TEST PILOT™

Manual design by Publishing Consultants

English

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ATF

TEST PILOT

Features

- Fast 3D Action
- Terrain Following Mode
- Multi Weapon Selection
- Automatic Landing
- Relief Landscape
- War Reports
- Complex Strategy
- Rearming and Refuelling
- Enemy Interceptors
- On-Board Flight Computer

Objective

ATF is an action Strategy game based upon the Advanced Tactical Fighter, the most effective fighting machine ever designed. To defeat the determined enemy you will need careful planning and first class flying skills. The delicate balance between your forces, communications and industry must be maintained while striking at the heart of the enemy. Victory will only be secured once you have destroyed the enemy and forced him to surrender.

The choice of your mission is entirely your decision. Your only help is a war report generated after each sortie. One mistake, one wrong mission could lead your side to defeat.

Loading Instructions

1. Insert the disk in drive.
2. Type LOAD "*",8,1 and press RETURN.
3. Type RUN and press RETURN.

When the program has loaded, you are prompted for a softlock security code. The code is found by looking up the number in the screen in the left hand column of the table (see ATF Appendix) and entering the number in the right hand column

entering the number in the right hand column
using keys 0-9 and ENTER. The game is now
ready for playing.

Commodore Keys

Z or =	Bank Left	(Joystick Left)
/ or [	Climb	(Joystick Back)
; or +	Dive	(Joystick Forward)
X or -	Bank Right	(Joystick Right)
Space	Fire	(Joystick Fire Button)

Q	Increase Thrust
A	Decrease Thrust
U	Undercarriage
L	Automatic Landing
T	Terrain Following
F1	Terrain Lines on/off
J	Jammer
C	Select Computer Screen
D	Select Allied or Enemy Database
E	Select Database Category
F	Foreword Step
R	Reverse Step
G	Nearest Target in Category
RETURN	Database Lock-on
M	Missile Launch
N	Select Missile Type

Title Page

Move to the option you wish to select using the UP
and DOWN controls. Press FIRE to select the
option.

START GAME   - begin a game

CONTROL   - select keyboard or joystick

PILOT RATING   - choose the level of difficulty

SOUND   - switch sound on or off

A New Game

War Situation Reports are generated at the beginning of a game and each time you return to an allied base to rearm and refuel. They are your main source of information, and keep you informed of overall progress. Use them to help decide your next mission.

The War Situation Report

The War Situation Report consists of four sections:

1. Gains and Losses
    All recent victories and defeats are listed.

2. Intelligence Report
    Intelligence reports will display additional information on which to base your strategy.

3. Status
    The status of both the allied and enemy powers are summarized as a set of bar graphs. The section below headed Balance of Power explains their use in more detail.

The Balance of Power

The allied and enemy graphs represent the relative strengths of each side's forces, communications and industries. The five graphs displayed represent:

BASES

LAND FORCES

SEA FORCES

COMMUNICATIONS

INDUSTRY
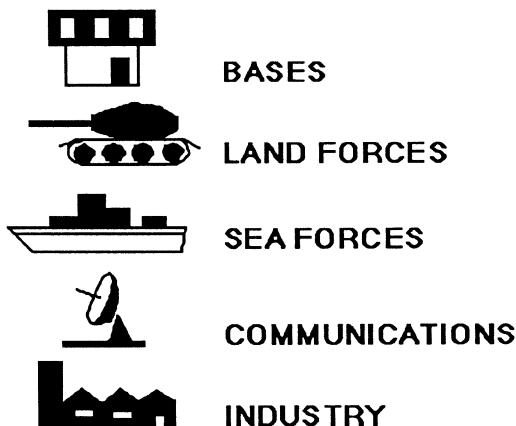
They interact with each other in a number of ways as the battle progresses. You must attempt to strengthen your position, while weakening the enemy's to secure victory.

BASES displays the number of air bases each side controls. You will always need at least one base at which to rearm and refuel.

The values of LAND FORCES and SEA FORCES indicate the number of operational fighting units, their strength and morale.

