 X 91 = 273
M113s = 31 X 2.69 = 83.39	T72s = 4 X 977 = 3908
ITVs = 3 X 205 = 615	BMP 1s = 13 X 286 = 3718
Total = 26024.39	AT-5s = 3 X 268 = 804
	Hind-Ds = 4 X 202 = 808
	Total = 20167

Correlation of Forces = 26024.39/20167 = **1.30:1.00** In favor of the Battalion Task Force.

NTC "Meatball" Method: The "Meatball" method that used to be used at the National Training Center, only counted tank killing systems. Specifically TOW/AT-5 and above. Artillery, CAS and attack helicopters were not counted.

Battalion Task Force	**Krasnovian MRB(-)**
M60A3 = 30	T72s = 4
ITVs = 3	BMP 1s = 13
Total = 33	AT-5s = 3
	Total = 20

Correlation of Forces = 33/20 = **1.65:1.00** In favor of the Battalion Task Force.

APPENDIX - B

OPERATIONAL LETHALITY INDEXES

This appendix provides a complete listing of TLI and OLI values for approximately 1230 different weapon systems. The appendix is divided up by six different categories. Those categories are: Aircraft Weapons, Air Defense Weapons, Armor Weapons, Anti-Tank Weapons, Artillery Weapons, and Infantry Weapons.

The difference between the TLI and OLI values is that the OLI values are the TLI values divided by 5000. 5000 represents the dispersion factor, or the density of the modern battlefield. This value is a conservative, but fairly accurate assessment of the density of the battlefield based on historical analysis.

The TLI factors are included in this appendix, so that if the dispersion factor changes, the new OLI values can be computed by dividing the TLI by the new dispersion value.

These OLI values were provided by Charles F. Hawkins, President of Data Memory Systems, Inc. (DMSi). The Historical Evaluation and Research Organization (HERO) is a division of DMSi.

Currently, DMSi provides services to the U.S. National Defense University; the Office of the Secretary of Defense, Office of Net Assessment; an agency of the U.S. Intelligence Community; the Joint Warfare Center (JWC); Boeing Aerospace Corporation; the LTV Corporation; SHAPE Technical Center; and Mitsubishi Space Software Company.

AIRCRAFT WEAPONS

Fixed Wing Fighters/Ground Attack Aircraft					
System	Name	TLI	OLI	Nation	Description
AC	A-4H SKYHAWK	1405000	281	USA	W/8 Mk82 500lb GP Bombs
AC	A-6E INTRUDER	2250000	450	USA	W/28 Mk82 500lb GP Bombs
AC	A-6E INTRUDER	5165000	1033	USA	W/2 GBU-10; 6 Mk82; 4 CBU-52
AC	A-6E INTRUDER	7310000	1462	USA	W/14 Mk20 Rockeye 500lb LGB
AC	A-7E CORSAIR II	2950000	590	USA	W/4 GBU-16 1000lb LGB
AC	A-10A THUNDRBLT	7765000	1553	USA	W/6 rockeye LGB; 6 AGM-65
AC	A-10A THUNDRBLT	9545000	1909	USA	W/6 Mk82; 4 AGM-65D Maverick
AC	A-10A THUNDRBLT	17840000	3568	USA	W/16 CBU-52 Cluster Bomb
AC	A-37B DRAGONFLY	605000	121	USA	W/4 Mk81; 4 2.75" Rckts Pods
AC	AC-130E SPRCTRE	31400000	6280	USA	W/1 105mm, 2 20mm, 2 40mm Guns
AC	AC-130U SPECTRE	42270000	8454	USA	W/1 105mm, 2 25mm, 2 40mm Guns
AC	AV-8B HARRIER	5350000	1070	USA	W/25mm Gun Pod; 6 CBU-59
AC	AV-8B HARRIER	6525000	1305	USA	W/25mm GP; 6 AGM-65E; 2 GBU-16
AC	B-52D STRATOFRT	28025000	5605	USA	W/108 Mk82 500lb GP Bomb
AC	F-4E PHANTOM	2185000	437	USA	W/6 Mk117 750lb GP Bomb
AC	F-4E PHANTOM	2225000	445	USA	W/4 AGM-65D Maverick
AC	F-4E PHANTOM	2285000	457	USA	W/4 AGM-88A Harm
AC	F-5E FRDM FGHTR	1040000	208	USA	W/2 Mk82 500lb GP Bomb
AC	F-8E CRUSADER	2400000	480	USA	W/12 Mk81 250lb GP Bomb
AC	F-15C EAGLE	5050000	1010	USA	W/12 Mk82 500lb GP Bomb
AC	F-15E STRK EAGLE	4240000	848	USA	W/12 Mk82 500lb; 2 Mk84 2000lb
AC	F-15E STRK EAGLE	7925000	1585	USA	W/4 GBU-10 LGB; 2 AGM-65D
AC	F-15E STRK EAGLE	14685000	2937	USA	W/12 Mk20 Rockeye 500lb LGB
AC	F-15E STRK EAGLE	26560000	5312	USA	W/4 CBU-52; 2 Mk84; 2 Mk83
AC	F-16C FALCON	1265000	253	USA	W/4 Mk84 2000Lb Bomb
AC	F-16C FALCON	2895000	579	USA	W/4 GBU-15 2000lb LGB
AC	F-16C FALCON	5255000	1051	USA	W/2 Walleye II; 6 AGM-65D
AC	F-16C FALCON	5695000	1139	USA	W/2 GBU-15 LGB; 6 CBU-59
AC	F/A-18C HORNET	1685000	337	USA	W/4 Mk83; 3 Mk84 GP Bomb
AC	F/A-18C HORNET	2010000	402	USA	W/4 AGM-88A HARM
AC	F/A-18C HORNET	3230000	646	USA	W/2 GBU-10 LGB; 2 CBU-59
AC	F/A-18C HORNET	4945000	989	USA	W/4 AGM-65E; 4 GBU-12 LGB
AC	F-111F AARDVARK	5495000	1099	USA	W/24 Mk117 750lb GP Bomb
AC	F-111F AARDVARK	5570000	1114	USA	W/4 GBU-10 2000lb LGB
AC	F-117A NIGHTHAWK	2215000	443	USA	W/2 GBU-10 2000lb LGB
AC	OV-10D BRONCO	815000	163	USA	W/2 2.75" Rckts Pods
AC	A-5 FANTAN	1105000	221	PRC	W/6 250kg Gen Purpose Bombs
AC	ALPHA JET	1205000	241	INTL	W/4 400kg Gen Purpose Bombs
AC	AM-X CENTAURO	820000	164	INTL	W/2 500kg Bombs; 2 2.75" Rckts
AC	ARMCCHI MB-326G	435000	87	ITA	W/4 Mk82 500lb GP Bombs
AC	ARMCCHI MB-339L	1155000	231	ITA	W/4 Mk82 Bombs; 2 2.75" Rckts

AIRCRAFT WEAPONS

Fixed Wing Fighters/Ground Attack Aircraft					
System	Name	TLI	OLI	Nation	Description
AC	B-5 BEAGLE	1555000	311	PRC	W/8 250kg Gen Purpose Bombs
AC	BUCCANEER S2	2220000	444	UK	W/2 2000lb GBU-15; 4 Mk83 Bombs
AC	CANBERRA B	825000	165	IND	W/4 Mk82; 2 Mk83 1000lb Bombs
AC	F-6 (MIG-19)	1305000	261	PRC	W/2 250kg Gen Purpose Bombs
AC	F-7 (MIG-21)	970000	194	PRC	W/4 250kg Gen Purpose Bombs
AC	F-8 FINBACK	1330000	266	PRC	W/2 250kg Bombs; 2 68mm Rckts
AC	G-9IR/4	715000	143	ITA	W/2 Mk82 Bombs; 2 2.75" Rckts
AC	G-91Y	1005000	201	ITA	W/2 Mk83 Bombs; 2 2.75" Rckts
AC	HA-220 SAETA	290000	58	SPA	W/2 Mk81 Bombs; 4 2.75" Rckts
AC	HAL AJEET	505000	101	IND	W/2 Mk82 Bombs; 2 68mm Rckts
AC	HAL KIRAN	140000	28	IND	W/4 Mk83 Bombs; 1 68mm Rckts
AC	HAL MARUT	1435000	287	IND	W/2 68mm Rckts Pods
AC	HARRIER FRS-1	915000	183	UK	W/3 Mk83 1000lbs GP Bombs
AC	HARRIER GR-3	1085000	217	UK	W/3 Mk83 Bombs; 2 68mm Rckts
AC	HAWK 200	1045000	209	INTL	W/6 Mk83 1000lbs GP Bombs
AC	IAR-93	1210000	242	ROM	W/6 120kg Bombs; 2 57mm Rckts
AC	JACUAR A	2330000	466	INTL	W/8 Mk83 1000lbs GP Bombs
AC	JAGUAR GR-1	2625000	525	INTL	W/8 Mk83 1000lbs GP Bombs
AC	KFIR C7	2250000	450	ISR	W/2 Mk117 750lbs; 2 Mk82 Bombs
AC	MIG-17 FRESCO F	545000	109	RUS	W/2 250kg Gen Purpose Bombs
AC	MIG-19	1305000	261	RUS	W/2 250kg Gen Purpose Bombs
AC	MIG-21 FISHBD J	970000	194	RUS	W/4 250kg Gen Purpose Bombs
AC	MIG-23 FLGR G/H	900000	180	RUS	W/4 500kg Gen Purpose Bombs
AC	MIG-27 FLOGGR J	1430000	286	RUS	W/4 500kg Gen Purpose Bombs
AC	MIG-29 FULCRUM	930000	186	RUS	W/6 250kg Gen Purpose Bombs
AC	MIRAGE III-E	1365000	273	FRA	W/2 500kg Gen Purpose Bombs
AC	MIRAGE IV-M	680000	136	FRA	W/4 250kg Gen Purpose Bombs
AC	MIRAGE V-B	2320000	464	FRA	W/4 400kg Gen Purpose Bombs
AC	MIRAGE 2000	1900000	380	FRA	W/6 400kg Gen Purpose Bombs
AC	MIRAGE 4000	3265000	653	FRA	W/4 1000lb Laser-Guided Bombs
AC	MIRAGE F-1	2420000	484	FRA	W/6 400kg Gen Purpose Bombs
AC	SAAB JA-37 VGGN	2445000	489	SWE	W/4 135mm Rckts Pods
AC	SAAB JAS-39 GRP	3500000	700	SWE	W/4 AGM-65D Maverick ASMs
AC	SAAB RF-35 DRKN	1200000	240	SWE	W/2 400kg Gen Purpose Bombs
AC	SOKO G-4	300000	60	YUG	W/2 57mm Rckts Pods
AC	SOKO J-1 JASTRB	290000	58	YUG	W/2 250kg Gen Purpose Bombs
AC	SU-7 FITTER A	555000	111	RUS	W/2 750kg Gen Purpose Bombs
AC	SU-17 FITTER B	1200000	240	RUS	W/4 500kg Gen Purpose Bombs
AC	SU-22 FITTER H	1405000	281	RUS	W/4 500kg Gen Purpose Bombs
AC	SU-24 FENCER A	3220000	644	RUS	W/6 250kg Bombs; 2 AS-7 ASMs
AC	SU-25 FROGFOOT	2165000	433	RUS	W/6 250kg Bombs; 2 57mm Rckts

