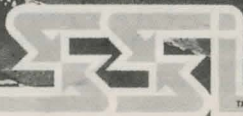


RED LIGHTNINGTM

AN OPERATIONAL GAME OF WORLD WAR III



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Red Lightning Documentation Check:

After you select a scenario or saved game, the computer will ask you to do a documentation check before it will allow you to start the game. This check will take the form of a question about some section of the rules. You have three (3) tries to get the correct response.

EXAMPLE: *Please type the first word of section 2.0 PLAYING THE GAME*

The correct response would be: *Each*

Questions or Problems?

Our main business telephone number is (408) 737-6800. We also have a Technical Support Hotline number: (408) 737-6810, which you can call if you have problems with your disk or need a clarification of the game and/or rules. Both numbers can be called every workday, 9 to 5 Pacific Time.

Parts Inventory:

Your Red Lightning game should come with the following:

- One Game Box
- This Rules Book
- One Game Disk
- One Scenario Disk (Atari ST and IBM only)
- One Map Card

INTRODUCTION

Red Lightning is a game for one or two players. Players will assume the roles of commanders of NATO and Warsaw Pact military forces during a hypothetical general war in central Europe in the early 1990's. Each game turn represents twelve hours of action. The military units represented in the game are regiments, brigades, divisions, corps, and corps or army headquarters. Units and air forces may be examined to the level of individual vehicles, squads, and heavy weapons. Almost every tank, gun, and tactical aircraft deployed in central Europe is available for inspection.

1.0 STARTUP

Before beginning play, you should make a backup copy of your Red Lightning disks and place your masters in a safe place. You should always play off copies of your masters, thus providing for a backup in case of damage to your play disks.

1.1 Starting the Game

1.1.1 Atari ST

Owners of 512k machines will probably find that they do not have sufficient memory for both Red Lightning and desk accessories or a ramdisk of useful size. ST owners with more than 512k should leave 512k for system and program use, but any other space may be freely used for accessories and ramdisks. This game is intended to be usable with accessories, and does work with most that the author has tried. A full function item selector (such as the A&D UIS-2 accessory) is very useful for managing your save game disk while playing the game. Some experimentation may be necessary in order to properly use accessories with Red Lightning. Also be forewarned that many desk accessories are BIGTIME memory hogs.

If you have a hard disk drive or double sided floppy drive, you should copy all files from both disks into one folder. This will eliminate the necessity for disk swaps when starting the game.

To start playing the game, power up your computer in the normal manner. It is suggested that you use your copy of the Red Lightning game disk (disk A) as your boot disk if you aren't sure about how much memory your normal boot disk leaves free. If necessary, select the low resolution mode from the Set Preferences desktop menu item. The game will not run if your computer is not in the low resolution display mode.

Place the game disk in any disk drive and be ready to insert disk B if the program asks you to. If there is no open window to the drive with your game disk in it, 'open' the drive icon. Select the RL.PRG icon from the open window. After the drive starts running, just follow the prompts. You may remove the game or scenario disk from your disk drive and replace it with a save game disk once the game has finished loading. At this point, you may put away both Red Lightning disks as the game is entirely RAM resident and does not require any program/scenario disk access once play has begun.

1.1.2 IBM PC XT/AT

Red Lightning is not intended to be used in cooperation with TSR (Terminate and Stay Resident or "memory resident") programs. This doesn't mean it definitely won't work with such programs, but there may be problems with them.

To install the game on a hard disk drive, you should copy all files from both disks into one sub directory. There are no restrictions on directory names, and the sub directory need not be on your root directory. To begin play, use the DOS command CD to change the current directory to the Red Lightning sub directory. Type "RL" and press the <Enter> key.

If you will be playing the game from a floppy drive, boot your computer normally, then put your copy of the Red Lightning game disk (disk A) into drive A, type "RL", and press <Enter>.

Once the game is loaded, it will tell you when it needs a disk swap. Be sure to leave the last requested disk in your disk drive unless the program tells you otherwise.

1.2 Talking to the Computer

1.2.1 Atari ST

Most orders are issued by using the mouse to move the cursor to the menu line at the top of the screen or to the control buttons at screen right, and selecting the desired menu or map action. Once an action has been selected, you just place the cursor over a colored button or buttons and press the left mouse button in order to complete the action. Keyboard entry is necessary only when naming saved game files.

At times during the game, the system bell will ring, and a mouse icon will be displayed in the information box below the map. This indicates that the program is waiting for you to press the left mouse button before the game will continue.

Saved game files are selected using the standard GEM selector box. In order to change the "path" to search for saved game files, use the keyboard to modify the path name at the top of the box, then click on the scroll bar at the side of the box to perform the search. Once the desired file is displayed in the box, click on the file name then click on OK to load the game.

1.2.2 IBM PC XT/AT

Most game functions are controlled by use of the numeric keypad and <Enter> or <Esc> keys. In some cases, there is a choice of keys which may be used to issue an order so that users of systems with unusual keyboards can play the game without difficulty.

The primary game control screen features two control modes. In MENU mode, you may issue orders or examine detailed game information. In SCROLL mode, you may move a cursor around the map and select simple information about individual hexagons on the map. The <S> or <Esc> key may be used to toggle between MENU and SCROLL modes. Menu and map hex selections are made using the <Enter> key. Either the numeric pad or top row of the main keyboard may be used to input numbers to the program. Don't press the Num Lock key. This has already been done within the program.

A list of active keys ("buttons") and their effects is given on all game screens.

1.3 The Map

The map shows central Europe from northern Denmark to central Austria and from central Belgium to central Poland / Czechoslovakia. Military units (when detected) will be displayed on the map as standard NATO military symbols (see appendix A). Hex scale is twenty five kilometers. The primary display shows an area fourteen hexes wide and seven high (about 4% of the total map area). Scrolling is accomplished by selecting any of the top six buttons at the right of the screen (ST) or pressing the corresponding number keys (IBM/compatibles). Holding down the mouse button or number key will repeat the scroll in the selected direction. The other three buttons shown on the map screen perform the following functions:

• <U> Enable/Disable display of unit icons. This allows you to remove the units from the map to allow unobstructed viewing of the map. Pressing the key again will return the units to the map.

• <P> Enable/Disable display of hex possession and para / amphibious target hex information. This function shows which side controls a given hex by putting a colored dot in the lower left corner of all hexes on the map. When enabled, Warsaw Pact hexes will be shown with a red dot, neutral hexes (Austria) with a white dot, and NATO owned hexes with a blue dot. If the para / amphibious target hex is within the displayed area, it will be indicated by an outlined "check" mark(ST) or "down arrow" (IBM/compatibles) (See section 3.23 — Para / Amphibious Hex).

• <O> Invoke the strategic overview display. The unit and possession selections described above remain in effect. The entire game map will be displayed at a greatly reduced scale. To exit, you must select a location on the overview display. The standard map display will reappear centered on the selected area.

You may also select any hex on the standard map display for additional information (displayed below the map) on terrain and units in the hex. This is accomplished by pressing the left mouse button(ST) or the <Enter> key (IBM/compatibles) while the map cursor is in the desired hex. If a hex containing a unit is selected, that unit and any other units belonging to its corps (NATO) or army (Pact) will be marked with a small rectangle in the lower left

corner of the unit icon. Full unit information will only be available for friendly and neutral hexes.

1.4 Saving a Game

At the beginning of each turn, you will be given the chance to save the game in progress. A formatted disk, hard disk, or ramdisk (on machines with RAM in excess of game requirements) is required. You need only follow the prompts in order to save the game. Saved games may be restarted at the saved point whenever the game is booted.

1.5 The README File

Your game disk may include a README file. If so, then there have been important changes or additions to these rules. Please examine any README file on your game disk before beginning play.

2.0 PLAYING THE GAME

Each game of Red Lightning consists of 20 or 60 turns representing the first 10 or 30 days of WWII in Central Europe. Each turn represents 12 hours (either AM or PM) of time.

Before each turn is resolved, both players may move all of their units (or give attack orders), plot all their air missions, assign special forces teams to targets, and even allocate a paratroop or marine unit to land somewhere. Then, after all these functions have been completed by both players, the turn is resolved with a combat phase. The players watch as the combat unfolds, and the casualties are counted. Score is then calculated and displayed indicating that another turn is about to begin.

Before beginning a game of Red Lightning, it is strongly recommended that you carefully read sections 3.24 (Movement) and 4.0 (Combat). These two sections will let you know the basics of how to play.

There are two players in a game of Red Lightning and either (but not both) can be controlled by the computer. Thus, the options are:

- **NATO Solitaire:** A human player controls the forces of NATO against a Warsaw Pact computer player.
- **Pact Solitaire:** A human player controls the forces of the Warsaw Pact against a NATO computer player.
- **Two Player:** Human players control both sides.

2.1 Pre-Game Selections

Before starting a game of Red Lightning, you will be asked if you wish to load a previously saved game. If you do wish to load a saved game, the program will display a standard selector box(ST) or file list(IBM compatibles). Simply select the saved game file as indicated to begin play.

If you have not loaded a saved game, you will be presented with the following menu:

Scenario Selection

Scenario:

- Red Lightning
- "Lions & Tigers & Bears ..."
- A Gathering of Hosts

Scenario Length: Long or Short

General Selection

Chemical Weapons: Yes or No

Season: Summer, Autumn, Winter, or Spring

Pact Competence Level: Pushover, Moderate, Challenging, Hairy, Hideous, or Random

Play Mode: NATO Solitaire, Pact Solitaire, or Two Player

Control Levels

North Atlantic/Special Ops: On or Off

Air Campaign: On or Off

Sub Divisional Deployments: On or Off

Limited Intelligence: On or Off

2.11 Effects of Menu Selections

Under the Scenario Selection section of the menu, you may choose which of the three scenarios you will play and what scenario length you want. If you choose the long scenario, you will play for 60 turns or until one side is declared victorious (by knocking the other side out of the war). The short scenario lasts only 20 turns.

General Selections control the following items:

Chemical weapons: If "yes", then chemical warfare is assumed to be in effect. Warsaw Pact, US, and French artillery factors will be modified (generally increased in effectiveness) depending upon current weather conditions (see section 4.2). Units will also fatigue more rapidly in combat under these conditions. Warsaw Pact SSM attacks on NATO airfields and depots will tend to be more effective. Setting this selection to "no" will strongly tilt play balance to favor NATO.

Season: The time of year may be selected. This will have a significant effect on the game. Airpower and chemical weapons are very much affected by weather conditions.

Pact Competence Level: This sets the following:

1. Rate of recovery from combat fatigue for Pact ground and air units forces. (See section 5.3)
2. Combat modifier for Pact ground units. (See section 4.2)
3. Intelligence of the computer player in solitaire games. At higher levels, the Warsaw Pact computer player plays a "smarter" and more aggressive game and at lower levels a NATO computer player plays a "smarter" and more careful defensive game.

- **Play Mode:** This selects for two player or solitaire (human vs. computer) modes of play.

Control Levels are ON/OFF that either enable or disable certain features of the game. A "historical" game would be with all four selections set to "on". However, it is suggested that you learn the game with the Air Campaign and North Atlantic/Special Ops levels set to "off".

- **North Atlantic/Special Ops:** This selects whether you will have any input into the conduct of the North Atlantic campaign or use of special forces and SSM's (see sections 3.22 and 5.1). If "on", you will have full access to theater reserve units, special forces, and SSM forces. If "off", you will not have access to the menus governing these functions, and these functions will be ignored by the program. The North Atlantic campaign will still be resolved assuming only the deployment of default units (USMC, Canadian, Norwegian, and other NATO forces, Soviet 6th Army and Northern Fleet marine forces) to Norway. There will be no Iceland invasion (see section 5.1). Since the Warsaw Pact has significant advantages in these areas, setting this selection to "off" will strongly upset play balance to favor NATO.

- **Air Campaign:** This selects whether you will have access to the menus controlling air operations. If "on", you will have full control of your air forces. If "off", the program will control both players' air forces. This function doesn't favor either player, and turning it off will simplify the game.

- **Sub Divisional deployments:** This selects whether you will have control over the deployments of individual regiments and brigades

within larger units (see section 3.13). It should be noted that turning this function "off" can actually make the game more difficult as you cannot force units in critical spots into a desired deployment mode. If set to "off", the computer will control the deployments of both players' subordinate (part of a larger unit) regiments and brigades. The computer will set sub unit deployments immediately before the combat phase. Units adjacent to enemy units will have a large proportion of their sub units set to forward deployment. Units scheduled to attack will be almost entirely set to forward deployments. Units in "safe" areas will tend to be set to rest and reserve deployments. The sub unit deployments displayed on the Examine Unit screen (see section 3.13) will be those selected by the computer before the last turn's combat phase. If set to "on", you have full control over these deployments.