The level of COMMUNICATIONS is dependent upon the number and condition of a side's communication bases. These bases form important targets throughout the battle. When COMMUNICATIONS are poor the movement of

forces will be uncoordinated and you will only receive small amounts of information on which to base your strategy.

The INDUSTRY level reflects the current state of the factories which build military hardware and maintain communication systems. If a factory is damaged its output will decrease. If a factory is destroyed its production will cease. When INDUSTRY is low, military hardware that is lost in battles will not be replace and communication bases will not be maintained.

After pressing FIRE the REARMING & REFUELLING PAGE will appear in the main window area of the screen.

Rearming & Refuelling

Rearming and refuelling is achieved by moving UP and DOWN to select the item and LEFT and RIGHT to alter its value. The available free weight is displayed below the bar graphs and cannot be exceeded. It is up to you to select the right balance between arms and fuel for your chosen mission.

Weapons

Three kinds of weapons are available for arming your craft:

1. CANNON MAGAZINES:
   For fast rapid fire - suitable for destroying incoming enemy interceptors.

2. ASRAAM MISSILES:
   Missiles guided by you within the visual range of the main screen. Once fired guide the missile towards its target using LEFT and RIGHT.

3. MAVERICK MISSILES:
The most powerful kind of missile - suitable for damaging/destroying ground bases forces and targets. These missiles when launched head for the object currently selected in the database in the onboard flight computer. Although these missiles can fly well beyond the visual range they do have a limited range.

The cannons are operated by pressing the FIRE button. Key N selects between ASRAAM and MAVERICK missiles, with a symbol on the Head Up Display confirming which missile system is selected. After launching a missile with Key M, any target damage will be reported on the In Flight Message Window.

Main Visual Display

After rearming and refuelling, the main display window will switch to the computer enhanced all weather visual for the mission. The view is generated from a point above and behind the ATF craft to provide excellent all round vision. Terrain relief lines are superimposed onto the screen for low level flying. These lines can be turned off using the TERRAIN TYPE key.

Instrument Panel Layout

Head Up Display (HUD)

THR:	Engine thrust
SPD:	Aircraft Speed
GND:	Ground height
ALT:	Aircraft altitude

> Note: Both ground height and aircraft altitude are relative to sea level. Your aircraft will touch the ground if these two indicators meet.

The symbol at the center of the HUD indicates which missile system is active i.e. ASRAAM (A)

or MAVERICK (M). The maverick symbol will become solid when the missile locks onto its target.

Above the center symbol is your HEADING. Below the symbol you will find the BEARING and RANGE to the target currently selected in the database. To intercept your target, turn the aircraft left or right until the heading and the bearing are equal. You will now be flying directly towards the target.

Bottom

FUEL: Fuel level.
SAM: Surface to Air Missile warning.
AL: Automatic Landing mode.
TF: Terrain Following mode.
UC: Undercarriage Status (up or down).

The Inflight Message Window

Immediately above the bottom row of instruments is the INFLIGHT MESSAGE WINDOW. Messages will be displayed in this window to give essential information during a mission.

The Onboard Flight Computer

Mission data is displayed by the plane's onboard flight computer on 5 different pages of information. The flight computer screen is in the lower half of the screen to the right of the main visual display.

The screens are selected using key C.

1. World map
   Shows a map of the world and indicates your position and the position of the currently selected item in the database. If both objects coincide then only one marker dot will be visible.

2. Database
   As you fly around and locate various allied
   and enemy objects they will automatically be
   entered into the database. All allied objects
   are already in the database. See the next
   section for a detailed explanation of the
   database.

3. Weapon status
   Displays the remaining weapons available
   in the following order: CANNON FIRE,
   ASRAAM missiles and MAVERICK
   missiles.

4. ATF status
   Displays the efficiency of the important
   function of the ATF as percentages.

Database Operation

Use key C to cycle onto the Database screen of the
flight computer. Pressing key D will now select
either ALLIED or ENEMY database mode.
Target symbols are shown red for ENEMY and
green for ALLIED. Targets are categorized as
follows:

BASES

GROUND FORCES

SEA FORCES

COMMUNICATIONS

FACTORIES

Select the required category using key E.