AIRCRAFT WEAPONS

Fixed Wing Fighters/Ground Attack Aircraft					
System	Name	TLI	OLI	Nation	Description
AC	SUPER ETENDARD	1005000	201	FRA	W/4 400kg Gen Purpose Bombs
AC	TORNADO IDS	8705000	1741	INTL	W/8 2000lb GBU-15s
AC	TU-16 BADGER G	3100000	620	RUS	W/8 500kg Gen Purpose Bombs
AC	TU-22 BLINDER	1740000	348	RUS	W/4 500kg Gen Purpose Bombs
AC	TU-26 BACKFRE B	10550000	2110	RUS	W/24 250kg Gen Purpose Bombs
AC	VULCAN B2	7885000	1577	UK	W/2 Mk83 1000lb GP Bombs
AC	YAK-38	730000	146	RUS	W/2 57mm Rckts; 2 AS-7 ASMs
Attack Helicopters					
System	Name		OLI	Nation	Description
ATK HEL	AH-1J COBRA	490000	98	USA	W/4 Hellfire ATGM, 20mm Gun
ATK HEL	AH-1S COBRA	390000	78	USA	W/8 TOW ATGM, 20mm Gun
ATK HEL	AH-1T SEA COBRA	310000	62	USA	W/4 TOW ATGM, 20mm Gun
ATK HEL	AH-64A APACHE	1010000	202	USA	W/38 2.75" Rockets, 30mm Gun
ATK HEL	AH-64A APACHE	1190000	238	USA	W/76 2.75" Rockets, 30mm Gun
ATK HEL	AH-64A APACHE	1390000	278	USA	W/8 Hellfire ATGM, 30mm Gun
ATK HEL	AH-64A APACHE	1715000	343	USA	W/8 Hellfire, 30 Rckt, 30mm Gun
ATK HEL	AH-64A APACHE	2060000	412	USA	W/16 Hellfire ATGM, 30mm Gun
ATK HEL	500MD DEFENDER	585000	117	USA	W/4 TOW ATGM, 30mm Gun
ATK HEL	A-109A MK2	160000	32	ITA	W/4 TOW ATGM, 12.7mm Gun
ATK HEL	A-129 MONGOOSE	595000	119	ITA	W/8 Hellfire, 38 2.75" Rockets
ATK HEL	BO-105	355000	71	GER	W/6 HOT ATGM, 20mm Gun
ATK HEL	SA-316B ALTTE 3	145000	29	FRA	W/4 AS-11 ATGM
ATK HEL	SA-332B PUMA	110000	22	FRA	W/38 68mm Rockets, 20mm Gun
ATK HEL	SA-341F GAZELLE	230000	46	FRA	W/6 HOT ATGM, 20mm Gun
ATK HEL	SA-365N DAUPHIN	180000	36	FRA	W/8 HOT ATGM
ATK HEL	SCOUT MK1	105000	21	UK	W/4 AS-11 ATGM
ATK HEL	LYNX MK1	465000	93	UK	W/8 TOW ATGM, 20mm Gun
ATK HEL	MI-8 HIP	305000	61	RUS	W.4 AT-2, 192 57mm Rkts, 12.7 Gun
ATK HEL	MI-24 HIND	310000	62	RUS	W/4 AT-3, 128 57mm Rkts, 12.7 Gun
ATK HEL	MI-24 IND	1010000	202	RUS	W/4 AT-6 ATGM, 30mm Gun
ATK HEL	MI-24 HAVOC	1110000	222	RUS	W/16 At-6 ATGM, 30mm Gun

AIR DEFENSE WEAPONS

Anti-Aircraft Gun					
System	Name	TLI	OLI	Nation	Description
AAA	AA-52 AA MG	2900	0.58	FRA	7.62mm Towed AA MG
AAA	AMX-30 DCA AA	925000	185	FRA	Twn 30mm SP AA Guns
AAA	BOFORS L/60 AA	195000	39	SWE	40mm Towed AA Gun
AAA	BOFORS L/70 AA	535000	107	SWE	40mm Towed AA Gun
AAA	DSHK M-38/46 AA	5200	1.04	RUS	12.7mm Towed AA Gun
AAA	GDF-002 AA GUN	1170000	234	RUS	Twn 35mm Towed AA Guns
AAA	GEPARD AA GUN	1400000	280	GER	Twn 35mm SP AA Guns
AAA	HS-661 AA GUN	375000	75	SWS	30mm Towed AA Gun
AAA	HS-804 AA GUN	390000	78	SWS	20mm Towed AA Gun
AAA	KS-19 AA GUN	720000	144	RUS	100mm Towed AA Gun
AAA	KS-30 AA GUN	1070000	214	RUS	130mm Towed AA Gun
AAA	LA-5TG AA GUN	330000	66	SWS	20mm Towed AA Gun
AAA	M-42 AA GUN	310000	62	USA	Twn 40mm SP AA Guns
AAA	M-44 AA GUN	425000	85	NKOR	85mm Towed AA Gun
AAA	M-53 AA MG	10500	2.1	CZCH	Quad 12.7mm Towed AA MGs
AAA	M-53-9 AA GUN	675000	135	CZCH	Twn 30mm Towed AA Guns
AAA	M-53-9 SP AA	705000	141	CZCH	Twn 30mm SP AA Guns
AAA	M-117 AA GUN	585000	117	USA	90mm Towed AA Gun
AAA	M-1939 AA GUN	155000	31	RUS	37mm Towed AA Gun
AAA	M-1955 AA GUN	345000	69	YUG	20mm Towed AA Gun
AAA	M-1983 AA MG	12700	2.54	NKOR	Quad 14.5mm SP AA MGs
AAA	M-1986 AA GUN	155000	31	RUS	Twn 30mm SP AA Guns
AAA	NK-37 AA GUN	90000	18	NKOR	37mm Towed AA Gun
AAA	NKSP-30-2 AA	705000	141	NKOR	Twn 30mm SP AA Guns
AAA	NKSP-37-1 AA	250000	50	NKOR	37mm SP AA Gun
AAA	NKSP-37-2 AA	375000	75	NKOR	Twn 37mm SP AA Guns
AAA	OTO MELARA AA	1410000	282	ITA	76mm SP AA Gun
AAA	RH-202 AA GUN	315000	63	GER	20mm Towed AA Gun
AAA	RH-202 SP AA	520000	104	GER	Twn 20mm SP AA Guns (M-113)
AAA	S-60 AA GUN	545000	109	RUS	57mm Towed AA Gun
AAA	SAURER FLAK AA	965000	193	AUS	Twn 20mm SP AA Guns
AAA	SIDAM AA GUN	740000	148	ITA	Quad 25mm SP AA Guns
AAA	TARASQUE AA GUN	370000	74	FRA	20mm Towed AA Gun
AAA	TCM-20 AA GUN	315000	63	ISR	Twn 20mm Towed AA Guns
AAA	TCM-20 SP AA	330000	66	ISR	Twn 20mm SP AA Guns
AAA	TYPE55 AAA GUN	235000	47	PRC	37mm Towed AA Gun
AAA	TYPE58 AA MG	8750	1.75	PRC	Twn 14.5mm AA MGs
AAA	TYPE59 AA GUN	720000	144	PRC	100mm Towed AA Gun
AAA	TYPE59 AAA GUN	395000	79	PRC	57mm Towed AA Gun
AAA	TYPE63 AA GUN	370000	74	PRC	Twn 37mm SP AA Guns
AAA	TYPE65 AAA GUN	355000	71	PRC	Twn 37mm Towed AA Guns

AIR DEFENSE WEAPONS

Anti-Aircraft Gun					
System	Name	TLI	OLI	Nation	Description
AAA	TYPE72 AAA GUN	400000	80	PRC	85mm Towed AA Gun
AAA	VULCAN AA GUN	895000	179	USA	20mm Towed AA Gun (M-167)
AAA	VULCAN-SP AA	935000	187	USA	20mm SP AA Gun (M-163)
AAA	ZPU-1 AA MG	5850	1.17	RUS	14.5mm AA MG
AAA	ZPU-2 AA MG	8750	1.75	RUS	Twn 14.5mm AA MGs
AAA	ZPU-2 SP AA	26600	5.32	RUS	Twn 14.5mm SP AA MGs (BTR-152)
AAA	ZPU-4 AA MG	12100	2.42	RUS	Quad 14.5mm AA MGs
AAA	ZPU-4 SP AA MG	12700	2.54	RUS	Quad 14.5 mm SP MGs
AAA	ZSU-23-4 AA GUN	885000	177	RUS	Quad 23mm SP AA Guns
AAA	ZSU-57-2 AA GUN	855000	171	RUS	Twn 57mm SP AA Guns
AAA	ZSU-X AA GUN	125000	25	RUS	Twn 30mm SP AA Guns
AAA	ZU-23 AA GUN	580000	116	RUS	Twn 23mm Towed AA Guns
AAA	ZU-23 AA GUN FO	120000	24	RUS	Twn 30mm Towed AA Guns
AAA	ZU-23 SP AA GUN	610000	122	RUS	Twn 23mm SP AA Guns
Surface-To-Air Missiles					
System	Name	TLI	OLI	Nation	Description
SAMs	BLOODHOUND SAM	380000	76	UK	Towed Single Radar SAM
SAMs	BLOWPIPE SAM	85000	17	UK	Manpack Single Optical Sam
SAMs	BLOWPIPE SPARTN	90000	18	UK	SP Single Op SAM (Spartan APC)
SAMs	CHAPARRAL SAM	675000	135	USA	SP Quad Infrared SAM
SAMs	CHAPARRAL TOWD	615000	123	USA	Towed Quad Infrared SAM
SAMs	CROTALE SAM	880000	176	FRA	SP Quad Radar SAM
SAMs	HAWK-I SAM	500000	100	USA	Towed Triple Radar SAM
SAMs	HAWK-SP SAM	550000	110	USA	SP Triple Radar SAM
SAMs	HN-5A SAM	80000	16	PRC	Manpack Single Infrared SAM
SAMs	HN-5C SAM	???	???	PRC	SP 8-Launcher Infrared SAM
SAMs	HQ-2J SAM	410000	82	PRC	Towed Single Radar SAM
SAMs	HQ-61 SAM	770000	154	PRC	SP SAM
SAMs	HYUNMU SAM	220000	44	ROK	Towed Single Radar SAM
SAMs	JAVELIN SAM	100000	20	UK	Manpack Single Optical SAM
SAMs	LLAD SAM	1875000	375	CAN	SP SAM
SAMs	MISTRAL SAM	150000	30	FRA	Manpack Single Infrared SAM
SAMs	PATRIOT SAM	610000	122	USA	SP Quad Radar SAM
SAMs	RAPIER SAM	605000	121	UK	Towed Quad Radar SAM
SAMs	RAPIER-SP SAM	665000	133	UK	SP Quad Radar SAM
SAMs	RBS-70 SAM	435000	87	SWE	Towed Single Radar SAM
SAMs	RBS-70 M113 SAM	480000	96	SWE	SP Single Radar SAM
SAMs	REDEYE SAM	65000	13	USA	Manpack Single Infrared SAM
SAMs	ROLAND SAM	590000	118	GER	SP Twn Optical/Radar SAM
SAMs	SA-2 SAM	410000	82	RUS	Towed Single Radar SAM
SAMs	SA-3 SAM	355000	71	RUS	Towed Twin Radar SAM

AIR DEFENSE WEAPONS

Surface-To-Air Missiles					
System	Name	TLI	OLI	Nation	Description
SAMs	SA-4 SAM	175000	35	RUS	SP Twn Radar SAM
SAMs	SA-5 SAM	310000	62	RUS	Towed Single Radar SAM
SAMs	SA-6 SAM	770000	154	RUS	SP Triple Radar SAM
SAMs	SA-7 SAM	80000	16	RUS	Manpack Single Infrared SAM
SAMs	SA-8 SAM	480000	96	RUS	SP Quad Radar SAM
SAMs	SA-9 SAM	495000	99	RUS	SP Quad Infrared SAM
SAMs	SA-10 SAM	1335000	267	RUS	SP Quad Radar SAM
SAMs	SA-11 SAM	670000	134	RUS	SP Quad Radar SAM
SAMs	SA-12 SAM	345000	69	RUS	SP Single Radar SAM
Surface-To-Air Missiles					
System	Name	TLI	OLI	Nation	Description
SAMs	SA-12 SAM FO	835000	167	RUS	SP Twn Radar SAM (Follow-on)
SAMs	SA-13 SAM	735000	147	RUS	SP Quad Infrared SAM
SAMs	SA-14 SAM	380000	76	RUS	Manpack Single Infrared SAM
SAMs	SHAHINE SAM	930000	186	FRA	SP 6-Launcher Radar SAM
SAMs	STARSTREAK SAM	135000	27	UK	SP SAM
SAMs	STINGER SAM	80000	16	USA	Manpack Single Infrared SAM
SAMs	STINGER AVENGER	100000	20	USA	SP Single Infrared SAM
SAMs	TAN SAM	725000	145	JAP	SP Quad Radar SAM
SAMs	THUNDERBRD3 SAM	370000	74	UK	Towed Single Radar SAM
SAMs	TIGERCAT SAM	495000	99	UK	Towed Triple Optical/Radar SAM