- **Limited intelligence:** This selects how much information is available to you on the location of enemy forces. If "on", you will only know of any units spotted by electronic, airborne, and satellite recon, and any information gained from special and regular forces during their normal duties. If "off", both players will be completely informed of the location of all enemy forces at all times. The computer players always function in a limited intelligence mode, so setting this selection "off" will upset play balance to favor human players.

Exit Selections allows you to terminate the selection process and begin playing the game.

2.2 Turn Sequence

Each game turn will proceed in the following order:

- A. Game Save Opportunity (section 1.4)
- B. Warsaw Pact Orders Phase (section 3.0)
- C. NATO Orders Phase (section 3.0)
- D. Joint Air Combat Phase (section 4.1)
- E. Joint Ground Combat & Movement Phase (section 4.2)
- F. General Resolutions Phase (section 5.0)

3.0 THE ORDERS PHASE

Orders will be issued to the military and air forces of both alliances by use of the Orders menu (see section 3.2). At the beginning of each turn, the Warsaw Pact player will be given the option of invading Austria. Warsaw Pact units

may not enter Austria unless an invasion is declared. NATO units may not enter Austria unless Austria requests NATO aid.

3.1 The Info Menu

The Info Menu gives you access to the following game functions:

- | | |
|-----------------------|---------------------|
| 3.11 Strategic Report | 3.14 Weather Report |
| 3.12 Political Report | 3.15 Supply Net Map |
| 3.13 Full Hex Report | |

3.11 Strategic Report

Selection of Strategic Report will present you with a display of the overall strategic situation. Territory held by both players is listed, and the progress of the North Atlantic campaign is detailed. The Central Europe box lists territory held by each alliance as well as the current supply stockpile levels of both alliances. The North Atlantic box gives the status of Norway, Iceland, and the naval situation at sea. The three possibilities for the status of each area are "Control Contested", "NATO Control", or "Campaign Concluded: Pact (or) NATO Victory". "Control Contested" means that fighting is still going on while "Campaign Concluded" means that the battle is over and the listed side has been victorious. "Nato Control" indicates that the area has not been attacked yet.

Control of Norway or Iceland will affect the outcome of the naval campaign. The status of the naval campaign ("at sea") has a significant impact on the attrition of convoys carrying supplies and reinforcements from the US to Europe. These reinforcements, in turn, can have a definite effect on the outcome of the conflict in Central Europe.

The Recent News Reports box displays a list of significant events affecting the outcome of the war.

3.12 Political Report

Selection of Political Report will present you with a list of public morale and political alignment (NATO, Warsaw Pact, or neutral) for all of the countries in the area. When a country reaches zero morale, it may (50% chance per turn) negotiate a separate peace and withdraw from the war. Calculation of morale levels is explained in section 5.5.

3.13 Full Hex Report

When this function is selected, you will be

asked to select a friendly hex for examination. This is accomplished by clicking the mouse on any displayed friendly map hex(ST) or moving the cursor to the desired hex by use of the SCROLL keys and pressing <Enter> (IBM). Only friendly hexes may be chosen for this function.

The hex information and orders screen gives a geographic description and list of combat modifiers for the selected hex as well as a list of military units present in the hex. You may either examine any units in the hex (see below) or exit back to the main map screen.

If a unit is selected for examination, you will be presented with a detailed list of equipment for each of the sub units of the selected unit (i.e. regiments for a selected Motorized Rifle Division). Also displayed will be the deployment and readiness information for all sub units of the unit. The effects of deployment and readiness of sub units on combat capabilities of a unit are detailed in section 4.0. If sub unit deployments are under player control (see section 2.1), they may be changed by clicking on the deployment buttons associated with the sub units(ST) or by moving the triangular cursor to a sub unit and pressing <Enter> (IBM/compatibles). Any changes in the combat strength of the unit will be shown immediately.

The ability to change the deployment of each brigade within a division gives you maximum control of your forces. If you really have to hold a specific position, put your units on "forward" deployment and hope for the best. Units that are on "forward" deployment are not going to recover lost efficiency very quickly and will quickly dwindle in combat power if moved around much. If you don't expect to fight with a unit, place the brigades on "rest" status to enable fast recovery of efficiency.

The strengths of the unit are displayed at the bottom of the screen with lethality (the ability to damage enemy units) on the left of a slash, and survivability (the ability to resist damage) on the right. Artillery strength is a measure of the unit's ability to conduct artillery bombardments on enemy units. The displayed strengths are fully modified current strengths; they include the effects of terrain, sub unit deployments, and readiness. Mobile strengths will be used during combat if the unit has moved at any time during the turn or has an average sub

unit readiness of less than 75. Static strengths will be used for combats if the unit has not moved in a given turn. This reflects the effects of prepared defensive positions. (See appendix E for details on unit strength calculations.)

A previous/subsequent unit selection allows you to examine other units. This allows you to select each unit in play for your side one at a time to insure that none were missed.

3.14 Weather Report

Current conditions and a condensed summary of their effects on air operations, unit readiness in combat operations, and effectiveness of chemical weapons will be displayed.

Weather forecasts are also available. A 12 hour (next turn) forecast is 90% accurate. The 24 hour forecast (turn after next) is 80% accurate, and the 36 hour forecast is 70% accurate.

See section 5.6 for an explanation of weather determination and effects.

3.15 Supply Net Map

This calls for a calculation and display of current NATO and Warsaw Pact supply nets. A theater level map (same scale as the Strategic Overview map) showing the current supplied areas will be displayed. This is a complicated calculation and will take a few seconds to process. Areas shown as dots are unsupplied while solid areas are supplied.

3.2 The Orders Menu

The Orders Menu gives you access to the following game functions:

- | | |
|--------------------------|----------------------|
| 3.21 Air Operations | 3.24 Unit Movement |
| 3.22 Special Operations | 3.25 End Player Turn |
| 3.23 Para/Amphibious Hex | |

3.21 Air Operations

Selection of Air Operations gives you access to the Air Operations planning screen. At screen left is a list of aircraft types. One of these types is highlighted. Details on the highlighted type are currently displayed in the Mission Allotment Orders and Aircraft Description boxes. The displayed aircraft may be changed by selecting any other type on the list. Recce aircraft may not be selected if the limited intelligence control selection is "off".

The Aircraft Description shows a drawing of the most numerous or distinctive aircraft in the selected type. Below the drawing is a list of characteristics for that type (these are an aver-

age if multiple or distinctive aircraft models are lumped together). Characteristics include air superiority, strike capability, close air support capability, avionics capability, and survivability. Additionally, the readiness of the force and the number of aircraft of that type available are shown.

Air superiority, strike capability, and close air support capability display the aircraft's ability to accomplish these missions. Avionics capability indicates the ability of the aircraft type to operate in less than ideal conditions. Survivability is a measure of the ability to resist attrition while on a mission. Force readiness, like the readiness level of a ground sub unit, is a modifier to the ability of the force to carry out its mission. The total aircraft listing gives the total number of aircraft in the selected (highlighted) category.

Allocations of aircraft to various missions is accomplished by selecting buttons in the Mission Allotment Orders box. Selecting "All rest" will assign all aircraft of the selected type to rest for the turn. This should be done when the readiness falls below an acceptable level or when environmental conditions would prevent effective accomplishment of assigned missions (i.e. MiG-21's flying on a PM/Storm turn).

At the bottom of the Mission Allotment Orders box is a flight conditions indicator. Aircraft effectiveness for each condition is:

Very Good	100%
Good	20% * avionics
Poor	15% * avionics
Very Poor	10% * avionics

This is essentially a force multiplier. Example: 100 Su-24 aircraft (avionics = 4) operating under "poor" flight conditions will function with the effectiveness of 60 (15% * 4 * 100) Su-24 operating under "very good" flight conditions. Survivability is not affected by flight conditions.

Flight conditions are based on weather and time of day as follows:

Fair weather/AM	very good
Fair weather/PM or	
Cloudy weather/AM	good
Cloudy weather/PM or	
Storms/AM	poor
Storms/PM	very poor

Whenever any part of a force is flown (assigned a mission), that force will have its readiness decreased by 10% * fraction of force flown. Example: If 65 aircraft of a 120 aircraft force are assigned missions on a given turn, then the loss of readiness experienced by that force would be: $10\% * 65 / 120 = 5\%$. Air forces recover about 5% readiness on any given turn. If 50% of all aircraft are flown every turn, and there are no attacks on airbases (which also affects force readiness), force readiness will remain constant.

3.22 Special Operations

Special Operations include all uses of airborne and marine forces, special forces teams, and Surface-to-Surface Battlefield Missiles (SSMs) (Pact player only). These functions are handled through the Special Operations Menu Option. If selected, this option will present you with the main special operations screen. From this screen you may exit back to the map, examine theater level airborne & marine forces, examine special forces & SSM's, or examine Norway and Iceland deployments of theater reserve units.

3.221 Theater Level Airborne and Marine Forces

If you examine theater level airborne and marine forces, you will get a new screen with a list of all currently available theater level airborne and marine units and their unit strengths. Any unit may be selected for deployment by selecting the button to the left of a unit name. Pressing the button again "de-selects" the unit. Only one unit may be selected for deployment on any given turn. The selected unit will be deployed to the area indicated at the bottom of the screen. Selecting the "Unit deployment area" button will toggle deployment sites for selected units from a map hex on the central front (see below) to/from Norway or Iceland. (Iceland may only be selected as a deployment area once either the "at sea" or Norway campaigns have been concluded with a Warsaw Pact victory.)

3.222 Special Forces Teams and SSMs

Examining the Special Forces and SSMs will lead you to another screen where you may assign special forces teams and SSMs to specific missions. The missions will be accomplished at the end of the turn. These missions represent actions by company size teams or small salvos of tactical battlefield missiles (SSMs). Allowed missions are:

- Airfield suppression... Each airfield suppression mission will have the following effect: One enemy aircraft type is selected. From 1 to 10 of the selected type are destroyed, and the force readiness is decreased by 5%. (This is the same effect as an airstrike on an airfield.)

- Port/POMCUS/railway suppression... Each such mission will attack one enemy reinforcement unit as it enters the map. The entering unit will suffer a 20 point reduction in readiness of all sub units. If no enemy units enter the map this turn, the mission is cancelled without loss to the special forces team.

- Rear area harassment... Each such mission will have a stockpile / 1000 chance of reducing the enemy supply stockpile by one.

- Intelligence gathering... Each such mission will add a 10% chance to spot enemy forces during recon resolution at the end of the turn. (See section 5.4) This option may not be chosen if the limited intelligence control selection is "off".

For each mission accomplished, one special forces team is expended and removed from the game. Selected actions may be cancelled by selecting the "Cancel all actions" button.

The SSM menu is used to assign fire missions to Warsaw Pact SSM's. NATO has no similar capability. Each fire mission represents the launch of 12 missiles. Missions are the same as for special forces with the exception that SSM's may not be used for intelligence gathering. SSM's also have the further limitation that if chemical warfare is not in effect, each fire mission has only a 50% chance of being effective.

3.223 Norway and Iceland Deployments

A list of all units deployed from each player's theater reserve to Norway or Iceland is displayed. Note that the Warsaw Pact player need not deploy units to Norway in order to have a chance of victory as there are units assumed to be deployed there automatically. However, there will be no Iceland campaign unless the Warsaw Pact player deploys at least one theater reserve unit to Iceland. (There are assumed to be no Pact default forces sent to Iceland. The decision to initiate an Iceland invasion is up to the Warsaw Pact player once he controls Norway or wins the campaign "at sea".)

3.23 Para/Amphibious Hex

Any unit selected for deployment to the central front (the area covered by the game map) will

4.0 COMBAT PHASE

Each turn, after both sides have moved (or plotted moves for) all desired units, the game proceeds into the combat phase to resolve all air and ground combats. Air combat consists of Air Superiority, Ground Support, and Air Strike missions. Ground combat occurs whenever units belonging to one side attempt to enter a hex occupied by the other side's units.

4.1 Joint Air Combat Phase

Once into the combat phase, all Air Combat is resolved first (as air combat may heavily affect ground combat) and then all ground combat is resolved. The air combat resolution starts with Air Superiority missions and then proceeds to Ground Support and Strike missions. The results of the Joint Air Combat Phase are listed in the information window at the bottom of the screen.