In each category we find target bearing and range by pressing key F (Forward) or R (Reverse) to step through the known targets. Key G will automatically select the nearest target in the category. The bearing and range given on the JUD will be the currently selected target in the database.

To enable the player to respond quickly to in-flight messages, a "database lock-on" key has been provided (RETURN)   . Pressing this key will automatically select the target most recently announced on the in-flight message window and display its range and bearing on the HUD. It is not necessary to be in Database mode to use this function.

Short Range Scanner

Immediately above the Flight Computer window is located the short range scanner. This provides constant information about your surroundings. Your craft always appears in the middle of the scanner and the terrain scrolls within the window as you move. Ground and air objects are displayed on the scanner. Ground objects appear as steady dots while air objects (interceptors) flash.

The World

A new world is randomly generated for each game although the overall size of the world remains constant. Each world consists of a group of islands which are made up of beach/desert, scrubland and polar regions. These various terrains are represented by different colors on the main visual window and short range scanner. The world is fully wrap around, so if you fly off

one edge of the world you will immediately come on the other side. The flight computer uses wrap around if necessary to calculate the heading and shortest distance to an object.

Flying ATF

To take off increase THRUST to maximum power. As THRUST approaches 100% you will be able to take off using UP. During flight you should not allow your speed to drop too low otherwise your ATF will stall and start to lose height. Recovery from stall is possible by immediately reapplying thrust. The undercarriage can be raised/lowered using the U key.

To help you avoid enemy radar detection the ATF is equipped with terrain following equipment. To engage/disengage the terrain following press T. While engaged you should restrict your speed to no more than half the maximum speed otherwise there is a danger of you damaging or even possibly destroying your craft on steep hillsides.

If the SAM warning light flashes, press J to activate the jamming transmitter.

All allied bases are surrounded by a catchment area. As soon an you enter one of these areas the AUTOMATIC LANDING indicator will start to flash informing you that you are within landing range of an allied base. Should you wish to land at that particular base press L to engage the automatic landing sequence. The ATF will then switch from manual to automatic control and will bring the craft into land without further action from the pilot. To cancel automatic landing press L again.

The End of a Mission

Having landed safely an updated war report will be produced giving the latest changes in the battle. This should be used to decide your next mission. Any damage to your craft will be repaired making all systems fully operational.

Finally, having decided on your next mission objective you will be given the opportunity to rearm and refuel before taking off.