ANTI-TANK WEAPONS

Anti-Tank Guided Missiles					
System	Name	TLI	OLI	Nation	Description
ATGM	AT-1 ATGM	385000	77	RUS	"Snapper" Manpack ATGM
ATGM	AT-1 BRDM ATGM	380000	76	RUS	BRDM ATV w/AT-1 ATGM
ATGM	AT-1 GAZ-69	150000	30	RUS	GAZ-69 Truck w/AT-1 ATGM
ATGM	AT-2 BRDM ATGM	715000	143	RUS	BRDM ATV w/AT-2 ATGM
ATGM	AT-3 ATGM	440000	88	RUS	Manpack AT Guided Missile
ATGM	AT-3 BRDM	645000	129	RUS	BRDM ATV w/AT-3 ATGM
ATGM	AT-3 BRDM-2	795000	159	RUS	BRDM ATV w/AT-3 ATGM (Imprvd)
ATGM	AT-3 GAZ-69	175000	35	RUS	GAZ-69 Truck w/AT-3 ATGM
ATGM	AT-3 LAND ROVER	250000	50	LIB	Land Rover w/AT-3 ATGM
ATGM	AT-3 NKATV ATGM	485000	97	NKOR	NK ATV w/AT-3 ATGM
ATGM	AT-4 ATGM	435000	87	RUS	Manpack AT Guided Missile
ATGM	AT-4 BRDM ATGM	435000	87	RUS	BRDM-2 AC w/AT-4 ATGM
ATGM	AT-4 LUAZ ATGM	340000	68	RUS	Luaz Truck w/AT-4 ATGM
ATGM	AT-5 ATGM	555000	111	RUS	Manpack AT Guided Missile
ATGM	AT-5 BRDM ATGM	1340000	268	RUS	BRDM ATV w/AT-5 ATGM
ATGM	AT-7 ATGM	230000	46	RUS	Manpack AT Guided Missile
ATGM	AT-8 ATGM	430000	86	RUS	Manpack AT Guided Missile
ATGM	COBRA 2000 ATGM	410000	82	GER	Manpack AT Guided Missile
ATGM	DRAGON ATGM	170000	34	USA	Manpack AT Guided Missile
ATGM	ENTAC ATGM	320000	64	FRA	Manpack AT Guided Missile
ATGM	ENTAC AMX ATGM	740000	148	FRA	AMX-13 w/ENTAC ATGM
ATGM	ENTAC M-75 ATGM	455000	91	BEL	M-75 w/ENTAC ATGM
ATGM	ENTAC TRCK ATGM	250000	50	FRA	Truck w/ENTAC ATGM
ATGM	HELLFIRE ATGM	560000	112	USA	Manpack AT Guided Missile
ATGM	HONGJIAN 73	440000	88	PRC	Manpack ATGM (aka Red Arrow)
ATGM	HOT ATGM	500000	100	FRA	Manpack AT Guided Missile
ATGM	HOT JAGUAR-1	1120000	224	GER	Jaguar-1 ATV w/HOT ATGM
ATGM	HOT VAB ATGM	1085000	217	FRA	VAB ATV w/HOT ATGM
ATGM	HOT VBL ATGM	???	???	FRA	VBL APC w/HOT ATGM
ATGM	HOT VCAC ATGM	1380000	276	FRA	VCAC ATV w/HOT ATGM
ATGM	KAM-3D ATGM	415000	83	JAP	Jeep w/KAM-3D ATGM
ATGM	KAM-9 ATGM	555000	111	JAP	Manpack AT Guided Missile
ATGM	MAPATS ATGM	575000	115	ISR	Truck w/MAPATS ATGM
ATGM	MILAN ATGM	410000	82	FRA	Manpack AT Guided Missile
ATGM	MILAN AML ATGM	415000	83	FRA	AML AC w/Milan ATGM
ATGM	MILAN AMX-13VCI	760000	152	FRA	AMX-13 VCI w/Milan ATGM
ATGM	MILAN FV-436	420000	84	UK	FV-436 APC w/Milan ATGM
ATGM	MILAN M-75 ATGM	580000	116	BEL	M-75 APC w/Milan ATGM
ATGM	MILAN M-113	555000	111	BEL	M-113 APC w/Milan ATGM
ATGM	MILAN SPARTAN	870000	174	UK	Spartan APC w/Milan ATGM
ATGM	MILAN TPZ-1	305000	61	GER	TPZ-1 (aka Fuchs) w/Milan ATGM

ANTI-TANK WEAPONS

Anti-Tank Guided Missiles					
System	Name	TLI	OLI	Nation	Description
ATGM	MILAN VBL ATGM	???	???	FRA	VBL APC w/Milan ATGM
ATGM	MILAN VLTT ATGM	430000	86	FRA	VLTT Jeep w/Milan ATGM
ATGM	MILAN YPR-765	725000	145	BEL	YPR-765 APC w/Milan ATGM
ATGM	MOSQUITO ATGM	425000	85	ITA	Manpack AT Guided Missile
ATGM	SS-10 ATGM	355000	71	FRA	Manpack AT Guided Missile
ATGM	SS-10 TRCK ATGM	490000	98	FRA	Truck w./SS-10 ATGM
ATGM	SS-11 M-113	890000	178	FRA	M-113 APC w/SS-11 ATGM
ATGM	SS-11 RAKETE	1155000	231	GER	Rakeete ATV w/SS-11 ATGM
ATGM	SWNGFIRE FV-438	1105000	221	UK	FV-438 ATV w/Swingfire ATGM
ATGM	SWNGFIRE FV-712	365000	73	UK	FV-712 (Ferret) SC w/Swingfire
ATGM	SWNGFIRE JEEP	550000	110	EGP	Jeep w/Swingfire ATGM
ATGM	SWNGFIRE STRKR	1020000	204	UK	Stiker ATV w/Swingfire ATGM
ATGM	TOW ATGM	540000	108	USA	Manpack AT Gukded Missile
ATGM	TOW AMX-13 VCI	1140000	228	FRA	AMX-13VCI APC w/TOW ATGM
ATGM	TOW BV-206 ATGM	635000	127	CAN	BV-206 Oversnow w/TOW ATGM
ATGM	TOW HUMMV ATGM	645000	129	USA	HUMMV w/TOW ATGM
ATGM	TOW JAGUAR-2	1310000	262	GER	Jaguar-2 ATV w/TOW ATGM
ATGM	TOW LAV ATGM	1435000	287	USA	Light Assault Vehicle w/TOW
ATGM	TOW M-901 ATGM	1025000	205	USA	M-901 ATV w/TOW ATGM
ATGM	TOW TRUCK ATGM	570000	114	USA	Truck w/TOW ATGM
ATGM	TOW YP-408 ATGM	825000	165	NET	YP-408 APC w/TOW ATGM
ATGM	TOW YPR-765	1105000	221	NET	YPR-765 APC w/TOW ATGM
ATGM	VIGILANT ATGM	405000	81	UK	Manpack AT Guided Missile
ATGM	VIGILANT FV-703	170000	34	UK	FV-703 (Ferret) APC w/Vigilant
ATGM	VIGILANT FV-714	185000	37	UK	PV-714 APC w/Vigilant ATGM
Anti-Tank Guns And Recoilless Rifles					
System	Name	TLI	OLI	Nation	Description
ATG/RR	B-10 RR	150000	30	RUS	82mm Towed Recoilless Rifle
ATG/RR	B-11 RR	295000	59	RUS	107mm Towed Recoilless Rifle
ATG/RR	D-81TM AT GUN	710000	142	RUS	125mm Towed AT Gun
ATG/RR	D-48 AT GUN	520000	104	RUS	85mm Towed AT Gun
ATG/RR	DN-90 AT GUN	435000	87	ISR	90mm Towed AT Gun
ATG/RR	M-40 RR	335000	67	USA	106mm Towed Recoilless Rifle
ATG/RR	M-40 JEEP RR	350000	70	USA	Jeep w/M40 106mm RR
ATG/RR	M-40 M-113 RR	560000	112	USA	M-113 APC w/M-40 106mm RR
ATG/RR	M-44 AT GUN	720000	144	RUS	100mm Towed AT Gun
ATG/RR	M-52 AT GUN	490000	98	CZCH	85mm Towed AT Gun
ATG/RR	M-53 AT GUN	855000	171	CZCH	100mm Towed AT Gun
ATG/RR	M-59 RR	230000	46	CZCH	82mm Towed Recoilless Rifle
ATG/RR	M-67 RR	160000	32	USA	90mm Towd Recoilless Rifle
ATG/RR	OT-810 RR	260000	52	CZCH	APCw/???mm Recoilless Rifle

ANTI-TANK WEAPONS

Anti-Tank Guns And Recoilless Rifles					
System	Name	TLI	OLI	Nation	Description
ATG/RR	SPG-9 RR	140000	28	RUS	73mm Towed Recoilless Rifle
ATG/RR	T-12 AT GUN	880000	176	RUS	100mm Towed AT Gun
ATG/RR	T-12 AT GUN FO	1415000	283	RUS	125mm Towd ATG (T-12 Follow-on)
ATG/RR	T-12 NKAPC ATG	925000	185	NKOR	NK APC w/T-12 100mm AT Gun
ATG/RR	TURRET AT GUN	635000	127	FRA	90mm Fixed AT Gun (Turret)
ATG/RR	TYP36 RR	46900	9.38	PRC	57mm Towed Recoilless Rifle
ATG/RR	TYPE52-3 RR	125000	25	PRC	75mm Towed Recoilless Rifle
ATG/RR	TYPE55 AT GUN	210000	42	PRC	57mm Towed AT Gun
ATG/RR	TYPE56 AT GUN	415000	83	PRC	85mm Towed AT Gun
Anti-Tank Guns And Recoilless Rifles					
System	Name	TLI	OLI	Nation	Description
ATG/RR	TYPE56 RR	125000	25	PRC	75mm Towed Recoilless Rifle
ATG/RR	TYPE60 RR	315000	63	JAP	Twin 106mm Towed RR
ATG/RR	TYPE65 RR	150000	30	PRC	82mm Towed Recoilless Rifle
ATG/RR	WOMBAT RR	405000	81	UK	120mm Towed Recoilless Rifle
ATG/RR	WOMBT FV-432 RR	475000	95	UK	FV-432 APC w/Wombat RR
Anti-Tank Rocket Launchers					
System	Name	TLI	OLI	Nation	Description
ATRL	ACCP AT RL	150000	30	FRA	Manpack AT Rocket Launcher
ATRL	APILAS AT RL	13450	2.69	FRA	Manpack AT Rocket Launcher
ATRL	ARMBURST AT RL	13600	2.72	GER	Disposable AT Rocket Launcher
ATRL	BLINDICIDE RL	85000	17	BEL	Manpack AT Rocket Launcher
ATRL	CARL GUSTAV RL	155000	31	SWE	Manpack AT RL (aka AT-4)
ATRL	DARD-120 AT RL	315000	63	FRA	Manpack AT Rocket Launcher
ATRL	FOLGORE AT RL	185000	37	ITA	Manpack AT Rocket Launcher
ATRL	LAT-500 AT RL	115000	23	AUS	Manpack AT Rocket Launcher
ATRL	LAW-80 AT RL	49550	9.91	UK	Disposable AT Rocket Launcher
ATRL	LAW M-72A2 RL	17000	3.4	USA	Disposable AT Rocket Launcher
ATRL	LAW M-72A3 RL	26200	5.24	USA	Disposable AT Rocket Launcher
ATRL	LRAC AT RL	125000	25	FRA	Manpack AT Rocket Launcher
ATRL	M-20 AT RL	135000	27	USA	Manpack AT RL (3.5" Bazooka)
ATRL	M-202 FLAME RL	19500	3.9	USA	Manpack Flame Rocket Launcher
ATRL	PZF-3 AT RL	60000	12	GER	Disposable AT Rocket Launcher
ATRL	PZF-44 AT RL	14350	2.87	GER	Disposable AT Rocket Launcher
ATRL	RPG-2 AT RL	60000	12	RUS	Manpack AT Rocket Launcher
ATRL	RPG-7 AT RL	90000	18	RUS	Manpack AT Rocket Launcher
ATRL	RPG-16 AT RL	40500	8.1	RUS	Manpack AT Rocket Launcher
ATRL	RPG-18 AT RL	14000	2.8	RUS	Disposable AT Rocket Launcher
ATRL	TYPE51 AT RL	135000	27	PRC	Manpack AT Rocket Launcher
ATRL	TYPE56 AT FL	210000	42	PRC	Manpack AT Rocket Launcher
ATRL	TYPE69 AT RL	90000	18	PRC	Manpack AT Rocket Launcher

ANTI-TANK WEAPONS

Anti-Tank Rocket Launcher					
System	Name	TLI	OLI	Nation	Description
ATRL	TYPE70 AT RL	12200	2.44	PRC	Disposable AT Rocket Launcher
ATRL	VIPER AT RL	14600	2.92	USA	Disposable AT Rocket Launcher