NATO and Warsaw Pact aircraft with Air Superiority missions will add their combat capability to a base value capability (due to anti aircraft fire) of their respective alliance. This capability number translates to a loss ratio that causes casualties among enemy aircraft flying that turn. The number of claimed kills will be displayed at the bottom of the screen. (Displayed kills will approximate actual kills by a factor of 1.2 to 2.0). The actual algorithm used in calculating the number of aircraft destroyed is listed in appendix E.

Ground Support missions create additional artillery points at a rate based on the capability of the assigned aircraft. The number of points created are listed during the Joint Air Combat Phase on the "Close Air Support" line. The algorithm for calculating the number of artillery points created by a given force is listed in appendix E. The artillery points created are added to all units on the friendly side.

Airstrikes are assigned by the appropriate player to attack airbases, supply lines, or troop concentrations. Each strike on an airbase will select (randomly) one enemy aircraft type, destroy 1-10 of the type, and decrease the readiness of the type by 5%. Every supply line strike, on the other hand, has a stockpile/1000 chance of reducing the enemy supply stockpile level by one. Each strike against troop concentrations will have a 1% chance of striking each enemy sub unit (unit subordinate to a larger unit). Each piece of equipment in the inventory of the sub unit has a chance of surviving the

attack. In addition to the loss of equipment, the sub unit will have its readiness decreased by 1 to 20 points. Any units so affected will be listed below the map.

4.2 Joint Ground Combat & Movement Phase

All maneuver movements plotted during the orders phase are executed in a random order with one corps/army moving all of its units before units of the next corps/army move its units. Movement alternates between NATO and the Warsaw Pact with one Pact army moving, then one NATO corps. All units of each player's theater reserve are considered to belong to one corps for this purpose.

If a unit attempts to enter a hex already occupied by an enemy unit, combat will occur. If the defending unit began the turn with an average sub unit readiness of at least 75 and did not expend any movement points during the turn, the attack is treated as an assault, and the defending unit uses its static strength. If the defending unit expended any movement points this turn, a meeting engagement is assumed, and the defending units defend with mobile strengths.

4.21 Ground Combat Strength Modifiers

The numbers that are displayed during a full hex report (see section 3.13) are the strengths of the units. They will be modified by terrain and chemical warfare (see charts below). In addition, the pact competence level selection will modify the combat ability of Pact units:

Pact Competence Strength Multiplier:

Pushover ————0.8
Moderate ————0.9
Challenging ————1.0
Hair ————1.1
Hideous ————1.2

Terrain Effects On Unit Combat Strengths:

TERRAIN TYPE	LETHALITY	LIGHT UNITS	SURVIVABILITY
Open	1.0	1.0	1.0
Forest	1.0	2.0	1.5
Rough	1.0	2.0	1.5
Marsh	1.0	2.0	1.0
Urban	1.0	3.0	2.0
River	0.75	1.0	1.0

The light units modifier applies only to units listed as having a survivability of one or two in Appendix B. Survivability modifiers are cumulative, thus increasing the survivability of light units in urban terrain six-fold.

Weather Effects on Chemical Weapons:

WEATHER	ARTILLERY MOD	ADDITIONAL READINESS LOSS
fair/warm	1.1	4
fair/mild	1.2	2
fair/cold	1.2	2
cloudy/warm	1.2	4
cloudy/mild	1.3	2
cloudy/cold	1.3	2
storms	1.0	(no effect)

Thus, all artillery factors are multiplied by 1.1 on a fair/warm day and all combats result in an additional 4 points of readiness being lost.

4.22 Ground Combat Resolution

Ground combat is resolved in a three-step process that ends up displaying the battle results in a Battle Result Display. This display shows the % of the attacking and defending forces that must check for elimination. Note that this percentage does not necessarily match the percentage of equipment lost, just the percentage of the equipment that had to check for loss. The steps are the Artillery Combat Step, the Ground Combat Step, and the Elimination/Retreat/Advance Step.

Artillery Combat

All units attempting to enter or hold the hex will sum their artillery values. If the corps/army headquarters or any corps/army artillery units belonging to the involved corps/army are within two hexes of the combat hex, they will contribute 1/2 of their combined artillery and non-artillery factors as artillery strength in support of the combat. Only units not scheduled to perform their own maneuver combats will be available for ranged artillery support. Artillery units scheduled for maneuver combats will be treated as normal combat units and will contribute their entire artillery values to their plotted combat. When chemical weapons are in use, the total artillery value may be multiplied by a factor of 1.1 to 1.3 depending upon the weather. Only Warsaw Pact, US, and French units receive a chemical warfare advantage. Finally, close air support is added to the attacking player's artillery value. This gives a final "Artillery

Value", which is then converted into a "Loss Ratio". This "Loss Ratio" is applied to enemy forces and causes losses that are calculated from the survivability of the forces involved and whether or not those forces are in static or mobile modes (mobile forces suffer greater losses from artillery combat). See appendix E for details on the algorithms used in artillery combat.

Ground Combat

After artillery combat, ground combat is resolved. Ground combat is very similar to artillery combat except that the non-artillery lethality (see Appendix B) of the forces involved is used instead of the artillery factors, and there is no contribution to the combat from air support or artillery units. Remember that the lethality of static units is higher than that of mobile units, and that the lethality of units attacking from river terrain is multiplied by .75.

Eliminations, Retreats and Advances After Combat

After losses are applied to both sides, a check is made to determine whether any units have been eliminated. If so, those units are removed from the map. Surviving defending units are then checked to see if they will retreat. The chance that a unit will retreat is equal to the loss ratio from non-artillery combat. This number is shown in the Battle Result Display during the combat resolution phase and will range from 2% to 100%. NATO units will only retreat north, northwest, southwest, or south. Warsaw Pact units will only retreat north, northeast, southeast, or south. Units will retreat into a random friendly hex if one is available. If a unit attempts to retreat and no retreat route is available, the unit will stay in place and suffer an additional 5% equipment loss and readiness decrease.

If all defending units retreat from the hex, attacking units may advance into the hex. The chance for a unit to advance is equal to the average readiness of the unit's sub units divided by 100%. A unit with a low average readiness level is unlikely to advance after combat. Also, a unit can only advance after combat if at least one of its sub units has a "reserve" deployment.

4.23 Combat Summary

The combat strength of a unit is based upon the type of equipment assigned to the unit, the readiness of its sub units, and the deployments of those sub units. Large quantities of lethal,

4.0 COMBAT PHASE

Each turn, after both sides have moved (or plotted moves for) all desired units, the game proceeds into the combat phase to resolve all air and ground combats. Air combat consists of Air Superiority, Ground Support, and Air Strike missions. Ground combat occurs whenever units belonging to one side attempt to enter a hex occupied by the other side's units.

4.1 Joint Air Combat Phase

Once into the combat phase, all Air Combat is resolved first (as air combat may heavily affect ground combat) and then all ground combat is resolved. The air combat resolution starts with Air Superiority missions and then proceeds to Ground Support and Strike missions. The results of the Joint Air Combat Phase are listed in the information window at the bottom of the screen.

NATO and Warsaw Pact aircraft with Air Superiority missions will add their combat capability to a base value capability (due to anti aircraft fire) of their respective alliance. This capability number translates to a loss ratio that causes casualties among enemy aircraft flying that turn. The number of claimed kills will be displayed at the bottom of the screen. (Displayed kills will approximate actual kills by a factor of 1.2 to 2.0). The actual algorithm used in calculating the number of aircraft destroyed is listed in appendix E.

Ground Support missions create additional artillery points at a rate based on the capability of the assigned aircraft. The number of points created are listed during the Joint Air Combat Phase on the "Close Air Support" line. The algorithm for calculating the number of artillery points created by a given force is listed in appendix E. The artillery points created are added to all units on the friendly side.

Airstrikes are assigned by the appropriate player to attack airbases, supply lines, or troop concentrations. Each strike on an airbase will select (randomly) one enemy aircraft type, destroy 1-10 of the type, and decrease the readiness of the type by 5%. Every supply line strike, on the other hand, has a stockpile/1000 chance of reducing the enemy supply stockpile level by one. Each strike against troop concentrations will have a 1% chance of striking each enemy sub unit (unit subordinate to a larger unit). Each piece of equipment in the inventory of the sub unit has a chance of surviving the

attack. In addition to the loss of equipment, the sub unit will have its readiness decreased by 1 to 20 points. Any units so affected will be listed below the map.

4.2 Joint Ground Combat & Movement Phase

All maneuver movements plotted during the orders phase are executed in a random order with one corps/army moving all of its units before units of the next corps/army move its units. Movement alternates between NATO and the Warsaw Pact with one Pact army moving, then one NATO corps. All units of each player's theater reserve are considered to belong to one corps for this purpose.

If a unit attempts to enter a hex already occupied by an enemy unit, combat will occur. If the defending unit began the turn with an average sub unit readiness of at least 75 and did not expend any movement points during the turn, the attack is treated as an assault, and the defending unit uses its static strength. If the defending unit expended any movement points this turn, a meeting engagement is assumed, and the defending units defend with mobile strengths.

4.21 Ground Combat Strength Modifiers

The numbers that are displayed during a full hex report (see section 3.13) are the strengths of the units. They will be modified by terrain and chemical warfare (see charts below). In addition, the pact competence level selection will modify the combat ability of Pact units:

Pact Competence Strength Multiplier:

Pushover	—0.8
Moderate	—0.9
Challenging	—1.0
Hairy	—1.1
Hideous	—1.2

Terrain Effects On Unit Combat Strengths:

TERRAIN TYPE	LETHALITY	LIGHT UNITS	SURVIVABILITY
Open	1.0	1.0	1.0
Forest	1.0	2.0	1.5
Rough	1.0	2.0	1.5
Marsh	1.0	2.0	1.0
Urban	1.0	3.0	2.0
River	0.75	1.0	1.0

The light units modifier applies only to units listed as having a survivability of one or two in Appendix B. Survivability modifiers are cumulative, thus increasing the survivability of light units in urban terrain six-fold.

Weather Effects on Chemical Weapons:

WEATHER	ARTILLERY MOD	ADDITIONAL READINESS LOSS
fair/warm	1.1	4
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fair/cold	1.2	2
cloudy/warm	1.2	4
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cloudy/cold	1.3	2
storms	1.0	(no effect)

Thus, all artillery factors are multiplied by 1.1 on a fair/warm day and all combats result in an additional 4 points of readiness being lost.

4.22 Ground Combat Resolution

Ground combat is resolved in a three-step process that ends up displaying the battle results in a Battle Result Display. This display shows the % of the attacking and defending forces that must check for elimination. Note that this percentage does not necessarily match the percentage of equipment lost, just the percentage of the equipment that had to check for loss. The steps are the Artillery Combat Step, the Ground Combat Step, and the Elimination/Retreat/Advance Step.

Artillery Combat

All units attempting to enter or hold the hex will sum their artillery values. If the corps/army headquarters or any corps/army artillery units belonging to the involved corps/army are within two hexes of the combat hex, they will contribute 1/2 of their combined artillery and non-artillery factors as artillery strength in support of the combat. Only units not scheduled to perform their own maneuver combats will be available for ranged artillery support. Artillery units scheduled for maneuver combats will be treated as normal combat units and will contribute their entire artillery values to their plotted combat. When chemical weapons are in use, the total artillery value may be multiplied by a factor of 1.1 to 1.3 depending upon the weather. Only Warsaw Pact, US, and French units receive a chemical warfare advantage. Finally, close air support is added to the attacking player's artillery value. This gives a final "Artillery

Value", which is then converted into a "Loss Ratio". This "Loss Ratio" is applied to enemy forces and causes losses that are calculated from the survivability of the forces involved and whether or not those forces are in static or mobile modes (mobile forces suffer greater losses from artillery combat). See appendix E for details on the algorithms used in artillery combat.

Ground Combat

After artillery combat, ground combat is resolved. Ground combat is very similar to artillery combat except that the non-artillery lethality (see Appendix B) of the forces involved is used instead of the artillery factors, and there is no contribution to the combat from air support or artillery units. Remember that the lethality of static units is higher than that of mobile units, and that the lethality of units attacking from river terrain is multiplied by .75.

Eliminations, Retreats and Advances After Combat

After losses are applied to both sides, a check is made to determine whether any units have been eliminated. If so, those units are removed from the map. Surviving defending units are then checked to see if they will retreat. The chance that a unit will retreat is equal to the loss ratio from non-artillery combat. This number is shown in the Battle Result Display during the combat resolution phase and will range from 2% to 100%. NATO units will only retreat north, northwest, southwest, or south. Warsaw Pact units will only retreat north, northeast, southeast, or south. Units will retreat into a random friendly hex if one is available. If a unit attempts to retreat and no retreat route is available, the unit will stay in place and suffer an additional 5% equipment loss and readiness decrease.