ATF APPENDIX: SECURITY TABLE

#	Val	#	Val	#	Val	#	Val	#	Val	#	Val	#	Val	#	Val
1:	300	65:	755	129:	249	193:	707	257:	330	321:	755	385:	249	449:	707
2:	661	66:	630	130:	545	194:	426	258:	251	322:	225	386:	759	450:	273
3:	679	67:	469	131:	138	195:	65	259:	679	323:	469	387:	138	451:	65
4:	148	68:	297	132:	947	196:	21	260:	989	324:	419	388:	688	452:	439
5:	625	69:	641	133:	167	197:	781	261:	625	325:	641	389:	167	453:	781
6:	859	70:	59	134:	404	198:	900	262:	982	326:	409	390:	320	454:	386
7:	80	71:	8	135:	247	199:	798	263:	80	327:	8	391:	247	455:	798
8:	236	72:	95	136:	547	200:	693	264:	414	328:	969	392:	688	456:	317
9:	805	73:	392	137:	827	201:	877	265:	805	329:	392	393:	827	457:	877
10:	159	74:	303	138:	570	202:	989	266:	970	330:	593	394:	55	458:	451
11:	457	75:	627	139:	882	203:	85	267:	457	331:	627	395:	882	459:	85
12:	803	76:	355	140:	684	204:	886	268:	590	332:	94	396:	36	460:	814
13:	165	77:	843	141:	259	205:	602	269:	165	333:	843	397:	259	461:	602
14:	561	78:	772	142:	735	206:	583	270:	804	334:	464	398:	597	462:	294
15:	757	79:	99	143:	196	207:	438	271:	757	335:	99	399:	196	463:	438
16:	725	80:	522	144:	600	208:	437	272:	65	336:	461	400:	618	464:	616
17:	540	81:	421	145:	627	209:	381	273:	540	337:	421	401:	627	465:	381
18:	776	82:	450	146:	448	210:	818	274:	338	338:	237	402:	448	466:	317
19:	816	83:	221	147:	192	211:	679	275:	816	339:	221	403:	192	467:	679
20:	677	84:	676	148:	542	212:	876	276:	892	340:	672	404:	420	468:	676
21:	957	85:	622	149:	91	213:	878	277:	957	341:	622	405:	91	469:	678
22:	346	86:	648	150:	514	214:	522	278:	749	342:	103	406:	883	470:	877
23:	482	87:	515	151:	255	215:	681	279:	482	343:	515	407:	255	471:	681
24:	317	88:	702	152:	729	216:	565	280:	787	344:	75	408:	636	472:	512
25:	90	89:	487	153:	29	217:	853	281:	90	345:	487	409:	29	473:	853
26:	348	90:	105	154:	432	218:	238	282:	308	346:	691	410:	914	474:	430
27:	712	91:	309	155:	255	219:	841	283:	712	347:	309	411:	255	475:	841
28:	42	92:	775	156:	642	220:	924	284:	171	348:	44	412:	490	476:	681
29:	318	93:	622	157:	997	221:	326	285:	318	349:	622	413:	997	477:	386
30:	43	94:	882	158:	156	222:	872	286:	969	350:	558	414:	881	478:	844
31:	683	95:	448	159:	499	223:	562	287:	683	351:	448	415:	499	479:	562
32:	170	96:	759	160:	945	224:	906	288:	293	352:	34	416:	110	480:	778
33:	607	97:	584	161:	259	225:	28	289:	607	353:	584	417:	259	481:	28
34:	911	98:	919	162:	370	226:	782	290:	409	354:	716	418:	61	482:	600
35:	28	99:	982	163:	535	227:	298	291:	28	355:	982	419:	535	483:	296
36:	541	100:	47	164:	129	228:	55	292:	965	356:	362	420:	564	484:	794
37:	508	101:	969	165:	464	229:	640	293:	508	357:	969	421:	464	485:	640
38:	999	102:	707	166:	464	230:	701	294:	784	358:	870	422:	810	486:	699
39:	750	103:	329	167:	483	231:	985	295:	750	359:	329	423:	483	487:	985
40:	580	104:	857	168:	22	232:	981	296:	711	360:	719	424:	98	488:	501
41:	120	105:	127	169:	667	233:	192	297:	120	361:	127	425:	667	489:	192
42:	241	106:	92	170:	240	234:	143	298:	643	362:	810	426:	853	490:	919
43:	670	107:	657	171:	29	235:	873	299:	670	363:	657	427:	29	491:	873
44:	377	108:	41	172:	602	236:	117	300:	544	364:	708	428:	993	492:	553
45:	789	109:	599	173:	927	237:	993	301:	789	365:	599	429:	927	493:	993
46:	289	110:	821	174:	32	238:	590	302:	300	366:	446	430:	390	494:	103
47:	224	111:	89	175:	139	239:	216	303:	224	367:	89	431:	139	495:	216
48:	988	112:	319	176:	125	240:	732	304:	140	368:	293	432:	715	496:	84
49:	878	113:	927	177:	353	241:	649	305:	878	369:	927	433:	353	497:	649
50:	357	114:	317	178:	221	242:	863	306:	808	370:	797	434:	279	498:	389
51:	976	115:	713	179:	984	243:	998	307:	976	371:	713	435:	984	499:	998
52:	671	116:	295	180:	887	244:	119	308:	662	372:	479	436:	544	500:	396
53:	510	117:	399	181:	773	245:	854	309:	516	373:	399	437:	773		
54:	85	118:	984	182:	15	246:	971	310:	629	374:	667	438:	442		
55:	849	119:	301	183:	516	247:	996	311:	849	375:	301	439:	516		
56:	970	120:	751	184:	869	248:	730	312:	450	376:	874	440:	819		
57:	768	121:	294	185:	800	249:	853	313:	768	377:	294	441:	800		
58:	439	122:	300	186:	774	250:	452	314:	383	378:	602	442:	343		
59:	509	123:	394	187:	763	251:	680	315:	599	379:	394	443:	763		
60:	191	124:	95	188:	969	252:	478	316:	188	380:	93	444:	640		
61:	116	125:	648	189:	313	253:	301	317:	116	381:	648	445:	313		
62:	374	126:	304	190:	19	254:	978	318:	246	382:	528	446:	886		
63:	801	127:	554	191:	807	255:	988	319:	801	383:	554	447:	807		
64:	106	128:	718	192:	813	256:	958	320:	428	384:	850	448:	486		