ARMOR WEAPONS

Tanks (Main Battle/Light)					
System	Name	TLI	OLI	Nation	Description
Tank	PT-76 LT	470000	94	RUS	Light Tank w/76mm Gun
Tank	T-54 MBT	1740000	348	RUS	MBT w/100mm Gun
Tank	T-54B MBT	1755000	351	RUS	Improved T-54 MBT
Tank	T-55 MBT	2155000	431	RUS	Improved T-54 MBT
Tank	T-62 MBT	3455000	691	RUS	MBT w/115mm Gun
Tank	T-64 MBT	4660000	932	RUS	MBT W/125 Gun
Tank	T-64B MBT	5180000	1036	RUS	T-64 w/AT-8 ATGM
Tank	T-72 MBT	4885000	977	RUS	MBT w/125 Gun
Tank	T-80 MBT	6460000	1292	RUS	MBT w/125mm Gun & AT-8 ATGM
Tank	M-1 MBT	4920000	984	USA	Abrams MBT w/105mm Gun
Tank	M-1A1 MBT	5245000	1049	USA	MBT w/120mm Gun
Tank	M-41 MBT	680000	136	USA	MBT w/76mm Gun
Tank	M-47 MBT	1030000	206	USA	MBT w/90mm Gun
Tank	M-48 MBT	810000	162	USA	MBT w/90mm Gun
Tank	M-48A1 MBT	825000	165	USA	Improved M-48 MBT
Tank	M-48A2C MBT	1355000	271	USA	Improved M-48A1 MBT
Tank	M-48A2G2 MBT	1845000	369	USA	M-48 MBT w/105mm Gun (For GER)
Tank	M-48A3 MBT	1835000	367	USA	Improved M-48A2C MBT
Tank	M-48A5 MBT	2965000	593	USA	Improved M-48A3 MBT
Tank	M-48E1 MBT	2220000	444	USA	M-48 MBT w/90mm Gun (For SPA)
Tank	M-551A1 AIRT	2530000	506	USA	Sheridan Arbm Tk w/152mm Gun
Tank	M-60 MBT	2985000	597	USA	MBT w/105mm Gun
Tank	M-60A1 MBT	3110000	622	USA	Improved M-60 MBT
Tank	M-60A2	2690000	538	USA	M-60 MBT w/152mm Gun
Tank	M-60A3 MBT	3215000	643	USA	Improved M-60A1 MBT
Tank	M-60A3I MBT	3250000	650	USA	M-60A3 MBT w/Thermal Sights
Tank	STINGRAY LT	2335000	467	USA	Lt Tk w/105mm Gun
Tank	CENTURINON MK5	635000	127	UK	MBT w/84mm Gun
Tank	CENTRUION MK13	1655000	331	UK	MBT w/105mm Gun
Tank	CHALLENGER MBT	4860000	972	UK	MBT w/120mm Gun
Tank	CHIEFTAIN MK1/2/3	3910000	782	UK	MBT w/120mm Gun
Tank	CHIEFTAIN MK5	3165000	633	UK	MBT w/105mm Gun
Tank	CHIEFTAIN 900	4250000	850	UK	Improved Chieftain MBT
Tank	SCIMITAR LT	260000	52	UK	Lt Tk w/30mm Gun
Tank	SCORPION LT	675000	135	UK	Lt Tk w/76mm Gun
Tank	SCORPION 90 LT	1230000	246	UK	Lt Tk w/90mm Gun
Tank	VALIANT 1 MBT	3015000	603	UK	MBT w/105mm Gun
Tank	VALIANT 2 MBT	3985000	797	UK	MBT w/120mm Gun
Tank	TYPE59 MBT	1825000	365	PRC	MBT w/100mm Gun
Tank	TYPE62 LT	1155000	231	PRC	Lt Tk w/85mm Gun
Tank	TYPE63 ALT	805000	161	PRC	Amphib Lt Tk w/85mm Gun

ARMOR WEAPONS

Tanks (Main Battle/Light)					
System	Name	TLI	OLI	Nation	Description
Tank	TYPE64 ALT	750000	150	PRC	Amphib Lt Tk w/76mm Gun
Tank	TYPE69-2 MBT	2115000	423	PRC	MBT w/100mm Gun
Tank	TYPE79 MBT	2660000	532	PRC	MBT w/105mm Gun
Tank	TYPE80 MBT	2880000	576	PRC	MBT w/105mm Gun
Tank	TYPE84 MBT	2575000	515	PRC	Improved Type59 MBT
Tank	JPZ-4-5 TD	1635000	327	GER	Tk Destroyer w/90mm Gun
Tank	LEOPARD IA 1/2/3	3470000	694	GER	MBT w/105mm Gun
Tank	LEOPARD IA4 MBT	3600000	720	GER	Improved Leopard IA1/2/3 MBT
Tank	LEOPARD IC MBT	3505000	701	GER	Leopard I MBT (For CAN)
Tank	LEOPARD II MBT	5885000	1177	GER	MBT w/120mm Gun
Tank	TAM MBT	3435000	687	GER	MBT w/105mm Gun (For ARG)
Tank	AMX-13-75 LT	605000	121	FRA	Lt Tk w/75mm Gun
Tank	AMX-13-90 LT	1140000	228	FRA	Lt Tk w/90mm Gun
Tank	AMX-13-105 LT	1245000	249	FRA	Lt Tk w/105mm Gun
Tank	AMX-13 HOT LT	1440000	288	FRA	Lt Tk w/HOT ATGM
Tank	AMX-13 SS-11 LT	1435000	287	FRA	Lt Tk w/SS-11 ATGM
Tank	AMX-30 MBT	4340000	868	FRA	MBT w/105mm Gun
Tank	AMX-30B2 MBT	3830000	766	FRA	AMX-30 MBT W/Increased Armor
Tank	AMX-30S MBT	3680000	736	FRA	AMX-30 MBT For Desert Opns
Tank	AMX-32 MBT	4700000	940	FRA	AMC-30 For Export
Tank	AMX-40 MBT	5710000	1142	FRA	MBT w/120mm Gun
Tank	SK-105 MBT	990000	198	AUS	MBT w/105mm Gun
Tank	EET1-105 MBT	3990000	798	BRA	MBT w/105mm Gun
Tank	EET1-120 MBT	5475000	1095	BRA	MBT w/120mm Gun
Tank	X-1A1 LT	1670000	334	BRA	Lt Tk w/90mm Gun
Tank	X-1A2 LT	1790000	358	BRA	Improved X-1A1 Lt Tk
Tank	XS-30-105 MBT	4040000	808	BRA	MBT w/105mm Gun
Tank	XS-30-120 MBT	5525000	1105	BRA	MBT w/120mm Gun
Tank	VIJAYANTA MBT	2500000	500	IND	MBT w/105mm Gun
Tank	M-4 MBT	1335000	267	ISR	MBT w/105mm Gun
Tank	M-47 RKM MBT	3320000	664	ISR	ReMade US M-47 MBT w/105mm Gun
Tank	MERKAVA I MBT	3290000	658	ISR	MBT w/105mm Gun
Tank	MERKAVE II MBT	5000000	1000	ISR	MBT w/120mm Gun
Tank	TI-67 MBT	2555000	511	ISR	Re-made T-55 MBT w/105mm Gun
Tank	ARIETE MBT	5305000	1061	ITA	MBT w/120mm Gun
Tank	OF-40 MBT	3840000	768	ITA	MBT w/105mm Gun
Tank	TYPE61 MBT	940000	188	JAP	MBT w/90mm Gun
Tank	TYPE74 MBT	3035000	607	JAP	MBT w/105mm Gun
Tank	KHALID MBT	3935000	787	JOR	MBT w/120mm Gun
Tank	TARIQ MBT	1845000	369	JOR	Improved Centurion MK13 MBT
Tank	NKLT LT	1435000	287	NKOR	Lt Tk w/75mm Gun & SS-11 ATGM

ARMOR WEAPONS

Tanks (Main Battle/Light)					
System	Name	TLI	OLI	Nation	Description
Tank	T-54-55 NK MBT	2155000	431	NKOR	Improved USSR T-54 MBT
Tank	TYPE59 NK MBT	1840000	368	NKOR	MBT w/100mm Gun
Tank	NM-116 MBT	845000	169	NOR	MBT w/90mm Gun
Tank	K-1 MBT	4380000	876	ROK	MBT w/105mm Gun (aka Type88)
Tank	K-1 MBT FO	5720000	1144	ROK	K-1 MBT Follow-On w/120mm Gun
Tank	M-47E1 MBT	2260000	452	SPA	ImprovedUS M-47 MBT
Tank	M-47E2 MBT	3075000	615	SPA	Improved US M-47 MBT
Tank	IKV-91-90 MBT	1365000	273	SWE	MBT w/90mm Gun
Tank	IKV-91-105 MBT	1470000	294	SWE	MBT w/105mm Gun
Tank	STRV-103 MBT	2580000	516	SWE	MBT w/105mm Gun
Tank	PZ-51 MBT	605000	121	SWS	MBT w/75mm Gun
Tank	PZ-55 MBT	895000	179	SWS	MBT w/84mm Gun (Improved Centrm)
Tank	PZ-58 MBT	1420000	284	SWS	MBT w/90mm Gun
Tank	PZ-61 MBT	2670000	534	SWS	MBT w/105mm Gun
Tank	PZ-68 MBT	2635000	527	SWS	MBT w/105mm Gun
Infantry Fighting Vehicles					
System	Name	TLI	OLI	Nation	Description
IFV	BMD-1 AIFV	920000	184	RUS	Trk Arbrn IFV w/73mm
IFV	BMD-81-1 AIFV	1225000	245	RUS	Trk Arbrn w/300m Gun; ATGM
IFV	BMD-81-2 AIFV	580000	116	RUS	Trk Arbrn IFV w/300mm Gun
IFV	BMP-1 IFV	1430000	286	RUS	Trk IFV w/73mm Gun & AT-3
IFV	BMP-1 AGL IFV	1325000	265	RUS	Trk IFV w/30mm AGL & AT-3
IFV	BMP-2 IFV	2070000	414	RUS	Trk IFV w/30mm & AT-5
IFV	BTR-80 IFV	310000	62	RUS	6-Wheeled IFV w/30mm Gun
IFV	M-2 IFV	2670000	534	USA	Trk IFV w/25mm Gun; TOW ATGM
IFV	V-150 IFV	510000	102	USA	4-Wheeled IFV w/20mm Gun
IFV	MCV-80 IFV	260000	52	UK	Trk IFV w/30mm Gun
IFV	NFV-1 IFV	360000	72	PRC	Trk IFV w/25mm Gun
IFV	NHV-1 IFV	260000	52	PRC	Trk IFV w/30mm Gun
IFV	NVH-1 IFV	985000	197	PRC	Trk IFV w/25mm Gun
IFV	YW-307 IFV	415000	83	PRC	Trk IFV w/25mm Gun
IFV	YW-309 IFV	1335000	267	PRC	Trk IFV w/73mm Gun; Hgin ATGM
IFV	FUCHS-20 IFV	915000	183	GER	6-Wheeled IFV w/20mm Gun
IFV	HS-30 IFV	480000	96	GER	Trk IFV w/20mm Gun
IFV	MARDER IFV	970000	194	GER	Trk IFV w/20mm Gun
IFV	TPZ-1 IFV	305000	61	GER	6-Wheeled IFV
IFV	UR-416 IFV	255000	51	GER	4-Wheeled IFV w/20mm Gun
IFV	WIESEL MK 20A1	210000	42	GER	Trk Arbrn IFV w/20mm Gun
IFV	AMX-10P AIFV	630000	126	FRA	Trk Arbrn IFV (AMX-10PC ACV)
IFV	VAB IFV	795000	159	FRA	6-Wheeled IFV w/20mm Gun
IFV	VCTP IFV	1010000	202	ARG	Trk IFV w/20mm Gun