If all defending units retreat from the hex, attacking units may advance into the hex. The chance for a unit to advance is equal to the average readiness of the unit's sub units divided by 100%. A unit with a low average readiness level is unlikely to advance after combat. Also, a unit can only advance after combat if at least one of its sub units has a "reserve" deployment.

4.23 Combat Summary

The combat strength of a unit is based upon the type of equipment assigned to the unit, the readiness of its sub units, and the deployments of those sub units. Large quantities of lethal,

survivable weapon systems will lead to lethal, survivable units. High readiness rates lead to high combat strengths. Poor equipment and readiness rates lead to weak units. Forward deployments will maximize your unit strength (at the expense of limiting the rate at which the unit can recover from combat). A unit will only advance after a successful combat if at least one sub unit assigned to it has a reserve deployment.

Units will cause fewer casualties to your opponent if they are forced to fight from open terrain. You can maximize the combat power of your units by defending in rough, urban, or forested terrain. Non artillery units will launch weaker attacks than normal from river hexes.

Units will defend better after they have been in a hex for at least a turn.

Artillery and HQ units will contribute strength to any combats within two hexes of their location. Close air support contributes to the strength of your units in both attacks and defenses.

4.3 Airborne & Amphibious Operations

Airborne and amphibious landings of theater reserve units will proceed without difficulty if the target hex is not occupied by enemy units, and if the hex is not already occupied by two friendly units. The unit being deployed will however suffer some losses in the process. (If the hex is already occupied by two friendly units, the drop will be aborted without losses.) Units will lose more equipment during AM drops due to increased chances for interception, but night drops impose a greater loss of readiness. The losses are also affected by the size of the enemy air force and the X coordinate of the airdrop target hex.

If the target hex is occupied by enemy units, a standard combat (as described in section 4.1) will occur. On the turn of a drop, the airborne or marine unit's lethality and any friendly close air support which applies to the combat drop will be multiplied by 1.66. If the defending unit is not forced to retreat from the hex, the dropped theater reserve unit will be destroyed. If the defending unit does retreat, the dropped theater reserve unit will be placed in the target hex as planned.

Airborne and marine units may not be deployed to the central front during the last 10 turns of any game. They may still be deployed "out of theater".

5.0 GENERAL RESOLUTIONS PHASE

After all movement and combat is resolved, The computer will resolve the current turn's actions in the following areas:

- 5.1 The North Atlantic Campaign
- 5.2 Reinforcements
- 5.3 Resupply Operations
- 5.4 Intelligence Gathering
- 5.5 National Morale Determination
- 5.6 Weather Determination
- 5.7 End of Game Test

5.1 The North Atlantic Campaign

The North Atlantic Campaign is divided into three parts: Norway, Iceland, and the naval campaign "At Sea". Players may deploy units from their theater reserve forces in attempts to influence the outcome of the campaign. The results of the campaign will in turn influence the outcome of the "big show" on the central front. When checking for victory in the three areas, the computer always checks for a Warsaw Pact victory first. If the Warsaw Pact fails to win in an area, then the NATO player is checked to see if he wins. The detailed algorithms for victory calculation are listed in Appendix E.

• Norway: Most of the forces involved in this area are invisible to players. Warsaw Pact (default) forces include the Soviet 6th Army, with support from Northern Fleet naval infantry, and air units based near Norway. NATO (default) forces include the Norwegian army and air force, as well as contingents of USMC, (British) Royal Marines, and Canadian army troops. The Warsaw Pact has an advantage here that can only be countered by NATO reserve units. If the NATO player commits nothing, the Warsaw Pact has a base 3.33% chance of victory each turn compared with a 0-2% chance for NATO.

• Iceland: An Iceland invasion can only occur if the Warsaw Pact player deploys an airborne or marine unit to Iceland. This can only happen if the Warsaw Pact player wins either "At Sea" or in Norway. The Warsaw Pact have no default forces for this campaign while the NATO defenses on Iceland are the NATO defaults. The chance of victory for the Warsaw Pact is based on the lethality of the forces both players commit to the campaign while the NATO chance of victory is 0-10% (depending on the current status of the "At Sea" campaign).

• "At Sea": Each turn there is a 10% chance of a major naval engagement in the North Atlantic. Once each week, a convoy sails from the US to Europe. On turns that convoys arrive, an engagement will automatically occur if the "At Sea" campaign has not yet been resolved. When an engagement occurs, there is a 15% chance that it will be decisive. If this happens, then the fate of the "At Sea" campaign is decided and a winner declared. If the Warsaw Pact doesn't control either Norway or Iceland, the chance of victory for the Pact is 20% (compared with 80% for NATO). If the Pact player controls Norway but not Iceland, the chance goes to 35% Pact/65% NATO. If the Pact controls both Iceland and Norway, the victory chance goes to 50%/50%.

A victory in one of the areas of the North Atlantic Campaign affects the following items in the Central Front:

• **Morale:** National morale is affected by the conclusion of any part of the North Atlantic Campaign. National morale for NATO nations will be increased by 5% if their alliance wins in Norway, Iceland, or "At Sea". Losses will decrease NATO morale by the same amount. Britain will be affected by $\pm 10\%$ and the US will be affected by $\pm 15\%$. If the Pact player wins either the Norway or Iceland campaigns, the national morale of Norway (or Iceland, as appropriate) will be set to 0%.

• **Supply:** Convoys from the US begin with 20 stockpile points each. Attrition will range from 10% to 100% depending on the outcome of the "At Sea" campaign, the Iceland campaign, and the Norway campaign. Convoy losses will be described in the Strategic Report (section 3.11) as Light, Moderate, or Heavy. Light losses indicate 10-30% losses while Moderate losses indicate 40-60% casualties. Anything above 60% is regarded as Heavy losses.

• **Reinforcements:** Some US army units are sent to Europe by sea. These units, the 24th Infantry Division and the 75th Artillery Brigade, are transported by convoys. Convoy losses will translate directly into equipment losses.

5.2 Reinforcements

Each turn, units may be scheduled to appear at some location on the map. Air units will appear directly in the appropriate forces (see section 3.21). Ground units will appear in the hexes listed for them in the order of battle if those hexes are friendly (not controlled by the other

player) and there is room for them in the hex (Only two units may occupy a hex). Normal corps/army stacking restrictions do not apply in this case.

An important factor for NATO are the POMCUS/MOBILIZATION (Pre-Positioned Materiel Configured in Unit Sets) sites. These sites represent all places where a unit's equipment is positioned in storage areas waiting for the troops to arrive to pick it up. The US has a number of major POMCUS/MOBILIZATION sites in Central Europe that allow US troops to be flown to Germany to pick up their equipment there and quickly become a combat ready unit. However, any POMCUS/MOBILIZATION site that is occupied by an enemy unit is destroyed. Therefore, it is important to the NATO player that all reinforcement locations be garrisoned until the arrival of the units that will be using the POMCUS/MOBILIZATION sites. A complete list of POMCUS/MOBILIZATION sites can be found in section 5.21.

Units scheduled to appear within 1 hex of a map edge and British 1st Infantry Brigade, do not use POMCUS/MOBILIZATION sites and will appear next to their reinforcement hex if their original reinforcement hex is occupied. Units unable to enter a friendly hex due to stacking limitations, or unable to enter an unfriendly map edge hex will postpone entry to that hex until room exists for them in the scheduled entry hex.

5.21 POMCUS/MOBILIZATION Site Listing

The POMCUS/MOBILIZATION hexes are listed below under each scenario. The listed turns represent the turn that the last reinforcement unit comes in at that hex (and therefore the POMCUS/MOBILIZATION site becomes empty). The sites are as follows:

Red Lightning:

4,32 (until turn 3)	21,4 (until turn 4)	4,29 (until turn 7)
7,27 (until turn 3)	21,12 (until turn 4)	7,31 (until turn 7)
9,37 (until turn 3)	14,37 (until turn 5)	12,39 (until turn 7)
12,25 (until turn 3)	20,26 (until turn 5)	17,11 (until turn 7)
16,44 (until turn 3)	21,17 (until turn 5)	8,25 (until turn 8)
19,7 (until turn 3)	25,47 (until turn 5)	6,30 (until turn 11)
19,15 (until turn 3)	27,13 (until turn 5)	12,41 (until turn 13)
4,34 (until turn 4)	8,31 (until turn 6)	4,31 (until turn 15)
7,25 (until turn 4)	17,44 (until turn 6)	14,40 (until turn 15)
8,32 (until turn 4)	29,10 (until turn 6)	

"Lions and Tigers and Bears..."

6,30 (until turn 2)	4,31 (until turn 6)
12,41 (until turn 4)	14,40 (until turn 6)

A Gathering of Hosts:

none

5.3 Resupply Operations

During the Resupply Phase, a part of the General Resolutions Phase, the supply status of each hex on the map is calculated. A supplied hex is any hex which can trace a line of hexes of any length to a friendly supply source. The following hexes may act as supply sources if they are friendly to the indicated player:

Supply Sources:

West map edge	NATO
East map edge	Warsaw Pact
4,25	NATO (if either 4,24 or 5,25 are NATO controlled)
12,21	NATO
14,20	NATO
16,21	NATO
17,11	NATO
21,8	NATO or Warsaw Pact
21,17	Warsaw Pact
29,10	NATO or Warsaw Pact
50,16	Warsaw Pact

Sub units in supplied hexes will be checked and readiness may be increased if the sub unit has a readiness of less than 100. The chance for successful resupply is equal to 1% times the current stockpile level. Thus, if stockpiles are at 100 or greater, resupply for units in supplied hexes is automatic.

Resupply Schedule:

Sub unit deployment Readiness increase

Forward	readiness = readiness + 4 (NATO)
Reserve	readiness = readiness + 8 (NATO)
Rest	readiness = readiness + 12 (NATO)

The Pact competence level will affect the readiness increase rates of Pact units as follows:

Pushover	As for NATO * .5
Moderate	As for NATO * .75
Challenging	As for NATO
Hairy	As for NATO * 1.25
Hideous	As for NATO * 1.5

For each sub unit resupplied, there is a 0.1% chance that friendly stockpile levels will decrease by one. Only sub units which need resupply (have readiness of less than 100) will be resupplied.

In addition to the readiness modification from resupply, the number of movement points that the units will have on the following turn are calculated during the Resupply Phase. Unit movement allowances for each unit are determined depending on the average readiness of the unit's sub units. Units with an average readiness of greater than 74 will receive a movement allowance of 12 for the following turn. Other units will receive a movement allowance of 10. If a unit is not in a friendly supplied area (as displayed from the menu "Supply Net Map" option), it will be given a movement allowance of 0 (zero) for the following turn if its average sub unit readiness is less than 51. Exception: Deployed theater reserve units (airborne and marine units) always have a 25% chance of receiving a 10 point movement allowance if unsupplied. This represents air resupply.

There is a 75% chance that the Warsaw Pact supply stockpile will increase by one each turn. NATO stockpile increases are determined by convoy attrition (see section 5.1). There is a 50% chance that one SSM shot will arrive as reinforcements to the Pact SSM force.

NATO air forces have their readiness increased by 5%. Pact air forces will have their readiness increased by 3 to 7% depending on the Pact Competence Level setting.

5.4 Intelligence Gathering

Before recce takes place (see below), each hex on the central front map will be checked for change of possession. Each unit on the map possesses a patrol radius of one hex distance in every direction. Any hex within the patrol radius of one player's unit and not in the patrol radius of one of the other player's units will automatically become friendly to the the patrolling unit.

If the limited intelligence control selection is set to "on", then each player may only see those enemy military units which have been detected by friendly recce. There are four ways to gain intelligence on enemy dispositions:

- Satellite (orbital) recce
- Airborne recce
- Patrols by military units of their immediate areas
- Special forces missions to gather information behind enemy lines.

Any enemy forces adjacent to friendly units at any time will be spotted. Orbital, airborne and special forces recon are cumulative:

Chance of Spotting units in an enemy controlled hex:

Orbital recon (fair weather)	-----	20%
Orbital recon (cloudy weather)	-----	10%
Orbital recon (storms)	-----	0%
Special forces recon	-----	+10% * number of missions
Airborne recon	-----	see below

Airborne recon for each side is divided into three geographic regions:

REGION	NATO	WARSAW PACT
Tactical recon:	hexrows 0-28	hexrows 23-54
Deep recon:	hexrows 28-42	hexrows 12-22
Strategic recon:	hexrows 43-54	hexrows 0-11

Airborne recon will occur in each region for which aircraft were assigned missions earlier in the turn. Airborne recon is the primary method of gaining information on enemy deployments. The percentage effectiveness of such recon is based on the effectiveness of the aircraft, the capability of the aircraft, the readiness of the aircraft, and the number of recon aircraft committed. The exact formula is listed in appendix E.