CRAZY CARS

TEST PILOT

Games Rules

You are racing in the world's craziest race: The American Cross Country Prestige Cars Race. This race is over three tracks throughout the United States : Arizona, Florida and the N.A.S.A.

If you are able to complete the race before the time runs out, you will get a faster car. You start with a Mercedes. Better than average drivers will receive a LAMBORGHINI Countach, and only the world's best drivers may drive a FERRARI GTO.

While racing, be careful not to collide with the other cars, each collision will slow your car down and you will lose time. Once you have passed a car, be careful to maintain your speed, do not allow the others cars behind you to catch-up and collide with you, this again will cause you to lose valuable time.

CRAZY CARS was designed to be as realistic as possible, therefore you must be careful to not lose control of your car especially when you are jumping or cornering.

If you go off the track, your speed will decrease rapidly and your chances of beating the clock will be greatly reduced. Hitting bumps at high speeds will cause your car to fly through the air, but this can be used to pass a car. To complete a stage, you have to pass the finish line before the time reaches zero.

Loading Instructions

For the C128, choose C-64 mode as advised by the manufacturer. Please ensure that joystick is connected to port 2.

1. Insert disk in drive.
2. Type LOAD "*",8,1 and press RETURN.

3. The program will load and run.

Controls

F3	Key switch the sound on/off
F7	Key hold/pause the game

During the game, you are controlling your car with a joystick or one of following keys : A, Z, < and >.

A	UP	Accelerate
Z	DOWN	Brake
<	LEFT	Left
>	RIGHT	Right

TOMAHAWK

TEST PILOT

Introduction

Tomahawk is a real-time flight simulation based upon the U.S. Army AH -64A APACHE Advanced Attack Helicopter - the meanest, deadliest combat helicopter ever to rule the skies! Its specialized job is to hunt and and destroy anything that gets in its way. The Apache was built specifically to fight and survive, night and day, in the thick of the battlefield.

Flying a real helicopter is a demanding task requiring training and practice - particularly ground attack. Tomahawk gives you this challenge. Climb into your cockpit and prepare for take-off...

Features of Tomahawk

- Spectacular 3D real world display
- Fully aerobatic (within limitations of real helicopter)
- Ground attack & air-to-air interception
- Over 7000 ground features
- Day/night vision systems
- Cloudy conditions, crosswinds & turbulence
- Doppler navigation & target tracking system
- Laser guided missiles, plus rockets & 30mm chain gun
- Selection of training and combat missions
- Impressive sound effects
- Pilot ratings - Trainee to Ace
- Twin joystick option

Loading Instructions

For the C128, choose C-64 mode as advised by the manufacturer. Please ensure that joystick is connected to port 2.

1. Insert disk in drive.

3. If Tomahawk does not load type RUN and
    press RETURN.

3D real-world display

Features include landing pads, buildings, trees,
transmission pylons, mountains, enemy tanks,
field guns and helicopters. Ground texture is
visible when flying below 500 feet to enhance the
sensation of speed. It is possible, with practice, to
fly between trees and mountain peaks.

Menu Options

*   Mission 1 - Flying Training - used for
    helicopter familiarization & developing
    ground attack skills. Enemy ground forces
    will not return fire.

*   Mission 2 - Combat - A short mission to
    destroy invading ground forces and return to
    base.