ARMOR WEAPONS

Infantry Fighting Vehicles					
System	Name	TLI	OLI	Nation	Description
IFV	SAURER IFV	290000	58	AUS	Trk IFV (4K 4FA-G2)
IFV	COBRA IFV	1480000	296	BEL	Trk IFV w/90mm Gun
IFV	EE-11 IFV	890000	178	BRA	6-Wheeled IFV w/20mm Gun
IFV	M1984-1 IFV	2440000	488	BUL	Trk IFV w/30mm Gun; AT-5
IFV	M1984-2 IFV	1700000	340	BUL	Trk IFV w/23mm Gun
IFV	VCC-80 IFV	625000	125	ITA	Trk IFV w/25mm Gun
IFV	TYPE88 IFV	2345000	469	JAP	Trk IFV w/35mm Gun
IFV	YPR-765 IFV	570000	114	NET	Trk IFV w/25mm Gun
IFV	NM-135-20 IFV	585000	117	NOR	Trk IFV w/20mm Gun
IFV	NM-135-25 IFV	1185000	237	NOR	Trk IFV w/25mm Gun
IFV	CHAIM V-300 IFV	385000	77	POR	4-Wheeled IFV w/20mm Gun
IFV	CCV-90 IFV	925000	185	SWE	Trk IFV w/40mm L/70 Gun
IFV	PBV-302 IFV	350000	70	SWE	Trk IFV w/20mm Gun
Reconnaissance And Other Vehicles					
System	Name	TLI	OLI	Nation	Description
Recon	ASU-57 AAV	145000	29	RUS	Trk Arbrn Asslt Veh w/57mm Gun
Recon	ASU-85 AAV	620000	124	RUS	Trk Arbrn Asslt Veh w/85mm Gun
Recon	BRDM-1 SCOUT	10450	2.09	RUS	4-Wheeled Amphibious Scout Car
Recon	BRDM-2 SCOUT	18050	3.61	RUS	4-Wheeled Scout Car w/14.5mm MG
Recon	BTR-40 SCOUT	2750	0.55	RUS	4-Wheeled Scout Car
Recon	BTR-60 SCOUT	15150	3.03	RUS	8-Wheeled Scout Car
Recon	LAV-25	480000	96	USA	8-Wheeled Lt Asslt Veh w/25mm Gun
Recon	LAV-A	2420000	484	USA	8-Wheeled Lt Asslt Veh w/90mm Gun
Recon	M-3 CFV	2985000	597	USA	Trk CFV w/25mm Gun; TOW ATGM
Recon	M-728 AEV	1575000	315	USA	Trk Arm Engr Veh w/165mm Gun
Recon	AVRE AEV	770000	154	UK	Trk Arm Eng Veh
Recon	FERRETT SCOUT	3050	0.61	UK	4-Wheeled Scout Car
Recon	FOX AC	185000	37	UK	4-Wheeled Arm Car w/30mm Gun
Recon	FV-432R SCOUT	210000	42	UK	Trk Recon Veh w/30mm Gun
Recon	PANGA SCOUT	9800	1.96	UK	4-Wheeled Scout Car
Recon	SALADIN AC	510000	102	UK	6-Wheeled Arm Car w/90mm Gun
Recon	SP2-11-2 SCOUT	135000	27	GER	Trk Recon Veh w/20mm Gun
Recon	SP2-22-2 SCOUT	6800	1.36	GER	Trk Recon Vehicle
Recon	AML-245CA AC	510000	102	FRA	4-Wheeled Arm Car w/90mm Gun
Recon	AML-90 AC	740000	148	FRA	4-Wheeled Arm Car w/90mm L/33 Gun
Recon	AMX-10RAC AC	1695000	339	FRA	6-Wheeled Arm Car w/90mm Gun
Recon	AMC-10RC AC	2800000	560	FRA	6-Wheeled Arm Car w/105mm Gun
Recon	EBR-75 AC	640000	128	FRA	8-Wheeled Arm Car w/75mm Gun
Recon	EBR-90 AC	1335000	267	FRA	8-Wheeled Arm Car w/90mm Gun
Recon	ERC-90 AC	1140000	228	FRA	8-Wheeled Arm Car w/90mm Gun
Recon	RPX-6000 SCOUT	20600	4.12	FRA	4-Wheeled Scout

ARMOR WEAPONS

Reconnaissance And Other Vehicles					
System	Name	TLI	OLI	Nation	Description
Recon	RPX-90 AC	2630000	526	FRA	4-Wheeled Arm Car w/90mm Gun
Recon	VBC-90 AC	2235000	447	FRA	4-Wheeled Arm Car w/90mm Gun
Recon	FN-4RN LT AC	235000	47	BEL	4-Wheeled Lt Arm Car w/60mm Mtr
Recon	FN-4RM-90 AC	1070000	214	BEL	4-Wheeled ArmCar w/90mm Gun
Recon	EE-9 CASCAVLE AC	1540000	308	BRA	6-Wheeled Arm Car w/90mm Gun
Recon	JARARACA EE-3	9550	1.91	BRA	4-Wheeled Scout Car
Recon	URUTU AC	1410000	282	BRA	6-Wheeled Arm Car w/90mm Gun
Recon	COUGAR AG	735000	147	CAN	6-Wheeled Arm Car w/76mm Gun
Recon	LYNX-50 SCOUT	15950	3.19	CAN	Trk Recon Vehicle
Recon	LEONIDAS SCOUT	1370000	274	GRE	Trk Recon Vehicle w/90mm Gun
Recon	D-944 SCOUT	14100	2.82	HUN	4-Wheeled Scout Car (A la BRDM)
Recon	OT-65 SCOUT	4200	0.84	HUN	4-Wheeled Scout Car
Recon	RBY-1 SCOUT	13650	2.73	ISR	4-Wheeled Scout Car
Recon	OTO-MELARA 6616	505000	101	ITA	4-Wheeled Scout Car w/20mm Gun
Recon	CENTAURO AC	2210000	442	ITA	8-Wheeled Arm Car w/105mm Gun
Recon	LYNX-25 SCOUT	350000	70	NET	Trk Recon Vehicle
Recon	CHAIM V-400 AC	1980000	396	POR	Trk Recon Vehicle w/90mm Gun
Recon	ELAND-20 AC	665000	133	SAFR	4-Wheeled Arm Car w/20mm Gun
Recon	ELAND-60 AC	220000	44	SAFR	4-Wheeled Arm Car w/60mm Mtr
Recon	ELAND-90 AC	770000	154	SAFR	4-Wheeled Arm Car w/90mm Gun
Recon	VEC AC	1125000	225	SPA	6-Wheeled Arm Car w/25mm Gun
Recon	VEC-3562 AC	2365000	473	SPA	6-Wheeled Arm Car w/90mm Gun
Recon	SHARK AC	2025000	405	SWS	8-Wheeled Arm Car w/105mm Gun
Recon	SPY AC	525000	105	SWS	4-Wheeled Arm Car w/20mm Gun

ARTILLERY WEAPONS

Field Guns And Howitzers					
System	Name	TLI	OLI	Nation	Description
ARTY	B-4 HOW	755000	151	RUS	203mm Towed Howitzer
ARTY	BS-3 GUN	855000	171	RUS	100mm Towed Field Gun
ARTY	D-1 HOW	865000	173	RUS	152mm Towed Howitzer (M-1943)
ARTY	D-20 GUN-HOW	995000	199	RUS	152mm Towed Gun-Howitzer
ARTY	D-30 HOW	905000	181	RUS	122mm Towed Howtizer
ARTY	D-44 GUN	485000	97	RUS	85mm Towed Field Gun
ARTY	D-74 GUN	990000	198	RUS	122mm Towed Field Gun
ARTY	DONGUZ GUN	1255000	251	RUS	152mmSP Field Gun (M-1981)
ARTY	M-46 GUN	1240000	248	RUS	140mm Towed Field Gun
ARTY	M-76 PERMGUN	1195000	239	RUS	152mm Towed Field Gun
ARTY	M-1966 GUN	255000	51	RUS	76mm Towed Field Gun
ARTY	M-1973 2S3 HOW	1080000	216	RUS	152mm SP Howitzer
ARTY	M-1974 2S1 HOW	960000	192	RUS	122mm SP Howitzer
ARTY	M-1975 2S7 HOW	790000	158	RUS	203mm SP Howitzer
ARTY	M-1976 GUN	1045000	209	RUS	152mm Towed FG (M-76 Variant)
ARTY	ML-20 GUN-HOW	995000	199	RUS	152mm Towed Gun-Howitzer
ARTY	S-23 GUN	965000	193	RUS	180mm Towed Field Gun
ARTY	SP-2S9 HOW	500000	100	RUS	120mm SP Howitzer
ARTY	ZIS-3 GUN	390000	78	RUS	76mm Towed Field Gun
ARTY	M-44 HOW	965000	193	USA	155mm SP Howitzer
ARTY	M-52 HOW	595000	119	USA	105mm SP Howitzer
ARTY	M-101 HOW	515000	103	USA	105mm Towed Howitzer
ARTY	M-102 HOW	525000	105	USA	105mm Towed Howitzer
ARTY	M-107 GUN	1245000	249	USA	175mm SP Field Gun
ARTY	M-108 HOW	610000	122	USA	105mm SP Howitzer
ARTY	M-109 HOW	1010000	202	USA	155mm SP Howitzer
ARTY	M-109A1/2/3 HOW	1115000	223	USA	155mm SP Howitzer
ARTY	M-110 HOW	790000	158	USA	203mm SP Howitzer
ARTY	M-110A1/2 HOW	865000	173	USA	203mm SP Howitzer
ARTY	M-119 HOW	490000	98	USA	105mm Towed Howitzer
ARTY	M-198 HOW	1115000	223	USA	155mm Towed Howitzer
ARTY	ABBOT HOW	730000	146	UK	105mm SPHowitzer
ARTY	AS-90 HOW	1230000	246	UK	155mm SP Howitzer
ARTY	GH-25PDR GN-HOW	390000	78	UK	87mm Towed Gun-Howitzer
ARTY	L-5 HOW	510000	102	UK	105mm Towed Howitzer
ARTY	L-118 GUN-HOW	660000	132	UK	105mm Towed Gun-Howitzer
ARTY	TYPE54 GUN	355000	71	PRC	76mm Towed Field Gun
ARTY	TYPE54 HOW	795000	159	PRC	122mm Towed Howitzer
ARTY	TYPE54-1 HOW	875000	175	PRC	122mm SP Howitzer
ARTY	TYPE56 GUN-HOW	995000	199	PRC	152mm Towed Gun-Howitzer
ARTY	TYPE56 HOW	890000	178	PRC	152mm Towed Howitzer

ARTILLERY WEAPONS

Field Guns And Howitzers					
System	Name	TLI	OLI	Nation	Description
ARTY	TYPE59 GUN	595000	119	PRC	100mm Towed Field GUn
ARTY	TYPE59-1 GUN	1050000	210	PRC	130mm Towed Field Gun
ARTY	TYPE60 GUN	990000	198	PRC	122mm Towed Field Gun
ARTY	TYPE80 HOW	1080000	216	PRC	152mm SP Howitzer
ARTY	TYPE83 GUN	1190000	238	PRC	152mm Towed Field Gun
ARTY	TYPE83 GUN-HOW	1170000	234	PRC	52mm SP Gun-Howitzer
ARTY	TYPE1967 HOW	835000	167	PRC	122mm S` Howitzer
ARTY	WAC-21 GUN-HOW	1165000	233	PRC	155mm Towed Gun-Howitzer
ARTY	M-109G HOW	1120000	224	GER	155mm SP Howitzer
ARTY	AMX-F3 HOW	1095000	219	FRA	155mm SP Howitzer
ARTY	AMX-M61 HOW	725000	145	FRA	105mm SP HOwitzer
ARTY	AUF-1 GCT HOW	1215000	243	FRA	155mm SP Howitzer
ARTY	FP-50 HOW	990000	198	FRA	155mm Towed Hoitzer
ARTY	TR HOW	995000	199	FRA	155mm Towed Howitzer
ARTY	FH-70 GUN-HOW	1115000	223	INTL	155mm Towed Gun-Howitzer
ARTY	SP-70 GUN-HOW	1230000	246	INTL	155mm SP Gun-Howitzer
ARTY	GHN-45 GUN-HOW	1165000	233	AUS	155mm Towed Gun-Howitzer
ARTY	GC-45 GUN-HOW	1165000	233	BEL	155mm Towed Gun-Howitzer
ARTY	C-1 HOW	540000	108	CAN	105mm Towed Howitzer
ARTY	DANA HOW	1015000	203	CZCH	152mm Towed Howitzer
ARTY	M-78 DANA HOW	1120000	224	CZCH	152mm SP Howitzer
ARTY	RO-2001 HOW	950000	190	EGP	122mm SP Howitzer
ARTY	M-60 GUN	1025000	205	FIN	122mm Towed Field Gun
ARTY	M-74 GUN-HOW	1130000	226	FIN	155mm Towed Gun-Howitzer
ARTY	L-33 GUN-HOW	1150000	230	ISR	155mm SP Gun-Howitzer
ARTY	M-68 GUN-HOW	1110000	222	ISR	155mm Towed Gun-Howitzer
ARTY	M-71 GUN-HOW	1110000	222	ISR	155mm Towed Gun-Howitzer
ARTY	M-72 GUN-HOW	1165000	233	ISR	155mm SP Gun-Howitzer
ARTY	M-839P GUN-HOW	1090000	218	ISR	155mm SP Gun-Howitzer
ARTY	M-56 PACK HOW	565000	113	ITA	105mm Towed Howitzer
ARTY	PALMARIA HOW	1200000	240	ITA	155mm SP Howitzer
ARTY	TYPE70 HOW	730000	146	JAP	105mm SP Howitzer
ARTY	TYPE75 HOW	1115000	223	JAP	155mm SP Howitzer
ARTY	M-1974 GUN-HOW	1045000	209	NKOR	152mm SP Gun-Howitzer
ARTY	M-1975 GUN	1005000	201	NKOR	130mm SP Field Gun
ARTY	M-1977 HOW	950000	190	NKOR	122mm SP Field Gun
ARTY	M-1978 GUN	1010000	202	NKOR	180mm SP Field Gun
ARTY	M-1981 GUN	1040000	208	NKOR	122mm SP Field Gun
ARTY	M-1993 GUN	1195000	239	NKOR	152mm Towed Field Gun
ARTY	KH-178 HOW	640000	128	ROK	105mm Towed Howitzer
ARTY	MH-179 HOW	1115000	223	ROK	155mm Towed Field Gun