"Maskirovka": The Soviet military devotes considerable resources to deceptive counter-intelligence. Each turn, several (generally from one to ten) false Soviet units may appear on NATO's map display. As these units aren't really there at all, any NATO unit moving next to such a ghost unit will remove it from the map. False units have no direct effect on play.

5.5 National Morale Determination & Effects

All countries except the Soviet Union will be affected to some extent by troop losses. Each sub unit lost in combat will decrease national morale for the owning nation by (1 / starting number of sub units). Each unit lost by a small army will have a large effect on the owner's national morale.

For every 30 non urban or 6 urban hexes lost or gained by an alliance, all members of the alliance will lose or gain 1% national morale. In

addition, loss of the following cities to enemy occupation will subtract 20% from the national morale of the losing nation. This morale is regained if the city is re-taken.

Major City Morale Losses:

CITY(MEX)	OWNER
Vienna(43,46)	----- Austria
Brussels(0,33)	----- Belgium
Prague(36,37)	----- Czechoslovakia
Copenhagen(29,10)	----- Denmark
Strasbourg(12,44)	----- France
Berlin(33,26)	----- GDR (East Germany)
Bonn(10,33)	----- FRG (West Germany)
Amsterdam(3,26)	----- Netherlands
Lodz(53,29)	----- Poland

For each country which concludes a separate peace (surrenders), all countries in the original alliance will lose 5% of national morale.

Finally, national morale is affected by the outcome of the North Atlantic campaign (see section 5.1).

If the national morale of a country reaches 0, there is a 50% chance each turn that the country will conclude a separate peace with the enemy alliance. When this happens, all of that country's military units will be removed from the map. Some countries will also withdraw air forces. If the US, West Germany or Soviet Union conclude a separate peace, the war (and the game) ends immediately.

Air Force Withdrawals by Country:

- Czechoslovakia:
20% of Pact MiG-21 force
- German Democratic Republic:
20% of Pact MiG-21 force
- Poland:
30% of Pact MiG-21 force
- Belgium:
10% of NATO F-16/F-18/Mirage F1 force
- France:
10% of NATO Jaguar/A-7/Harrier force
40% of NATO F-15/Mirage 2000 force
- Netherlands:
10% of NATO F-16/F-18/Mirage F1 force
- Great Britain:
20% of NATO Jaguar/A-7/Harrier force
30% of NATO F-4/Tornado Force

5.6 Weather Determination & Effects

Weather conditions are updated each turn. Forecasts are also updated to project weather three turns in advance. Weather is dependent upon the season:

Weather Probability by Season:

SEASON	COLD/MILD/WARM	RAI/CLCLOUDS/STORMS
Winter:	60%/40%/0%	30%/60%/10%
Spring:	30%/60%/10%	40%/50%/10%
Summer:	0%/60%/40%	50%/40%/10%
Autumn:	20%/60%/20%	30%/60%/10%

Weather has significant effects on air operations (see section 3.21) chemical weapons (see section 4.2) and Intelligence gathering (see section 5.4).

5.7 End of Game Test

The computer tests to see if either alliance has collapsed, or if the final turn of a scenario has been reached. If so, the game ends and victory is awarded; otherwise, the game continues.

Most short scenarios are concluded at the end of the day 10(pm) turn. Most long scenarios will continue until the end of the day 30(pm) turn. The Lions & Tigers & Bears scenario will end day 11(am) or day 31(am) turn.

6.0 SOLITAIRE AND TWO PLAYER PLAY

In two player mode, the game will pause and display an alert box before beginning the next player's phase. This allows the players to exchange places at the computer without either player seeing any information he shouldn't see. All unit location information etc. is erased before the alert box is displayed, and the next player's information is not displayed until the alert box [begin] button is selected.

When a saved game is resumed, it will continue with all play selections as they were made when the game was begun. Solitaire games will be restarted in a solitaire mode while two player games will restart in a two player mode.

7.0 SCENARIOS AND VICTORY CONDITIONS

Scenarios may be either short or long. Long scenarios last for 60 turns (30 days), and short scenarios last for 20 turns (10 days).

Victory is determined solely by relative alliance morale level. Victory level = Pact average morale - NATO average morale.

Orders of battle for all scenarios are given in appendices C and D.

7.1 Red Lightning

Mobilization during hostilities. This situation assumes no prior mobilization by either side and complete strategic surprise by the Warsaw Pact. NATO wakes up just in time to put up air defenses and order troops out of the barracks as the Warsaw Pact units cross the borders into Norway and West Germany.

Convoys will arrive on the following turns: day 8(am), day 15(am), day 22(am), day 29(am).

Short Scenario Victory Levels:

Victory level < 20 NATO victory

Victory level > 30 Pact victory

Any other result is a stalemate (draw).

Long Scenario Victory Levels:

Victory level < 20 NATO victory

Victory level > 50 Pact victory

Any other result is a stalemate (draw)

7.2 "Lions & Tigers & Bears..."

Some mobilization has occurred. Most of NATO's European forces are mobilized, although US army reinforcements from North America are just beginning to arrive. While western leadership realizes that there is a high probability of a Pact invasion, most NATO units remain near garrison positions in an "unprovocative" deployment. Pact units from the western USSR are beginning to arrive. Most Pact "first echelon" units have moved to invasion staging areas.

Convoys will arrive on the following turns: day 4(am), day 11(am), day 18(am), day 25(am).

Short Scenario Victory Levels:

Victory level < 12 NATO victory

Victory level > 22 Pact victory

Any other result is a stalemate (draw)

Long Scenario Victory Levels:

Victory level < 15 NATO victory

Victory level > 45 Pact victory

Any other result is a stalemate (draw)

7.3 A Gathering of Hosts

All of the forces of both alliances are fully mobilized and in wartime deployments. A few Pact units have not yet arrived, but almost everything each side has that can be committed to central Europe is "in the shop window".

Convoys will arrive on the following turns: day 3(am), day 10(am), day 17(am), day 24(am).

Short Scenario Victory Levels

Victory level < 4 NATO victory

Victory level > 14 Pact victory

Any other result is a stalemate (draw)

Long Scenario Victory Levels

Victory level < 10 NATO victory

Victory level > 40 Pact victory

Any other result is a stalemate (draw).

8.0 TACTICS TIPS

You should probably play your first few games with the Air Campaign control selection set to "off". You will lose a bit of flexibility this way, but the game will be much easier to play. The Limited Intelligence option is a matter of personal taste. Playing with limited intel is only a little more difficult than with unlimited intel, and it gives a more accurate and interesting game. The ability to painlessly simulate "fog of war" is one of the great strengths of computer wargames. The North Atlantic/ Special Ops control selection should probably be set to "off" for your first game, and "on" thereafter. This option adds relatively little complexity to game, but it does add a great deal of realism.

Each scenario presents different problems for both players. The first order of business is creating a coherent defense or attack out of chaotic garrison deployments. This will generally be more of a problem for NATO than for the Pact. Don't try to confront an organized enemy force with mixed or incomplete corps or armies. Give up ground if necessary in order to gain time to organize your forces. Corps HQ and artillery support, movement coordination, and stacking restrictions will combine to give a strong advantage to the player who keeps his corps or armies intact.

In a general sense, most Warsaw Pact formations are similar in capability. This is not true of

NATO's units. You should not expect a French or Belgian division to do the work of a British, German or American division. Examine your units in detail before committing them.

If one of the countries in your alliance is heading for zero morale, pull that country's units out of the line as much as possible. Remember that when a country leaves the war, it takes its army and air force with it. The units are going to go away anyway if the country goes neutral. At least if they're still on the map, you can use them as a last ditch reserve.

The most effective way to kill large numbers of enemy aircraft (assuming that they come out to play) is to commit large forces to air superiority missions. This is not the best way to reduce the overall effectiveness of the enemy air force. Aircraft lost in air superiority combat will tend to be older, less survivable types. Airfield strikes will affect all types equally, regardless of survivability. Also, strikes on airfields will keep enemy aircraft grounded due to decreased readiness. It doesn't matter how many aircraft the other guy has if he can't fly them. Flying low readiness forces is a losing proposition. You won't accomplish much, but you will generally lose a minimum of 2.5% of your committed force even if the other player doesn't fly a single air superiority mission. The air over central Europe will be filled with surface to air missiles.

The Warsaw Pact:

The Pact player should concentrate his forces and follow Pact doctrine. Keep up the tempo of the attack. Remember that unless you are facing fresh units, NATO's outfits are as badly fatigued as your own. Ignore losses if you have a second echelon army ready to take up the advance. Reinforce success, not failure. Unless a tremendous hole opens up in your front, NATO does not have the units to exploit breakthroughs into your rear areas. On the other hand, if you manage to break through NATO lines, head west at top speed. Don't lose any sleep over a lack of defense for your flanks. This is particularly true if NATO has already committed his entire force. Head for the concentration of urban hexes near the Dutch / West German border. Occupation of this area will almost certainly force West Germany and the Netherlands out of the war, resulting in a political collapse of NATO.

Be sure to take out the Berlin garrison as soon as possible. If you dedicate a large enough force,

5.6 Weather Determination & Effects

Weather conditions are updated each turn. Forecasts are also updated to project weather three turns in advance. Weather is dependent upon the season:

Weather Probability by Season:

SEASON	COLD/MILD/WARM	FAIR/CL.CLOUDS/STORMS
Winter:	60%/40%/0%	30%/60%/10%
Spring:	30%/60%/10%	40%/50%/10%
Summer:	0%/60%/40%	50%/40%/10%
Autumn:	20%/60%/20%	30%/60%/10%

Weather has significant effects on air operations (see section 3.21) chemical weapons (see section 4.2) and Intelligence gathering (see section 5.4).

5.7 End of Game Test

The computer tests to see if either alliance has collapsed, or if the final turn of a scenario has been reached. If so, the game ends and victory is awarded; otherwise, the game continues.

Most short scenarios are concluded at the end of the day 10(pm) turn. Most long scenarios will continue until the end of the day 30(pm) turn. The Lions & Tigers & Bears scenario will end day 11(am) or day 31(am) turn.

6.0 SOLITAIRE AND TWO PLAYER PLAY

In two player mode, the game will pause and display an alert box before beginning the next player's phase. This allows the players to exchange places at the computer without either player seeing any information he shouldn't see. All unit location information etc. is erased before the alert box is displayed, and the next player's information is not displayed until the alert box [begin] button is selected.

When a saved game is resumed, it will continue with all play selections as they were made when the game was begun. Solitaire games will be restarted in a solitaire mode while two player games will restart in a two player mode.

7.0 SCENARIOS AND VICTORY CONDITIONS

Scenarios may be either short or long. Long scenarios last for 60 turns (30 days), and short scenarios last for 20 turns (10 days).

Victory is determined solely by relative alliance morale level. Victory level = Pact average morale - NATO average morale.

Orders of battle for all scenarios are given in appendices C and D.

7.1 Red Lightning

Mobilization during hostilities. This situation assumes no prior mobilization by either side and complete strategic surprise by the Warsaw Pact. NATO wakes up just in time to put up air defenses and order troops out of the barracks as the Warsaw Pact units cross the borders into Norway and West Germany.

Convoys will arrive on the following turns: day 8(am), day 15(am), day 22(am), day 29(am).

Short Scenario Victory Levels:

Victory level < 20 NATO victory

Victory level > 30 Pact victory

Any other result is a stalemate (draw).

Long Scenario Victory Levels:

Victory level < 20 NATO victory

Victory level > 50 Pact victory

Any other result is a stalemate (draw)

7.2 "Lions & Tigers & Bears..."

Some mobilization has occurred. Most of NATO's European forces are mobilized, although US army reinforcements from North America are just beginning to arrive. While western leadership realizes that there is a high probability of a Pact invasion, most NATO units remain near garrison positions in an "unprovocative" deployment. Pact units from the western USSR are beginning to arrive. Most Pact "first echelon" units have moved to invasion staging areas.

Convoys will arrive on the following turns: day 4(am), day 11(am), day 18(am), day 25(am).

Short Scenario Victory Levels:

Victory level < 12 NATO victory

Victory level > 22 Pact victory

Any other result is a stalemate (draw)

Long Scenario Victory Levels:

Victory level < 15 NATO victory

Victory level > 45 Pact victory

Any other result is a stalemate (draw)

7.3 A Gathering of Hosts

All of the forces of both alliances are fully mobilized and in wartime deployments. A few Pact units have not yet arrived, but almost everything each side has that can be committed to central Europe is "in the shop window".