*   Mission 3 - Combat - Surrounded totally by
    enemy territory, your task is to liberate the
    entire map from enemy occupation. Each
    hostile sector becomes allied when enemy
    forces destroyed.

*   Mission 4 - Combat - A strategic battle for
    occupation of the entire map. Your task is to
    support allied ground forces in their battle
    along the front line.

*   Day or Night - Daytime: blue or overcast sky,
    green ground. Night-time: no horizon,
    computer-enhanced infra-red imaging.
    (Pilots' Night Vision System.)

*   Clear or Cloudy - option for overcast sky with
    selectable cloudbase for instrument flying.

*   Cloudbase - selectable from 50 ft. to 5000 ft.

- Crosswinds & Turbulence - for the experienced pilot! Variable crosswind & turbulence effects.

- Pilot Rating Trainee
                Squadron
                Instructor
                Ace

The pilot rating is equivalent to difficulty level and varies potency of enemy. With each increase in pilot rating, the enemy's accuracy doubles!

- Sound - On or Off

Weapons

Ammo - 12000 rounds 30mm ammunition, 750 rounds/min, 38 unguided rockets (19 each side), 8 Hellfire missiles - laser guided, auto-tracking

Failure status lights: engines, weapons, nav. computer, TADS

Instruments (left to right)

TADS

Target Acquisition & Designation System - (small instrument above fuel indicator). Used to identify and track tanks, field guns and helicopters. Red = hostile. Green = friendly. Includes range readout in feet when target is less than 10,000 feet away.

VDU - Vertical Display Unit

Speed, in knots (yellow = forwards, cyan = backwards)

Altitude, feet

Vertical Speed (VSI) - , ft/sec (arrow UP = climb, arrow DOWN = descent)

Time - Time to reach target, in hours and minutes (hashed if greater than 4 hrs, zero if less than 1 minute)

Ground position - autoranging navigation computer
Within 0.1 mls: resolution in feet
Within 4.9 mls: resolution in 0.1 mls
Over 5 mls: resolution 1 mile.

Artificial Horizon   Roll symbol & roll angle readout

Pitch indicator - nose up/down attitude
Sideslip indicator - sideways "drift"

Doppler Navigation/ Compass - (rightmost instrument)

Readout of Heading, Bearing & Track.

Heading: direction in which the helicopter is pointing.
Track: flight path direction.
Bearing: Heading required to point at objective.

> **Note: a helicopter can be pointing in one direction (Heading) but moving in a different direction (Track) e.g. sideways! Match the heading to the target bearing to intercept target. The flashing cross indicates relative bearing of target.**

Four modes:

1. B: Beacon navigation (8 beacons)
2. H: Landing Pad guidance (4 pads per sector)
3. T: Ground target tracking (8 targets per sector)
4. Lightning symbol: enemy helicopter interception.

Flashing symbol warns of approaching enemy helicopter.

Controls

Throttle   key W to open throttle
key S to close throttle

Controls engine/turbine rpm. Normally set to fully open unless practising engine-off landings. Assisted in flight by computerized autothrottle control.

Collective Lever   key Q increases lift
key A decreases lift

This is basically a vertical lift control used for take-off to the hover, and forward thrust control in straight & level flight.

Cyclic Control   joystick forward tilts nose down
joystick back tilts nose up
joystick right to roll right
joystick left to roll left

Rudder   key X to yaw right
key Z to yaw left

Doppler Mode   Key C selects between beacon mode (B), landing pad mode (H), ground attack mode (T) or air-to-air mode (lightning symbol) on Doppler/Compass instrument.

key N selects "next objective" in each mode:
    8 beacons (0 to 7)
    4 landing pads per sector (0 to 3)
    8 enemy targets per sector (0 to 7)
    1 enemy helicopter

Press CONTROL and RETURN together to abort mission and return to the menu.

Weapon Systems & Target Attack

When in ground attack or air-to-air mode, the weapons systems are activated. The helicopter must be airborne to fire its weapons. Select between gun, rockets or missiles using key P. The gun & rockets are manual tracking only i.e. the target must be in the sights when the weapon is

launched or the TADS to operate. The missile
system locks on to any hostile target passing
through the sights & lock-on is depicted by the
dashed square becoming a solid outline.
Tracking is automatic if the target remains on
screen.