ARTILLERY WEAPONS

Field Guns And Howitzers					
System	Name	TLI	OLI	Nation	Description
ARTY	M-53 GUN	1120000	224	ROK	155mm Towed Field Gun
ARTY	SP-130 HOW	1230000	246	ROM	130mm SP Howitzer
ARTY	G-5 HOW	1165000	233	SAFR	155mm Towed Howitzer
ARTY	G-6 GUN-HOW	1280000	256	SAFR	155mm SP Gun-Howitzer
ARTY	MK-4 GUN	790000	158	SAFR	140mm Towed Field Gun
ARTY	SB-155-39 HOW	1115000	223	SPA	155mm Towed Howitzer
ARTY	M-26 HOW	1380000	276	SPA	122mm Towed Howitzer
ARTY	FH-77 HOW	1080000	216	SWE	155mm Towed Howitzer
ARTY	M-39 HOW	915000	183	SWE	150mm Towed Howitzer
ARTY	D-30 HOW	950000	190	SYR	122mm SP Howitzer (T-34)
ARTY	M-48 GUN	230000	46	YUG	76mm Towed Field Gun
ARTY	M-56 HOW	530000	106	YUG	105mm Towed Howitzer
ARTY	M-84 HOW	985000	197	YUG	152mm Towed Howitzer
Multiple Rocket Launchers					
System	Name	TLI	OLI	Nation	Description
MRLS	ASTRO II MRL	965000	193	BRA	108mm 16-Round MRL
MRLS	BM-11 MRL	2020000	404	NKOR	122mm 30-Round MRL
MRLS	BM-13 MRL	1365000	273	RUS	132mm 16-Round MRL
MRLS	BM-14 MRL	1255000	251	RUS	140mm 16-Round MRL
MRLS	BM-14-17 MRL	1280000	256	RUS	140mm 17-Round MRL
MRLS	BM-14-19 MRL	1700000	340	PRC	130mm 19-Round MRL
MRLS	BM-21 MRL	2020000	404	RUS	122mm 40-Round MRL
MRLS	BM-24 MRL	895000	179	RUS	240mm 12-Round MRL
MRLS	BM-27 MRL	1495000	299	RUS	220mm 16-Round MRL
MRLS	BM-49 MRL	1700000	340	PRC	130mm 19-Round MRL
MRLS	BM-1975 MRL	1640000	328	RUS	122mm 12-Round Arbm MRL
MRLS	MBD-20 MRL	820000	164	RUS	200mm 4-Round MRL
MRLS	D-3 MRL	695000	139	SPA	300mm 10-Round MRL
MRLS	E-3 MRL	995000	199	SPA	216mm 21-Round MRL
MRLS	FIROS-6 MRL	290000	58	ITA	51mm 48-Round MRL
MRLS	FIROS-30 MRL	2195000	439	ITA	122mm 40-Roung MRL
MRLS	G-3 MRL	515000	103	SPA	381mm 8-Round MRL
MRLS	FRAD-1 MTLB MRL	2115000	423	RUS	122mm 36-Round MRL
MRLS	KOOR YONG MRL	2230000	446	ROK	130mm 32-Round MRL
MRLS	KUNG FENG MRL	1535000	307	TAI	130mm 32-Round MRL
MRLS	KUNG FENG 4 MRL	1670000	334	TAI	117mm 45-Round MRL
MRLS	LAR-160 MRL	2020000	404	ISR	160mm 13-Round MRL
MRLS	LARS MRL	1555000	311	GER	110mm 36-Round MRL
MRLS	M-51 MRL	1490000	298	CZCH	130mm 32-Round MRL
MRLS	M-63 PLAMAON MRL	1450000	290	YUG	128mm 32-Round MRL
MRLS	M-70 MRL	2025000	405	CZCH	122mm 40-Round MRL

ARTILLERY WEAPONS

Multiple Rocket Launchers					
System	Name	TLI	OLI	Nation	Description
MRLS	M-1977 OGAN MRL	2120000	424	YUG	128mm 32-Round MRL
MRLS	M-1979 MRL	1990000	398	ROM	122mm 40-Round MRL
MRLS	M-1981 MRL	2025000	405	PRC	122mm 40-Round MRL
MRLS	MAR-290 MRL	705000	141	ISR	290mm 4-Round MRL
MRLS	MAR-290 II MRL	475000	95	ISR	350mm 4-Round MRL
MRLS	MLRS	1555000	311	USA	227mm 12-Round MRL
MRLS	MRL-180	1025000	205	PRC	180mm 10-Round MRL
MRLS	NK-107 MRL	905000	181	NKOR	107mm 12-Round MRL
MRLS	PAMPERO MRL	1160000	232	ARG	105mm 16-Round MRL
MRLS	RPU-14 MRL	1195000	239	RUS	140mm 16-Round MRL
MRLS	SAKR-30 MRL	1715000	343	EGP	122mm 15-Round MRL
MRLS	TERUEL MRL	1745000	349	SPA	140mm 40-Round MRL
MRLS	TYPE63-19 MRL	1670000	334	PRC	130mm 19-Round MRL
MRLS	TYPE63-107 MRL	860000	172	PRC	107mm 12-Round MRL
MRLS	TYPE63-130 MRL	1255000	251	PRC	130mm 12-Round MRL
MRLS	TYPE67 MRL	285000	57	JAP	300mm 2-Round MRL
MRLS	TYPE70 MRL	1640000	328	PRC	130mm 19-Round MRL
MRLS	TYPE74 MDS	740000	148	PRC	284mm 10-Rds MRL (Mine Delivery)
MRLS	TYPE75 MRL	1965000	393	JAP	130mm 30-Round MRL
MRLS	TYPE81 MRL	1355000	271	PRC	107mm 12-Round MRL
MRLS	TYPE82 MRL	1485000	297	PRC	130mm 30-Round MRL
MRLS	TYPE83 MDS	840000	168	PRC	273mm 4-Rds MRL (Mine Delivery)
MRLS	TYPE83 MRL	2020000	404	PRC	122mm 24-Round MRL
MRLS	TYPE85 MRL	2125000	425	PRC	122mm 40-Round MRL
MRLS	VAP MRL	890000	178	EGP	80mm 12-Round MRL
MRLS	WP-8 MRL	880000	176	POL	140mm 8-Round MRL
Surface-To-Surface Missiles					
System	Name	TLI	OLI	Nation	Description
SSM	FROG-2 SSM	75000	15	RUS	Surface -to-Surface Missile
SSM	FROG-3 SSM	165000	33	RUS	Surface-to-Suface Missile
SSM	FROG-5 SSM	330000	66	RUS	Surface-to-Suface Missile
SSM	FROG-7 SSM	200000	40	RUS	Surface-to-Suface Missile
SSM	GLCM SSM	790000	158	USA	Ground Launched Cruise Missile
SSM	GREENBEE SSM	460000	92	TAI	Surface-to-Suface Missile
SSM	HADES SSM	185000	37	FRA	Surface-to-Suface Missile
SSM	LANCE SSM	480000	96	USA	Surface-to-Suface Missile
SSM	PLUTON	225000	45	FRA	Surface-to-Suface Missile
SSM	SS-1B SCUD-A	240000	48	RUS	Surface-to-Suface Missile
SSM	SS-1C SCUD-B	320000	64	RUS	Surface-to-Suface Missile
SSM	SS-2B SSM	120000	24	RUS	Surface-to-Suface Missile
SSM	SS-21 SSM	510000	102	RUS	Surface-to-Suface Missile

ARTILLERY WEAPONS

Surface-To-Surface Missiles					
System	Name	TLI	OLI	Nation	Description
SSM	SS-21M2 SSM	700000	140	RUS	Surface-to-Suface Missile
SSM	SS-21M3 SSM	240000	48	RUS	Surface-to-Suface Missile
SSM	SS-23 SSM	430000	86	RUS	Surface-to-Suface Missile

INFANTRY WEAPONS

Small Arms					
System	Name	TLI	OLI	Nation	Description
Small Arms	AK-47 ASSLT RFL	950	0.19	RUS	Assault Rifle 7.62mm
Small Arms	AKM ASSLT RFL	950	0.19	RUS	Assault Rifle 7.62mm
Small Arms	AKR SMG	900	0.18	RUS	Submachine Gun 5.45mm
Small Arms	AKS-74 ASSLT RFL	1000	0.2	RUS	Assault Rifle 5.45mm
Small Arms	MAKAROV	150	0.03	RUS	Pistol 9mm
Small Arms	NSV HMG	7150	1.43	RUS	Heavy Machine Gun 12.7mm
Small Arms	PK MG	2400	0.48	RUS	Machine gun 7.62mm
Small Arms	RPD LTMG	1050	0.21	RUS	Light Machine Gun 7.62mm
Small Arms	RPK LTMG	1050	0.21	RUS	Light Machine Gun 7.62mm
Small Arms	RPK-74 LTMG	850	0.17	RUS	Light Machine Gun 5.45mm
Small Arms	RPK-74 LTMG FO	1750	0.35	RUS	RPK-74 LTMG 5.45mm Follow-on
Small Arms	SGM MG	2200	0.44	RUS	Machine Gun 7.62mm
Small Arms	SVD SNIPER RFL	350	0.07	RUS	Sniper Rifle 7.62mm
Small Arms	M-1 CARBINE	250	0.05	USA	Carbine .30 Cal.
Small Arms	M-1 RFL	300	0.06	USA	Rifle .30 Cal.
Small Arms	M-2 HB HMG	5150	1.03	USA	Heavy Machine Gun .50 Cal.
Small Arms	M-14 RFL	1550	0.31	USA	Rifle 7.62mm
Small Arms	M-16A1 ASSLT RFL	1850	0.37	USA	Assault Rifle 5.56mm
Small Arms	M-16A2 ASSLT RFL	1950	0.39	USA	Assault Rifle 5.56mm
Small Arms	M-60 MG	1800	0.36	USA	Machine gun 7.62mm
Small Arms	M-203 GRND LNCH	19500	3.9	USA	40mm Grenade Launcher
Small Arms	M-231 FPW	1600	0.32	USA	Firing Port Weapon 5.56mm
Small Arms	M-1911A1	150	0.03	USA	Pistol .45 Cal.
Small Arms	M-1919A1 MG	1750	0.35	USA	Machine Gun .30 Cal
Small Arms	L-1A1 RFL	300	0.06	UK	Rifle 7.62mm
Small Arms	L-4A4 GPMG	1600	0.32	UK	General Purpose MG 7.62mm
Small Arms	L-7A2 MG	3200	0.64	UK	Machine Gun 7.62mm
Small Arms	L-8A2 GPMG	2400	0.48	UK	General Purpose MG 7.62mm
Small Arms	M-08 MMG	1650	0.33	PRC	Medium Machine Gun 7.92mm
Small Arms	RP-46 MG	950	0.19	PRC	Machine Gun 7.62mm
Small Arms	TYPE43 SMG	750	0.15	PRC	Submachine Gun 7.62
Small Arms	TYPE 50 SMG	1050	0.21	PRC	Submachine Gun 7.62mm
Small Arms	TYPE53 CARBINE	300	0.06	PRC	Carbine 7.62mm
Small Arms	TYPE53 LTMG	950	0.19	PRC	Light Machine Gun 7.62mm
Small Arms	TYPE53 MMG	950	0.19	PRC	Medium Machine Gun 7.62mm
Small Arms	TYPE54 HMG	2400	0.48	PRC	Heavy Machine Gun 7.62mm
Small Arms	TYPE56 CARBINE	300	0.06	PRC	Carbine 7.62mm
Small Arms	TYPE56 LTMG	1050	0.21	PRC	Light Machine Gun 7.62mm
Small Arms	TYPE56 RFL	950	0.19	PRC	Rifle 7 62mm
Small Arms	TYPE56 SMG	700	0.14	PRC	Submachine Gun 7.62mm
Small Arms	TYPE57 MMG	100	0.02	PRC	Medium Machine Gun 7.62mm