Convoys will arrive on the following turns: day 3(am), day 10(am), day 17(am), day 24(am).

Short Scenario Victory Levels

Victory level < 4 NATO victory

Victory level > 14 Pact victory

Any other result is a stalemate (draw)

Long Scenario Victory Levels

Victory level < 10 NATO victory

Victory level > 40 Pact victory

Any other result is a stalemate (draw).

8.0 TACTICS TIPS

You should probably play your first few games with the Air Campaign control selection set to "off". You will lose a bit of flexibility this way, but the game will be much easier to play. The Limited Intelligence option is a matter of personal taste. Playing with limited intel is only a little more difficult than with unlimited intel, and it gives a more accurate and interesting game. The ability to painlessly simulate "fog of war" is one of the great strengths of computer wargames. The North Atlantic/ Special Ops control selection should probably be set to "off" for your first game, and "on" thereafter. This option adds relatively little complexity to game, but it does add a great deal of realism.

Each scenario presents different problems for both players. The first order of business is creating a coherent defense or attack out of chaotic garrison deployments. This will generally be more of a problem for NATO than for the Pact. Don't try to confront an organized enemy force with mixed or incomplete corps or armies. Give up ground if necessary in order to gain time to organize your forces. Corps HQ and artillery support, movement coordination, and stacking restrictions will combine to give a strong advantage to the player who keeps his corps or armies intact.

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NATO's units. You should not expect a French or Belgian division to do the work of a British, German or American division. Examine your units in detail before committing them.

If one of the countries in your alliance is heading for zero morale, pull that country's units out of the line as much as possible. Remember that when a country leaves the war, it takes its army and air force with it. The units are going to go away anyway if the country goes neutral. At least if they're still on the map, you can use them as a last ditch reserve.

The most effective way to kill large numbers of enemy aircraft (assuming that they come out to play) is to commit large forces to air superiority missions. This is not the best way to reduce the overall effectiveness of the enemy air force. Aircraft lost in air superiority combat will tend to be older, less survivable types. Airfield strikes will affect all types equally, regardless of survivability. Also, strikes on airfields will keep enemy aircraft grounded due to decreased readiness. It doesn't matter how many aircraft the other guy has if he can't fly them. Flying low readiness forces is a losing proposition. You won't accomplish much, but you will generally lose a minimum of 2.5% of your committed force even if the other player doesn't fly a single air superiority mission. The air over central Europe will be filled with surface to air missiles.



The Warsaw Pact:

The Pact player should concentrate his forces and follow Pact doctrine. Keep up the tempo of the attack. Remember that unless you are facing fresh units, NATO's outfits are as badly fatigued as your own. Ignore losses if you have a second echelon army ready to take up the advance. Reinforce success, not failure. Unless a tremendous hole opens up in your front, NATO does not have the units to exploit breakthroughs into your rear areas. On the other hand, if you manage to break through NATO lines, head west at top speed. Don't lose any sleep over a lack of defense for your flanks. This is particularly true if NATO has already committed his entire force. Head for the concentration of urban hexes near the Dutch / West German border. Occupation of this area will almost certainly force West Germany and the Netherlands out of the war, resulting in a political collapse of NATO.

Be sure to take out the Berlin garrison as soon as possible. If you dedicate a large enough force,

APPENDICES

Appendix A — Unit Icons:

 Tank Division or "Unified Corps" division	 Motorized Rifle Brigade	 Marine Brigade
 Armored Division	 Mechanized or Motorized Brigade	 Naval Infantry Brigade
 Panzer Division	 Heimatschutzbrigade	 Marine Regiment
 Division Blindée or Division Blindée Légère	 Airborne Division	 Artillery Division, Brigade or Regiment
 Tank Brigade	 Division Aéro mobile	 Armored Cavalry Regiment
 Armored Brigade	 Airborne Brigade	 Corps or Army Headquarters
 Motorized Rifle Division	 Air Assault Brigade	
 Infantry Division	 Fallschirmjäger Brigade	
 Gebirgsjäger Division	 Para-Commando Regiment	
 Panzer Grenadier Division		
 Division d'Infanterie		

Appendix B — Equipment Values:

These values list the various combat characteristics of the equipment used by units in the game. The values represent our best estimates of the performance of the equipment in the battle conditions that they are likely to face in any near-future conflict in Central Europe.

Warsaw Pact Aircraft

TYPE	SR	DR	TR	AS	STR	CAS	AVON.	SURV.
Su-17/20/22	0	0	0	2	3	3	3	3
Su-24	0	0	0	1	4	3	4	3
Su-25	0	0	0	1	3	3	2	3
MiG-21	0	0	0	2	1	1	2	3
MiG-23	0	0	0	4	1	1	3	4
MiG-25/31	0	0	0	3	0	0	4	4
MiG-27	0	0	0	3	3	3	3	3
MiG-29	0	0	0	5	1	1	4	4
Su-17(recce)	2	3	3	0	0	0	3	4
MiG-21(recce)	1	2	3	0	0	0	3	4
MiG-25(recce)	3	3	3	0	0	0	3	5

NATO Aircraft

TYPE	SR	DR	TR	AS	STR	CAS	AVON.	SURV.
Alpha, Mirage V	0	0	0	1	2	2	2	3
A-10	0	0	0	1	3	4	2	3
F-111, B-52	0	0	0	0	5	0	5	3
Mirage III, Draken, F-104	0	0	0	2	1	1	2	3
F-4, Tornado	0	0	0	3	3	3	3	4
F-15, Mirage 2000	0	0	0	5	3	2	5	4
F-16, F-18, Mirage F1	0	0	0	4	3	3	3	4
Jaguar, A-7, Harrier	0	0	0	1	3	2	3	3
F-117	0	0	0	0	5	0	5	5
SR-71, TR-1(recce)	3	3	3	0	0	0	4	5
Jaguar, Draken, Mirage (recce)	1	2	3	0	0	0	3	4
F-4, F-16, Mirage F1 (recce)	2	3	3	0	0	0	4	4

SR = Strategic Recce
DR = Deep Recce

TR = Tactical Recce
AS = Air Superiority

STR = Strike
CAS = Close Air Support

AVON. = Avionics
SURV. = Survivability

Weapon Systems:

NAME	LETHALITY	SURVIVABILITY	USER	
Light infantry squad	2	2	Pact/NATO	
Attack Helicopters:				
MH-24/28	12	8	Pact	
AH-1	12	8	NATO	
AH-64	14	10	NATO	
PAH-1	11	8	NATO	
Gazelle	11	8	NATO	
Lynx	11	9	NATO	
Tanks:				
T-55	8	8	Pact	
T-64	9	9	Pact	
T-72	9	9	Pact	
T-80	9	9	Pact	
T-84	9	10	Pact	
M-41	2	6	NATO	
M-48	8	8	NATO	
M-60	9	9	NATO/Austria	
M-1	10	10	NATO	
Leopard	9	8	NATO	
Leopard-2	10	10	NATO	
AMX-30	8	8	NATO	
Centurion	8	8	NATO	
Chieftain	10	9	NATO	
Challenger	10	10	NATO	
Personnel Carriers and Infantry Fighting Vehicles:				
BMP with squad	5	4	Pact	
BMD with squad	5	4	Pact	
BTR with squad	3	3	Pact	
OT-64 with squad	3	3	Pact	
M-113 with squad	3	3	NATO	
M-2 with squad	6	4	NATO	
M-3 with squad	6	4	NATO	
Marder with squad	4	5	NATO	
Spartan with squad	3	4	NATO	
FV-432 with squad	3	3	NATO	
MCV-80 with squad	4	4	NATO	
Saxon with squad	3	3	NATO	
AMX-10 with squad	5	4	NATO	
VAB with squad	3	3	NATO	
YPR-765 with squad	4	4	NATO	
Saurer 4k4 w/ squad	4	4	Austria	
Artillery:				
2S1	SPA	11	5	Pact
2S3	SPA	13	5	Pact
2S4	SPA	15	4	Pact
2S5	SPA	14	4	Pact
2S7	SPA	16	4	Pact
2S9	SPA	11	5	Pact

NAME		LETHALITY	SURVIVABILITY	USER
DANA	SPA	13	4	Pact
M-109	SPA	16	5	NATO
AUF-1	SPA	16	5	NATO
F-3	SPA	15	4	NATO
Abbot	SPA	11	5	NATO
M-110	SPA	13	4	NATO
122 Hwtzr	towed	12	2	Pact
152 Hwtzr	towed	14	2	Pact
8 inch Hwtzr	towed	13	2	NATO
155 Hwtzr	towed	16	2	NATO
105 Hwtzr	towed	11	2	NATO
122 MRL	MRL	14	2	Pact
BM-21	MRL	17	2	Pact
BM-22	MRL	19	3	Pact
RM-70	MRL	18	2	Pact
MLRS	MRL	20	6	NATO
LARS	MRL	17	3	NATO
82 Mrtr	mortar	11	2	Pact
120 Mrtr	mortar	11	2	Pact/NATO
Vasilyek	mortar	14	2	Pact
81 Mrtr	mortar	12	2	NATO
4.2 Mrtr	mortar	14	2	NATO
M-125	mortar	12	3	NATO
M-113/Mrtr	mortar	14	4	NATO
M-106	mortar	14	4	NATO
FROG/SS21	tac mx	11	5	Pact
Lance	tac mx	11	5	NATO
Anti-Tank Weapons:				
AT-4		2	1	Pact
AT-5		3	1	Pact
Milan		2	1	NATO
Dragon		1	1	NATO
TOW		3	1	NATO
BRDM/ATGM		3	3	Pact
Jaguar		3	7	NATO
M-901		3	5	NATO
Striker		3	3	NATO
FV-438		3	3	NATO
VAB/HOT		3	3	NATO
YPR/TOW		3	4	NATO
M-150		3	3	NATO
Kuerassier		3	4	Austria
Jagdpanzer Kanone		2	7	NATO
SPG-9		1	2	Pact
85Atg		1	2	Pact
100Atg		2	2	Pact
Armored Recon Vehicles:				
PT-76		2	4	Pact
Fox		2	5	NATO
Scorpion		2	6	NATO

NAME	LETHALITY	SURVIVABILITY	USER
Scimitar	2	6	NATO
Luchs	2	5	NATO
AMX-10RC	3	5	NATO
M-113/CR	2	3	NATO

Appendix C — Orders of Battle, Air Forces

These list the aircraft totals, both at game start and from reinforcements, for all three scenarios:

Warsaw Pact Air Forces:

TYPE	NUMBER OF AIRCRAFT AVAILABLE AT START OF SCENARIO:		
	RED LIGHTNING	"LIONS & TIGERS & BEARS..."	A GATHERING OF HOSTS
Su-17/20/22	380	380	470
Su-24	135	225	225
Su-25	135	135	180
MiG-21	1040	1040	1130
MiG-23	425	515	695
MiG-25/31	90	90	135
MiG-27	225	315	585
MiG-29	90	180	270
Su-17(recce)	60	105	105
MiG-21(recce)	90	90	90
MiG-25(recce)	30	30	75

Air Reinforcements by Scenario: (Increments of 45 Aircraft)

Red Lightning:			
TURF	AIRCRAFT TYPE	TURF	AIRCRAFT TYPE
day 1(pm)	MiG-29	day 8(pm)	MiG-23
day 2(am)	Su-24	day 9(am)	Su-17
day 2(pm)	MiG-23	day 9(pm)	MiG-21
day 3(am)	MiG-27	day 10(am)	Su-25
day 3(pm)	MiG-23	day 10(pm)	MiG-21
day 4(am)	MiG-27	day 11(am)	MiG-27
day 4(pm)	MiG-29	day 11(pm)	MiG-23
day 5(am)	Su-24	day 12(am)	MiG-27
day 5(pm)	Su-17(recce)	day 12(pm)	MiG-23
day 6(am)	MiG-25	day 13(am)	MiG-27
day 6(pm)	MiG-25(recce)	day 13(pm)	MiG-27
day 7(am)	MiG-29	day 14(am)	MiG-27
day 7(pm)	MiG-23	day 14(pm)	MiG-27
day 8(am)	Su-17	day 15(am)	MiG-29

"Lions & Tigers & Bears..."

TURF	AIRCRAFT TYPE	TURF	AIRCRAFT TYPE
day 2(am)	MiG-25	day 7(am)	MiG-27
day 2(pm)	MiG-25(recce)	day 7(pm)	MiG-23
day 3(am)	MiG-29	day 8(am)	MiG-27

TURF	AIRCRAFT TYPE	TURF	AIRCRAFT TYPE
day 3(pm)	MiG-23	day 8(pm)	MiG-23
day 4(am)	Su-17	day 9(am)	MiG-27
day 4(pm)	MiG-23	day 9(pm)	MiG-27
day 5(am)	Su-17	day 10(am)	MiG-27
day 5(pm)	MiG-21	day 10(pm)	MiG-27
day 6(am)	Su-25	day 11(am)	MiG-29
day 6(pm)	MiG-21		

A Gathering of Hosts:

No reinforcements available...

NATO Air Forces:

TYPE	NUMBER OF AIRCRAFT AVAILABLE AT START OF SCENARIO:		
	RED LIGHTNING	"LIONS & TIGERS & BEARS..."	A GATHERING OF HOSTS
Alpha, Mirage V	278	278	278
A-10	108	108	300
F-111, B-52	182	206	206
Mirage III, Draken...	130	130	130
F-4, Tornado	674	698	818
F-15, Mirage 2000	168	192	192
F-16, F-18, Mirage F1	724	796	820
Jaguar, A-7, Harrier	151	151	271
F-117	0	48	48
SR-71, TR-1(recce)	23	23	23
Jaguar (recce)...	73	73	73
F-4(recce)...	138	162	258

Air Reinforcements by Scenario: (Increments of 24 Aircraft)

Red Lightning:			
TURF	AIRCRAFT TYPE	TURF	AIRCRAFT TYPE
day 1(pm)	F-15	day 9(pm)	F-4
day 2(am)	F-111	day 10(am)	A-10
day 2(pm)	F-16	day 10(pm)	F-4(recce)
day 3(am)	F-117	day 11(am)	A-10
day 3(pm)	F-16	day 11(pm)	A-7
day 4(am)	F-117	day 12(am)	A-10
day 4(pm)	F-4	day 12(pm)	F-4
day 5(am)	F-4(recce)	day 13(am)	A-10
day 5(pm)	F-16	day 13(pm)	F-4
day 6(am)	F-4(recce)	day 14(am)	A-10
day 6(pm)	F-4	day 14(pm)	F-4(recce)
day 7(am)	F-4(recce)	day 15(am)	A-10
day 7(pm)	F-16	day 15(pm)	A-7
day 8(am)	A-10	day 16(am)	A-7
day 8(pm)	F-4	day 16(pm)	A-7
day 9(am)	A-10	day 17(am)	A-7

"Lions & Tigers & Bears...":

TURN	AIRCRAFT TYPE	TURN	AIRCRAFT TYPE
day 2(am)	F-4(rece)	day 8(am)	A-10
day 2(pm)	F-4	day 8(pm)	F-4
day 3(am)	F-4(rece)	day 9(am)	A-10
day 3(pm)	F-16	day 9(pm)	F-4
day 4(am)	A-10	day 10(am)	A-10
day 4(pm)	F-4	day 10(pm)	F-4(rece)
day 5(am)	A-10	day 11(am)	A-10
day 5(pm)	F-4	day 11(pm)	A-7
day 6(am)	A-10	day 12(am)	A-7
day 6(pm)	F-4(rece)	day 12(pm)	A-7
day 7(am)	A-10	day 13(am)	A-7
day 7(pm)	A-7		

A Gathering of Hosts:

No reinforcements available...

Appendix D — Orders of Appearance, Ground Forces

The following is a complete listing of all ground forces that appear as reinforcements during the game:

Warsaw Pact Ground Force Reinforcements:

Red Lightning:

UNIT	REINFORCEMENT HEX	TURN
HQ 5 Guards Tank Army	54,27	11
3 Guards Tank Division / 5GTA	54,27	9
8 Guards Tank Division / 5GTA	54,27	10
120 Guards Motor Rifle Division / 5GTA	54,27	12
3 Guards Artillery Division / 5GTA	54,27	13
32 Heavy Artillery Brigade / 5GTA	54,27	14
1 Unified Corps	54,27	5
HQ 11 Guards Army	54,19	27
1 Tank Division / 11GA	54,19	25
1 Guards Motor Rifle Division / 11GA	54,19	26
40 Guards Tank Division / 11GA	54,19	28
24 Guards Tank Division / 11GA	54,19	29
149 Artillery Division / 11GA	54,19	30
22 Heavy Artillery Brigade / 11GA	54,19	31
HQ 1 PPR Army	54,19	46
10 PPR Tank Division / 1PPRA	54,19	43
2 PPR Motor Rifle Division / 1PPRA	54,19	44
3 PPR Motor Rifle Division / 1PPRA	54,19	45
8 PPR Motor Rifle Division / 1PPRA	54,19	47
9 PPR Motor Rifle Division / 1PPRA	54,19	48
HQ 3 CSR Army	54,43	46
1 CSR Tank Division / 3CSRA	54,43	43
4 CSR Tank Division / 3CSRA	54,43	44
3 CSR Tank Division / 3CSRA	54,43	45

"Lions & Tigers & Bears ...":

UNIT	REINFORCEMENT HEX	TURN
HQ 5 Guards Tank Army	54,27	5
3 Guards Tank Division / 5GTA	54,27	3
8 Guards Tank Division / 5GTA	54,27	4
120 Guards Motor Rifle Division / 5GTA	54,27	6
3 Guards Artillery Division / 5GTA	54,27	7
32 Heavy Artillery Brigade / 5GTA	54,27	8
HQ 11 Guards Army	54,19	21
1 Tank Division / 11GA	54,19	19
1 Guards Motor Rifle Division / 11GA	54,19	20
40 Guards Tank Division / 11GA	54,19	22
24 Guards Tank Division / 11GA	54,19	23
149 Artillery Division / 11GA	54,19	24
22 Heavy Artillery Brigade / 11GA	54,19	25
HQ 1 PPR Army	54,19	38
10 PPR Tank Division / 1PPRA	54,19	35
2 PPR Motor Rifle Division / 1PPRA	54,19	36
3 PPR Motor Rifle Division / 1PPRA	54,19	37
8 PPR Motor Rifle Division / 1PPRA	54,19	39
9 PPR Motor Rifle Division / 1PPRA	54,19	40
HQ 3 CSR Army	54,43	38
1 CSR Tank Division / 3CSRA	54,43	35
4 CSR Tank Division / 3CSRA	54,43	36
3 CSR Tank Division / 3CSRA	54,43	37
HQ 7 Guards Tank Army	54,27	52
29 Tank Division / 7GTA	54,27	52
37 Guards Tank Division / 7GTA	54,27	52
5 Motor Rifle Division / 7GTA	54,27	52
8 Artillery Division / 7GTA	54,27	52
41 Heavy Artillery Brigade / 7GTA	54,27	52

A Gathering of Hosts:

UNIT	REINFORCEMENT HEX	TURN
HQ 7 Guards Tank Army	54,27	12
29 Tank Division / 7GTA	54,27	10
37 Guards Tank Division / 7GTA	54,27	11
5 Motor Rifle Division / 7GTA	54,27	13
8 Artillery Division / 7GTA	54,27	14
41 Heavy Artillery Brigade / 7GTA	54,27	15

NATO Ground Force Reinforcements:

Red Lightning:

UNIT	REINFORCEMENT HEX	TURN
10 Be Mechanized Brigade / IBe	4,32	3
12 Be Motorized Brigade / IBe	4,34	4
1 Da Brigade / Jy	19,7	3
2 Da Brigade / Jy	21,4	4
3 Da Brigade / Jy	21,12	4
1 Br Infantry Brigade / Jy	17,11	7
1 Da Brigade / Sj	29,10	3
2 Da Brigade / Sj	27,13	5
3 Da Brigade / Sj	29,10	6

UNIT	REINFORCEMENT HEX	TURN
5 Ne Mechanized Division / INe	7,27	3
102 Ne Artillery Group / INe	7,25	4
101 Ne Infantry Brigade / INe	4,29	7
103 Ne Artillery Group / INe	8,25	7
104 Ne Artillery Group / INe	8,25	8
19 Br Infantry Brigade / IBr	0,33	7
15 Br Infantry Brigade / IBr	0,33	9
24 Br Infantry Brigade / IBr	0,33	11
1 Fr Artillerie / IFR	2,51	3
15 Division d'Infanterie / IIFr	2,51	4
HQ III Corps / IIIFr	0,34	3
8 Division d'Infanterie / IIIFr	0,34	4
2 Division Blindée / IIIFr	0,34	5
10 Division Blindée / IIIFr	0,34	6
6 Division Blindée Légère / IIIFr	0,34	7
3 Fr Artillerie / IIIFr	0,34	9
3 US Armored Cavalry Regiment / VUS	14,40	4
212 US Artillery Brigade / VUS	14,40	5
5 US Infantry Division / VUS	12,41	13
194 US Armored Brigade / VUS	14,40	15
1 US Infantry Division / VIUS	12,39	7
HQ III Corps / IIUIS	7,31	3
1 US Cavalry Division / IIUIS	7,31	7
4 US Infantry Division / IIUIS	6,30	11
2 US Armored Division / IIUIS	4,31	15
24 US Infantry Division / IIUIS	1,31	17
75 US Artillery Brigade / IIUIS	1,31	30
52 Heimschutzbrigade / IGe	12,25	3
53 Heimschutzbrigade / IGe	8,32	4
62 Heimschutzbrigade / IGe	20,26	5
63 Heimschutzbrigade / IGe	8,31	6
55 Heimschutzbrigade / IIGe	16,44	3
66 Heimschutzbrigade / IIGe	25,47	5
65 Heimschutzbrigade / IIGe	17,44	6
54 Heimschutzbrigade / IIIGe	9,37	3
64 Heimschutzbrigade / IIIGe	14,37	5
51 Heimschutzbrigade / SH	19,15	3
61 Heimschutzbrigade / SH	21,17	5
Royal Netherlands Marines	Theatre Reserve	7
5 Br Airborne Brigade	Theatre Reserve	9

"Lions & Tigers & Bears..."

UNIT	REINFORCEMENT HEX	TURN
24 Br Infantry Brigade / IBr	0,33	3
5 US Infantry Division / VUS	12,41	5
194 US Armored Brigade / VUS	14,40	7
4 US Infantry Division / IIUIS	6,30	3
2 US Armored Division / IIUIS	4,31	7
24 US Infantry Division / IIUIS	1,31	9
75 US Artillery Brigade / IIUIS	1,31	22

A Gathering of Hosts:

No reinforcements available

Appendix E — Formulae

Air Superiority Combat Algorithm

Air Superiority = For each type of aircraft assigned to air superiority mission:

Number of assigned aircraft * (force readiness of aircraft)% * aircraft mission capability

* (aircraft effectiveness)% (see section 3.21) / 4

Anti Aircraft = 160

Loss ratio = (Air Superiority + Anti Aircraft) / 3280

The loss ratio is the chance for each enemy aircraft to have to check against its survivability rating. This number will be multiplied by a random number from 0.9 to 1.1 to introduce a small random factor in losses. If an aircraft has to check, it has a (6-type survivability)/6 chance of being destroyed.

Example: The Warsaw Pact assigns 800 MiG-21, and 120 MiG-23 to air superiority missions on a cloudy AM turn. MiG-21 force readiness is currently 75%, and MiG-23 force readiness is currently 90%. A check reveals that flight conditions are "good" so:

Warsaw Pact air superiority =

MiG-21: (800 * 75% * 2 * 40%) = 480

MiG-23: (120 * 90% * 4 * 60%) = 259

NATO loss ratio =

(480 + 259 + 160) / 3280 = 27 = 27%

Thus, 27% of NATO aircraft flying on this turn will have to check against their survivability in order to avoid being destroyed. The random multiplier is 1.1, giving a modified loss ratio of 30%. If 95 F-111 aircraft are flying on this turn, 15% (30% * 95 * (6-3)/6) will be destroyed (14 aircraft lost). The Warsaw Pact would claim 15 to 28 F-111 kills.

Close Air Support Algorithm

NATO and Warsaw Pact aircraft with Close Air Support Missions will contribute to the friendly artillery fire for each combat in the following Joint Ground Combat & Movement Phase (see section 4.2). The number of artillery points available for each combat is given at the bottom of the screen.

Air support is calculated as:

For each type of aircraft assigned to close air support mission:

Number of assigned aircraft * (force readiness of air-

craft)% * aircraft mission capability

* (aircraft effectiveness)% (see section 3.21) / 8.