INFANTRY WEAPONS

Small Arms					
System	Name	TLI	OLI	Nation	Description
Small Arms	TYPE58 LTMG	950	0.19	PRC	Light Machine Gun 7.62mm
Small Arms	TYPE64 SMG	1350	0.27	PRC	Silenced Submachine Gun 7.62mm
Small Arms	TYPE67 LTMG	1050	0.21	PRC	Light Machine Gun 7.62mm
Small Arms	TYPE68 RFL	1200	0.24	PRC	Rifle 7.62mm
Small Arms	TYPE80 GPMG	50	0.01	PRC	General Purpose Machine Gun 7.62
Small Arms	TYPE81 LTMG	450	0.09	PRC	Light Machine Gun 7.62mm
Small Arms	ZB-26 LTMG	1550	0.31	PRC	Light Machine Gun 7.62mm
Small Arms	G-3 RFL	1200	0.24	GER	Rifle 7.62mm
Small Arms	MG-3	3800	0.76	GER	Machine gun 7.62mm
Small Arms	FA-MAS RFL	1900	0.38	FRA	Rifle 5.56mm
Small Arms	FR-F1 RFL	300	0.06	FRA	Rifle 7.5mm
Small Arms	M-49-56 RFL	250	0.05	FRA	Rifle 7.5mm
Small Arms	MAT-49 SMG	700	0.14	FRA	Submachine Gun 9mm
Small Arms	PAMLE 50	150	0.03	FRA	Pistol 9mm
Small Arms	M-240 MG	3450	0.69	BEL	Machine Gun7.62
Small Arms	M-249 SAW	1200	0.24	BEL	Squad Asslt Weapon 5.56mm
Small Arms	BROWNING HP	150	0.03	CAN	Submachine Gun Pistol 9mm
Small Arms	M-49 SMG	700	0.14	DEN	Pistol 9mm
Small Arms	MG-42-59	3800	0.76	DEN	Machine Gun 7.62mm
Small Arms	SIG-210	150	0.03	DEN	Pistol
Small Arms	SIG-P220	150	0.03	DEN	Pistol
Small Arms	BERETTA	150	0.03	ITA	Pistol
Small Arms	K-1 SMG	1350	0.27	ROK	Submachine Gun 5.56mm
Other Weapons					
System	Name	TLI	OLI	Nation	Description
Oth Wpns	AGS-17 AGL	18750	3.75	RUS	Auto Grnd Launcher
Oth Wpns	ARMED LANDROVER	1200	0.24	UK	4-Wheeled Land Rover w/7.62mm MG
Oth Wpns	AT-P	1950	0.39	RUS	Tracked Arty Tractor
Oth Wpns	BV-206C	2500	0.5	SWE	Tracked Oversnow PC
Oth Wpns	BV-202	1750	0.35	SWE	Tracked Oversnow PC
Oth Wpns	FAV-AGL	1570000	314	USA	HUMMV Fast Atk Veh w/MK-19 AGL
Oth Wpns	FV-4006 ARV	2200	0.44	UK	Tracked Armd Recovery Vehicle
Oth Wpns	FV-4018 BARV	1600	0.32	UK	Tracked Beach Armd Recvy Vehicle
Oth Wpns	FV-4204 ARV	7550	1.51	UK	Tracked Armd Recovery Vehicle
Oth Wpns	MK-19	290000	58	USA	40mm Grenade Launcher
Oth Wpns	M-79 AGL	19750	3.95	USA	40mm Grenade Launcher
Oth Wpns	M-578 ARV	6600	1.32	USA	Tracked Armd Recovery Vehicle
Oth Wpns	SAMSON	6150	1.23	UK	Tracked Armd Recovery Vehicle
Mortars					
System	Name	TLI	OLI	Nation	Description
Mortars	51mm MTR	55000	11	UK	Manpack

INFANTRY WEAPONS

Mortars					
System	Name	TLI	OLI	Nation	Description
Mortars	60mm MTR	80000	16	GNRC	Towed - Generic
Mortars	60mm BRANDT MTR	90000	18	FRA	Manpack
Mortars	60mm KM-19 MTR	85000	17	ROK	Manpack
Mortars	60mm M-19 MTR	85000	17	USA	Manpack
Mortars	60mm M-57 MTR	85000	17	YUG	Manpack
Mortars	60mm TYPE31 MTR	85000	17	PRC	Manpack
Mortars	60mm TYPE63 MTR	90000	18	PRC	Manpack
Mortars	81mm MTR	215000	43	GNRC	Manpack - Generic
Mortars	81mm MTR	225000	45	GNRC	Tracked SP - Generic
Mortars	81mm AMXBVCI MTR	280000	56	FRA	Tracked SP
Mortars	81mm BRANDT MTR	230000	46	FRA	Towed
Mortars	81mm BREDA MTR	210000	42	ITA	Towed
Mortars	81mm ECIA MTR	225000	45	SPA	Manpack
Mortars	81mm FBP MTR	210000	42	POR	Manpack
Mortars	81mm FV-432 MTR	240000	48	UK	Tracked SP (FV-432)
Mortars	81mm L-16 MTR	230000	46	UK	Towed
Mortars	81mm M-3 MTR	265000	53	ISR	Half-Track SP
Mortars	81mm M-125 MTR	225000	45	USA	Tracked SP (M-113)
Mortars	81mm M-1937 MTR	185000	37	RUS	Towed
Mortars	81mm M-29A1 MTR	215000	43	USA	Manpack
Mortars	81mm SOLTAM MTR	240000	48	ISR	Manpack
Mortars	81mm SOLTAM MTR	255000	51	SPA	Tracked SP (M-113)
Mortars	81mm XM-252 MTR	230000	46	USA	Manpack
Mortars	82mm M-37/42 MTR	205000	41	EGP	Tracked SP (M-113)
Mortars	82mm M-1941 MTR	175000	35	RUS	Manpack
Mortars	82mm PODINGS MTR	220000	44	RUS	Manpack
Mortars	82mm TYPE53 MTR	185000	37	PRC	Manpack
Mortars	82mm TYPE67 MTR	185000	37	PRC	Manpack
Mortars	82mm TYPE 63 MTR	185000	37	PRC	Tracked SP (YW-531)
Mortars	82mm VASILEK MTR	385000	77	RUS	Tracked SP Auto
Mortars	107mm MTR	385000	77	GNRC	Towed - Generic
Mortars	107mm MTR	395000	79	GNRC	Tracked SP - Generic
Mortars	107mm M-30 MTR	375000	75	USA	Towed
Mortars	107mm M-106 MTR	315000	63	USA	Tracked SP (M-113)
Mortars	107mm M-1938 MTR	340000	68	RUS	Mountain Pack
Mortars	120mm AM-60 MTR	500000	100	FRA	Brandt M-120-60
Mortars	120mm AM-65 MTR	500000	100	FRA	M0-120-AM-50 Towed
Mortars	120mm B-24 MTR	455000	91	CZCH	Towed
Mortars	120mm BRANDT MTR	535000	107	FRA	MO-120-AM-50 6-Wheeled SP
Mortars	120mm CHAIM MTR	415000	83	POR	Chaimite 4-Wheeled SP
Mortars	120mm ECIA MTR	480000	96	SPA	Towed

INFANTRY WEAPONS

Mortars					
System	Name	TLI	OLI	Nation	Description
Mortars	120mm HS-30 MTR	455000	91	GER	Tracked SP
Mortars	120mm M-73 MTR	480000	96	FIN	Tampella Towed
Mortars	120mm M-1943 MTR	425000	85	RUS	Towed
Mortars	120mm M-1943 MTR	465000	93	NKOR	Tracked SP
Mortars	120mm MTLB MTR	455000	91	RUS	Tracked SP
Mortars	120mm RT-61 MTR	480000	96	FRA	Towed
Mortars	120mm SOLTAM K6	460000	92	SPA	Towed
Mortars	120mm SOLTAM M3	465000	93	ISR	Half-Tracked SP
Mortars	120mm SOLTAM MTR	485000	97	SPA	Tracked SP (M-113)
Mortars	120mmSP1202S12	415000	83	RUS	Tracked SP
Mortars	120mm TOSAM MTR	480000	96	TUR	Towed
Mortars	120mm TYPE55 MTR	425000	85	PRC	Towed
Mortars	120mm YP-408 MTR	455000	91	NET	8-Wheeled SP
Mortars	160mm M-4 MTR	570000	114	ISR	Tracked SP
Mortars	160mm M-160 MTR	510000	102	RUS	Towed
Mortars	160mm SOLTM MTR	545000	109	ISR	Towed
Mortars	160mm TYPE55 MTR	510000	102	PRC	Towed
Mortars	160mm TYPE56 MTR	435000	87	PRC	Towed
Mortars	240mm M-240 MR	360000	72	RUS	Towed (Nuclear-Cap)
Mortars	240mm M-1975 MTR	375000	75	RUS	Tracked SP
Mortars	240mm M-1975 FO	415000	83	RUS	M-1975 Follow-on
Armored Personal Carriers					
System	Name		OLI	Nation	Description
APC	BMD APC M1979	9950	1.99	RUS	Trk Arbrn APC w/7.62mm MG
APC	BTR-40 APC	2900	0.58	RUS	4-Wheeled APC
APC	BTR-50 APC	3750	0.75	RUS	Trk APC
APC	BTR-60 APC	5750	1.15	RUS	8-Wheeled APC
APC	BTR-60P APC	8900	1.78	RUS	8-Wheeled APC w/12.7mm MG
APC	BTR-60PB APC	15150	3.03	RUS	8-Wheeled APC w/Turret 14.5 MG
APC	BTR-70 APC	17000	3.4	RUS	8-Wheeled APC
APC	BTR-70 APC FO	17400	3.48	RUS	BTR-70 Follow-On
APC	BTR-80 ACV	17850	3.57	RUS	6-Wheeled Arm Command Veh
APC	BTR-80 APC	27350	5.47	RUS	6-Wheeled APC
APC	BTR-152 APC	4900	0.98	RUS	6-Wheeled APC
APC	M-1974 ACRV	10500	2.1	RUS	Trk Artillery Support Veh
APC	MTLB APC	6150	1.23	RUS	Trk APC
APC	LAV-L	9800	1.96	USA	8-Wheeled Lt Asslt Veh-Logistical
APC	LVTP-5 AAV	4100	0.82	USA	Trk Amphib Asslt Veh
APC	LVTP-7 AAV	22750	4.55	USA	Trk Amphib Asslt Veh
APC	M-59 APC	8100	1.62	USA	Trk APC
APC	M-75 APC	9250	1.85	USA	Trk APC

INFANTRY WEAPONS

Armored Personal Carriers					
System	Name		OLI	Nation	Description
APC	M-113 APC	13450	2.69	USA	Trk APC
APC	M-577 ACV	12750	2.55	USA	Trk APC
APC	FAHD APC	19150	3.83	UK	4-Wheeled APC
APC	FV-432 APC/ACV	3900	0.78	UK	Trk APC/Command Veh
APC	SARACEN APC	3700	0.74	UK	6-Wheeled APC
APC	SAXON APC/ACV	4050	0.81	UK	4-Wheeled APC/Command Veh
APC	SHORLAND APC	4250	0.85	UK	4-Wheeled APC/Internal Security
APC	SPARTAN APC	9250	1.85	UK	Trk APC
APC	SULTAN ACV	7300	1.46	UK	Trk APC
APC	B-64 APC	3050	0.61	PRC	4-Wheeled APC
APC	TYPE55 APC	2750	0.55	PRC	4-Wheeled APC
APC	TYPE56 APC	4750	0.95	PRC	6-Wheeled APC
APC	TYPE63 APC	5100	1.02	PRC	Trk APC (aka YW531)
APC	WZ-551 APC	7150	1.43	PRC	6-Wheeled APC
APC	WZ-701 ACV	5200	1.04	PRC	Trk Arm Command Veh
APC	YW-534 APC	12700	2.54	PRC	Trk APC
APC	M-1984 APC	15450	3.09	PRC	6-Wheeled APC
APC	FUCHS APC	16400	3.28	GER	6-Wheeled APC
APC	M-113 APC GER	8750	1.75	GER	Trk APC (M-113 Modified)
APC	WIESEL APC	2600	0.52	GER	Trk Arbrn APC
APC	TPZ-50 APC	14400	2.88	GER	Trk APC/Fuchs w/.50 Cal MG
APC	AMX-10 SAO/VOA	9600	1.92	FRA	Trk Artillery Sup Veh
APC	AMX-13 VCI APC	8450	1.69	FRA	Trk APC
APC	AMX VCI APC	5950	1.19	FRA	AMX-13 VCI APC w/out Turret
APC	EBR-ETT APC	10850	2.17	FRA	8-Wheeled APC
APC	M-3 VTT APC	16550	3.31	FRA	4-Wheeled APC
APC	RPX-3000 APC	13600	2.72	FRA	4-Wheeled APC
APC	VAB APC	23050	4.61	FRA	Trk APC
APC	VAB PC APC	11850	2.37	FRA	Trk APC
APC	VBL APC	9800	1.96	FRA	4-Wheeled APC
APC	VCR-TT APC	18250	3.65	FRA	6-Wheeled APC
APC	VPX-5000 APC	7400	1.48	FRA	Trk APC
APC	SAURER APC	16750	3.35	AUS	Trk APC (aks 4K 4FA-G1)
APC	BDX APC	5950	1.19	BEL	Timoney 4-Wheeled APC
APC	GRIZZLY APC	20450	4.09	CAN	6-Wheeled APC
APC	OT-62 APC	15350	3.07	CZCH	Trk APC
APC	OT-64A APC	7550	1.51	CZCH	8-Wheeled APC
APC	OT-64B APC	13150	2.63	CZCH	8-Wheeled APC
APC	OT-64C APC	21000	4.2	CZCH	8-Wheeled APC
APC	LEONIDAS APC	12300	2.46	GRE	Trk APC (asa Steyr 4K-7FA)
APC	M-3 HT APC	8700	1.74	ISR	Half-Trk APC

INFANTRY WEAPONS

Armored Personal Carriers					
System	Name		OLI	Nation	Description
APC	OTO-MEL 6614	14500	2.9	ITA	Trk APC
APC	VCC-1 APC	19450	3.89	ITA	Trk APC
APC	VCC-2 APC	15650	3.13	ITA	Trk APC
APC	TYPE73 APC	12650	2.53	JAP	Trk APC
APC	TYPE82 ACV	16050	3.21	JAP	6-Wheeled APC
APC	YP-408 APC/ACV	12400	2.48	NET	8-Wheeled APC/Command Veh
APC	YPR-765 APC/ACV	15900	3.18	NET	Trk APC/ACV/Arty Spt Veh
APC	M-1973-1 APC	10700	2.14	NKOR	Copy of PRC YW-534 Trk APC
APC	M-1973-2 APC	10900	2.18	NKOR	M-1973-1 w/Heavier Weight
APC	M-67 APC	10350	2.07	NKOR	Trk APC
APC	CHAIMITE V-200	40500	8.1	POR	4-Wheeled APC
APC	KIFV APC	23400	4.68	ROK	Trk APC (Copy of US M-113)
APC	ROK ACV	16150	3.23	ROK	Trk Arm Command Veh
APC	TAB-72 APC	16550	3.31	ROM	8-Wheeled APC
APC	BMR-600 APC	20350	4.07	SPA	6-Wheeled APC

COUNTRY REFERENCE			
ARG	Argentina	LIB	Libya
AUS	Australia	NET	Netherlands
BEL	Belgium	NKOR	North Korea
BRA	Brazil	NOR	Norway
BUL	Bulgaria	POL	Poland
CAN	Canada	POR	Portugal
CZCH	Czechoslovakia	PRC	China
DEN	Denmark	ROK	South Korea
EGP	Egypt	ROM	Romania
FIN	Finland	RUS	Russia
FRA	France	SAFR	South Africa
GER	Germany	SPA	Spain
GNRC	Generic	SWE	Sweden
GRE	Greece	SWS	Switzerland
HUN	Hungary	TAI	Thailand
IND	India	TUR	Turkey
INTL	International	UK	United Kingdom
ISR	Israel	USA	United States
ITA	Italy	YUG	Yugoslavia
JAP	Japan		

APPENDIX - C

ORDER OF BATTLE FOR SCERNAIO

U.S Army Heavy Brigade

Artillery

155mm SP Bn (DS)
24 Tubes
155mm SP Bn (GS)
24 Tubes
4.2" Mtrs - 24 Tubes

Attack Helicopters

None

Ground Forces

2 - Armor Battalions (M1A1)
8 X Tank Companies
8 x 14 + 4 M1A1s = 116
2 X Scout Platoons
2 X 6 CFVs = 12
2 X 4.2" Mtr Platoons
2 X 6 Tubes = 12

2 - Mech Battaions (M2)
8 X Mech Companies
8 X 13 + 4 M2s = 108
8 X 9 Dragons = 72
2 X ITV Companies
2 X 12 ITVs = 24
2 X 4.2" Mtr Platoons
2 X 6 Tubes = 12
2 X Scout Platoons
2 X 6 CFVs = 12
48 X Infantry Squads (9 Men Ea)
48 X 3 SAWs = 144
48 X 1 M203 = 48
48 X 5 M16A2 = 240

Samaran 754th Mech Bde

Artillery

2S3 - 152mm Regt (DS)
18 Tubes
2S3 - 152mm Regt (GS)
18 Tubes
Lt. Arty Btry 120 mm Mtr(DS)
12 Tubes
82mm Mtrs
18 Tubes
60mm Mtrs
27 Tubes

Attack Helicopters

None

Ground Forces

3 - Mech Battalions (BMP)
9 X Mech Companies
9 X 12 + 9 BMPs= 117
3 X Recor Platoons
3 X 6 BRDMs= 18(9 AT-5)
3 X 82mm Mtr Platoons
3 X 6 Tubes = 18
9 X Hvy Weapons Platoons
9 X 6 SPG-9s = 54
9 X 3 60mm Mtrs = 27
9 X 4 50 Cal. MG = 36
81 X Infantry Squads (9Men Ea)
81 X 2 M60 MG = 164
81 X 5 AK-47 = 405
81 X 1 RPG-7 = 81
81 X 1 RPK-74 = 81

1 - Tank Regiment (T-72)
3 X Tank Companies
3 X 11 + 2 T-72s = 35
1 X Recon Platoon
1 X 6 BRDMs=6 (3AT-5s)

1- Commando Company

9 X Infantry Squads (9 Men Ea)

- 9 X 1 M60 MG = 9
- 9 X 1 SVD = 9
- 9 X 5 AK-47 = 45
- 9 X 1 RPG-7 = 9
- 9 X 1 RPK-74 = 9

1 X Heavy Weapons Platoon

- 6 X SPG-9 = 6
- 3 X 60mm Mtr = 3 Tubes
- 4 X .50 Cal. MG = 4

APPENDIX - D

QJMA (HERO) EXTERNAL FACTORS

The Following are a listing of the external factors used in the QJMA model. These factors are used in the actual war gaming of engagements. For additional information on the value (in table format) of these factors see T.N. Dupuy's book *Numbers, Predictions and War: Using History to Evaluate Combat Factors and Predict the Outcome of Battles.*

ENVIRONMENTAL
Terrain
Weather
Season
Climate

BEHAVIORAL
Leadership
Training
Experience
Morale
Manpower Quality

OPERATIONAL
Combat Posture
Fortifications
Mobility
Weapons' Lethality
Air Superiority
Surprise
Fatigue
Technical Sophistication
Vulnerability
Logistics
Combat Intelligence
Initiative
Command & Control
Communications
Momentum
Time & Space
Chance & Friction

These are the primary external factors that the QJMA takes into consideration. Overall, there are 73 variables involved with the model. What is listed here are the main variables, from which the remaining variables are subsets of.

This data was provided by Charles F. Hawkins, President of Data Memory Systems, Inc. (DMSi). The Historical Evaluation and Research Organization (HERO) is a division of DMSi.

APPENDIX - E

HOW TO USE THE COF MODEL

The purpose of this appendix is to provide the information and an example of how to use the consolidated COF model.

Step One: Gather the data on the order of battle for both sides. This includes the units, number and type of weapon systems. Record the main units on the **Unit Value Worksheet.** A general guide is to look at units two levels down and one level up.

Step Two: On the **Combat Power Worksheet**, list the unit(s), the type of equipment and amount of each type of equipment. Look up the OLI using the values found in Appendix B. Multiply the OLI by the total number of each type of equipment to get a total value, based on each weapon system. Add the total values from each weapon system category to get a total unit OLI value.

Step Three: Record the unit OLI value on the **Unit Value worksheet.** This now becomes a reference sheet for future operations.

Step Four: On the **Computation of COF Worksheet**, fill out the type unit, quantity of each type unit, percent strength and unit OLI value. Multiply these values together for each type of unit. Add the different units together to get the overall OLI value for both side (Blue and Red).

Step Five: Divide the larger OLI value by the smaller OLI value to determine the COF or force ratio.

This model could be shortened if the unit values were predetermined. If this was the case, then the only worksheet that would be filled out is the **Computation of COF Worksheet.**

The next four pages show an example of how to fill out the worksheets. The last three pages are blank worksheets that can be modified and/or reproduced as needed.

UNIT VALUE WORKSHEET

Red: North Korean Army		Blue: United States Army	
TYPE UNIT	VALUE	TYPE UNIT	VALUE
Independent Tank Regt:		*M1A1 Armor Battalion*	*65039*
Armor Battalion	*21647.8*		
Mech Infantry Battalion	*1160.8*		
AAA Battery	*1039.15*		

Combat Power Worksheet

Type Unit: North Korean Indep. Tank Regiment

Units

Type Weapon System	Weapon Value	Tank Bn		Mech Bn		AAA Btry	
		Number	Value	Number	Value	Number	Value
Armor							
T-62	*691*	*31*	*21421*				
PT-76	*94*	*2*	*188*				
ZSU							
ZSU-57	*171*					*6*	*1026*
Artillery							
Anti-Tank							
RPG-7	*18*			*27*	*486*		
BM-10	*30*			*6*	*180*		
Infantry							
AK-47	*0.19*	*204*	*38.76*	*459*	*87.21*	*67*	*12.73*
RPD	*0.21*			*14*	*2.94*	*2*	*0.42*
82mm MTR M-37	*41*			*9*	*369*		
BTR-60	*1.15*			*31*	*35.65*		
Aircraft							
Total CP Values			**21647.76**		**1160.8**		**1039.15**

Combat Power Worksheet

Organization:

U.S. M1A1 Armor Battalion

Units

Type Weapon System	Weapon Value	Armor Co.		Armor Bn			
		Number	Value	Number	Value	Number	Value
Armor							
M1A1	*1049*	*14*	*14686*	*58*	*60842*		
M-3	*597*			*6*	*3582*		
ADA							
Artillery							
Anti-Tank							
Infantry							
4.2" Mtr	*63*			*6*	*378*		
M16A2	*0.39*	*6*	*2.34*	*238*	*92.82*		
M-2 MG	*1.03*	*1*	*1.03*	*36*	*37.08*		
M-60 MG	*0.36*			*7*	*2.52*		
M113	*2.69*			*11*	*29.59*		
M577	*2.55*			*8*	*20.4*		
M203	*3.9*	*2*	*7.8*	*14*	*54.6*		
Aircraft							
Total CP Values			14697.2		65039		

UNIT VALUE WORKSHEET

Red:		Blue:	
TYPE UNIT	**VALUE**	**TYPE UNIT**	**VALUE**

Combat Power Worksheet

Organization:

Type Weapon System	Weapon Value	Units					
		Number	Value	Number	Value	Number	Value
Armor							
ADA							
Artillery							
Anti-Tank							
Infantry							
Aircraft							
Total CP Values							

COMPUTATION OF COF WORKSHEET

Blue:

TYPE UNIT	UNIT VALUE	% STRENGTH	NUMBER OF UNITS	TOTAL UNIT VALUE
TOTAL VALUE =				

Red:

TYPE UNIT	UNIT VALUE	% STRENGTH	NUMBER OF UNITS	TOTAL UNIT VALUE
TOTAL VALUE =				

COF(M) = LARGE # / SMALL # : SMALL #/SMALL # =

IN FAVOR OF: BLUE OR RED (CIRCLE ONE)