Example: NATO assigns 108 A-10 to the close air support mission on a fair/AM turn. Current A-10 force readiness is 90%. The close air support available for NATO units this turn would be:

$$108 * 90\% * 4 * 100\% / 8 = 48$$

(This amount of close air support is approximately equivalent to adding an artillery brigade to every friendly unit stack on the board.)

Air Strike Combat Algorithm:

NATO and Warsaw Pact aircraft with Strike missions will generate a number of airstrikes for each player to allocate to specific targets.

Number of airstrikes is calculated as:

For each type of aircraft assigned to strike mission:

Number of assigned aircraft * (force readiness of aircraft)% * aircraft mission capability

* (aircraft effectiveness)% (see section 3.21) / 120.

Example: NATO assigns 95 F-111 to the strike mission on a fair/PM turn. Current F-111 force readiness is 80%. The number of airstrikes available to the NATO player this turn would be:

$$95 * 80\% * 5 * 80\% / 120 = 2.53$$

Any fractional remainder has a chance (equal to the fraction) of generating an additional airstrike. In this case, there is a 53% chance of a third strike being available to the NATO player.

The Ground Combat Algorithms:

Unit Combat Strength Algorithms

Sub Unit Deployment Strength Modifiers:

Rest ————— 0.33

Reserve ————— 0.67

Forward ————— 1.00

The total artillery lethality of a unit =

For each sub unit:

Sub unit readiness% * sub unit deployment modifier *

(Sum of all lethalties for equipment with lethalties greater than 10) / 10.

(Note that this means helicopters are treated as artillery.)

The total non artillery lethality of a unit =

For each sub unit:

Sub unit readiness% * sub unit deployment modifier *

(Sum of all lethalties for equipment with lethalties less than 10) / 10.

The total survivability of a unit =

For each sub unit:

Sub unit readiness% * sub unit deployment modifier *

(Sum of all survivabilities for equipment) / 10

Artillery Combat

All defending unit and headquarters artillery, and close air support are summed in exactly the same way.

A loss ratio is calculated for each force:

Moving force: (attacker or moved defender)

30% * total enemy artillery lethality / total friendly survivability

Static force: (defender if not moved)

12% * total enemy artillery lethality / total friendly survivability

Regardless of movement status, the defending units receive terrain benefits, and the attacking forces do not.

Next, artillery combat losses are applied to both sides. Each piece of equipment in every involved unit has a (loss ratio)% chance of having to check against its survivability in order to survive. The equipment's survival chance is: equipment survivability / (16 + 2 * owning sub unit deployment loss modifier).

Sub Unit Deployment Loss Modifiers

Forward ————— 3

Reserve ————— 2

Rest ————— 1

Units participating in combat as ranged artillery support will only suffer 1/2 of the calculated losses (maximum 50%).

Finally, the readiness of each sub unit involved in the combat is decreased by (chemical effects(0 to 4 depending on weather) + friendly loss ratio)% * sub unit deployment / 3. Readiness will not be reduced below 50%.

Note that sub units with "forward" deployments will contribute greater strength to combats, and will more rapidly be fatigued (readiness decreased) in combat than will those with

"reserve" deployments. The same relationship holds for "reserve" vs. "rest" deployments.

Example of Artillery Combat: The First British Armoured Division attempts to enter an open hex containing the Soviet 35 Air Assault Brigade. British I Corps HQ is two hexes away. All units are at 90% readiness. Chemical warfare is in effect. NATO has 25 points of close air support, and the Warsaw Pact has 15 points of close air support. 35 Air Assault Brigade has not moved this turn. All sub units have a "forward" deployment. The weather is mild and fair. The Pact competence level is set to "Challenging".

NATO artillery lethality is:

I Corps: 48(lethality) * 90% * 1/2(ranged "artillery" support) = 28.2

1 Armoured Division: 171(lethality) * 90% = 153.9

$$\text{total} = 28.2 + 153.9 + 25 = 207.1$$

Warsaw Pact artillery lethality is:

35 Air Assault Brigade: 123(lethality) * 90% * 1.2(chemical modifier) = 132.8

$$\text{total} = 132.8 + 15 = 147.8$$

NATO loss ratio:

$$30\% * 147.8 / (585(\text{Survivability } 1\text{BrAd}) * 90\%) = 8.4\%$$

Warsaw Pact loss ratio:

$$12\% * 207.1 / (69(\text{Survivability } 35\text{AAstBde})) * 90\% = 40.0\%$$

For each piece of equipment with a survivability of 5:

$$\text{NATO loss rate} = 8.4\% * (1 - 5 / (16 + 2 * 3)) = 6.5\%$$

$$\text{Pact loss rate} = 40.0\% * (1 - 5 / (16 + 2 * 3)) = 30.9\%$$

NATO sub unit readiness will decrease by (2(chemical effect mild weather) + 6.5) * 3(deployment) / 3 = 8.5

Pact sub unit readiness will decrease by (2 + 40.0) * 3 / 3 = 42.0

Airdrop Resolution Algorithms

Paradrop Formulae: A drop attrition factor will be calculated:

(Note: x = the x coordinate for the target hex of the drop.)

NATO drop factor = (1 + (total number of Pact aircraft / 600)) *

(x - 26 - 2(if dropping into friendly hex)) %

Pact drop factor = (1 + (total number of NATO aircraft / 600)) *

(26 - x - 2(if dropping into friendly hex)) %

If this is a PM turn, the factor is reduced by 25%, and the unit's readiness is reduced by 10% to 50%. If this is an AM turn, the unit's readiness is reduced by 5% to 25%.

If the factor is less than 1% it is set to 1%. Factor% of all equipment in the unit is lost.

Norway Victory Algorithm

The Warsaw Pact chance of victory on any given turn is:

((40 + combined lethality of committed Warsaw Pact theater reserve units / 7.5

- combined survivability of committed NATO theater reserve units / 2.5) / 12) %.

If the Warsaw Pact does not win on any given turn, then the NATO chance of victory on any given turn is:

0% if The Pact has won "at sea".

1% if the campaign "at sea" continues.

2% if NATO has won the campaign "at sea".

Example:

1. NATO has won "at sea"

2. NATO has committed the British 5th Airborne bde to Norway. (survivability = 24).

3. Warsaw Pact has committed 7th and 106th Guards Airborne divisions to Norway. (lethality = 47 + 47 = 94).

There is a 3.6% chance for a Warsaw Pact victory this turn. Failing that, there is a 2% chance for NATO victory this turn.

Iceland Victory Algorithm

The Warsaw Pact chance of victory on any given turn is:

(combined lethality of committed Warsaw Pact theater reserve units / 7.5

- combined survivability of committed NATO theater reserve units / 7.5 - 2) %.

If the Warsaw Pact does not win on any given turn, then the NATO chance of victory on any given turn is:

0% if The Pact has won "at sea".

5% if the campaign "at sea" continues.

10% if NATO has won the campaign "at sea".

Example:

1. NATO has won "at sea"

2. Warsaw Pact has won in Norway, allowing

them to initiate an invasion of Iceland.

3. NATO has committed the Royal Netherlands Marines to Iceland. (survivability = 7).

4. Warsaw Pact has committed 103 Guards Airborne division, Baltic Naval Infantry Brigade, and 36 Air Assault Brigade to Iceland. (lethality = $47 + 15 + 18 = 80$).

There is a 7.7% chance for a Warsaw Pact victory this turn. Failing that, there is a 10% chance for NATO victory this turn.

"At Sea" Victory Algorithm

Each turn there is a 10% chance of a major naval engagement in the North Atlantic. Once every week, a convoy will sail from the US to Europe. On turns that convoys arrive, an engagement will automatically occur if the outcome of the North Atlantic campaign has not already been determined. When an engagement occurs, there is a 15% chance that it will be decisive. A decisive engagement will determine permanent (within the time limit of the game) control of the North Atlantic.

If the Warsaw Pact controls both Norway and Iceland, there is a 50% chance that NATO will win, and a 50% chance that the Warsaw Pact will win.

If the Warsaw Pact controls either Norway or Iceland (but not both), there is a 65% chance for NATO victory and a 35% chance for a Pact victory.

If the Warsaw Pact controls neither Norway or Iceland, there is an 80% chance for NATO victory and a 20% chance for a Pact victory.

Convoy Attrition Percentage

The amount of losses that a convoy suffers is calculated as follows:

$(8 - \text{turn}/14 + 1 \text{ for each part of the North Atlantic controlled by the Warsaw Pact}) * 10\%$

Example: If the Pact controls Norway but has not won in Iceland or "at sea", and this is the turn 28 convoy: Convoy attrition will be between 10% and 70%. The turn/14 factor accounts for declining Soviet submarine activity as subs are lost or return to base.

Convoy losses will be described in the Strategic Report (see section 3.11) as Light (10%-30%), Moderate (40%-60%), or Heavy (70%-100%).

Reconnaissance (Recce) Formulae

Number of assigned aircraft * (force readiness of aircraft)%

* aircraft mission capability

* (aircraft effectiveness)%
(see section 3.21) / 200.

Example: The Warsaw Pact wishes to see NATO deployments near Stuttgart (hex 17,44). This is in the Pact deep recce area, so fifty five Su-17(recce) aircraft are assigned to the deep recce mission. If flight conditions are "good", and force readiness is 90%, these aircraft will contribute 44.6% to the chance of spotting hexes in this area.

$55 * 90\% * 3 * 60\% / 200 = .446 = 44.6\%$

If the weather is fair satellites will contribute 20%, and one special forces recce mission would contribute 10%. This would give a 74.6% chance of spotting any given hex in the deep recce area.

SUPPLY SOURCES:

West map edge	NATO
East map edge	Warsaw Pact
4,25	NATO (if either 4,24 or 5,25 are NATO controlled)
12,21	NATO
14,20	NATO
16,21	NATO
17,11	NATO
21,8	NATO or Warsaw Pact
21,17	Warsaw Pact
29,10	NATO or Warsaw Pact
50,16	Warsaw Pact

Sub units in supplied hexes will be checked and readiness may be increased if the sub unit has a readiness of less than 100. The chance for successful resupply is equal to 1% times the current stockpile level. Thus, if stockpiles are at 100 or greater, resupply for units in supplied hexes is automatic.

RESUPPLY SCHEDULE:

Sub unit deployment Readiness increase

Forward	readiness = readiness + 4 (NATO)
Reserve	readiness = readiness + 8 (NATO)
Rest	readiness = readiness + 12 (NATO)

The Pact competence level will affect the readiness increase rates of Pact units as follows:

Pushover	As for NATO * .5
Moderate	As for NATO * .75
Challenging	As for NATO
Hairy	As for NATO * 1.25
HIDEOUS	As for NATO * 1.5

CHANCE OF SPOTTING UNITS IN AN ENEMY CONTROLLED HEX:

Orbital recce (fair weather)	20%
Orbital recce (cloudy weather)	10%
Orbital recce (storms)	0%
Special forces recce	+10% * number of missions
Airborne recce	see below

WEATHER PROBABILITY BY SEASON:

SEASON	COLD/MIILD/WARM	FAIR/CLOUDS/STORMS
Winter:	60%/40%/0%	30%/60%/10%
Spring:	30%/60%/10%	40%/50%/10%
Summer:	0%/60%/40%	50%/40%/10%
Autumn:	20%/60%/20%	30%/60%/10%

AIRBORNE RECCE FOR EACH SIDE

Divided into three geographic regions:

REGION	NATO	WARSAW PACT
Tactical recce:	hexrows 0-28	hexrows 23-54
Deep recce:	hexrows 28-42	hexrows 12-22
Strategic recce:	hexrows 43-54	hexrows 0-11

MAJOR CITY MORALE LOSSES:

CITY(HEX)	OWNER
Vienna(43,46)	Austria
Brussels(0,33)	Belgium
Prague(36,37)	Czechoslovakia
Copenhagen(29,10)	Denmark
Strasbourg(12,44)	France
Berlin(33,26)	GDR (East Germany)
Bonn(10,33)	FRG (West Germany)
Amsterdam(3,26)	Netherlands
Lodz(53,29)	Poland

AIR FORCE WITHDRAWALS BY COUNTRY:

- Czechoslovakia:
20% of Pact MiG-21 force
- German Democratic Republic:
20% of Pact MiG-21 force
- Poland:
30% of Pact MiG-21 force
- Belgium:
10% of NATO F-16/F-18/Mirage F1 force
- France:
10% of NATO Jaguar/A-7/Harrier force
40% of NATO F-15/Mirage 2000 force
- Netherlands:
10% of NATO F-16/F-18/Mirage F1 force
- Great Britain:
20% of NATO Jaguar/A-7/Harrier force
30% of NATO F-4/Tornado Force



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