Gun   Diagonal sights
                       Range 2000 ft.

Rocket   ver/horiz sights
                       range 4000 ft.

Missiles   square sights
                       range 3.1 mls

Fire Button   joystick.

The time for a weapon to reach a target will
depend on how far the target is away. It is possible
to locate and destroy enemy targets in both map
mode and in cloud, but the weapon sights will not
be displayed.

During combat, enemy fire is indicated by flak.
The screen will flash if your helicopter is hit.
Damage to helicopter systems is indicated on the
failure status panel and structural damage is
shown by the Doppler helicopter symbol flashing.
A third structural hit is fatal! The chances of
being hit by the enemy are decreased by swerving
during the attack. You have a total of 3 helicopters
per mission. Study the mission report for crash
evaluation and performance report.

If an enemy helicopter is approaching, a warning
symbol will be flashed on the Doppler instrument
if your are not in air-to-air combat mode. You are
advised to select air-to-air combat mode and
destroy the enemy helicopter before he gets too
close!

Scoring Scheme

Points Scored

Weapon Used	Target		
	Field gun	Tank	Helicopter
Gun	20		100
Rockets	10	20	50
Missiles	5	10	25

It is not possible to destroy a tank with the chain gun. Destruction of allied forces will result in total loss of score. Although it is much easier to hit a target with a missile, fewer points will be scored. The enemy will begin to fire back at a range between 4000 and 5000 feet, making it much more dangerous to use guns (range 2000 ft!) but the points scored will be higher.

Map

Use key M to select map or to return to normal display. Your helicopter is shown by the flashing symbol with a tail. Enemy helicopters are shown without a tailplane. Beacons 0 to 7 are used for navigation purposes.

By selecting MAP mode when sitting on any allied pad, the helicopter may be moved to another allied sector by using joystick. This feature eliminates the need for lengthy straight and level flight to visit each sector.

When training (Mission 1), all sectors are allied and any landing pad may be used for refuelling, rearming or repairs. All sectors contain enemy tanks and field guns for target practice.

In combat missions, territory is distinguished by blue (Allied) sectors and red (Hostile) sectors. A flashing blue sector indicates the presence of enemy forces in allied territory. Likewise, a flashing red sector indicates the presence of

allied forces in hostile territory. You will be captured by the enemy if you touchdown in hostile territory.

The destruction of all enemy forces in a hostile sector will result in the sector becoming allied. Likewise, if all allied forces in a sector are destroyed, the sector becomes hostile.

The map is designed to "wrap around" at the edges i.e. when flying off the map, the helicopter will reappear at the opposite edge.

Completion of Mission

A mission is completed when all enemy ground forces have been destroyed and you have returned safely to a landing pad. After touchdown, close the throttle to bring the turbine and rotor rpm to zero. A complimentary mission report will follow.

Pilot's Notes

The controls in a real helicopter are "proportional" i.e. their effect is proportional to the displacement from center. It is not possible to implement this feature with a joystick since it contains simple on/off microswitches. By making the effect of each control proportional to how long the joystick is held, a simple approximation to "real" controls has been achieved, i.e. momentary operation of the joystick for fine control, and hold to build up a rapid rate. This does however mean that the joystick must be operated repeatedly for manoeuvres such as a steady turn or to hold a steady pitch angle.

Helicopters are naturally unstable and difficult to fly without autostabilization. The Apache is fitted with Digital Automatic Stabilization Equipment

(DASE) making it far easier to fly than most modern helicopters.

Take-off Procedure

1. Ensure that collective indicator at minimum.

2. Select full throttle - key W - hold pressed until throttle indicator at maximum.

3. Wait for turbine rpm & rotor rpm to reach 100%.

4. Increase collective pitch by pressing key Q until lift-off occurs. VSI indicates vertical speed in ft/sec.

5. Reduce collective (key A) to achieve hover i.e. VSI = 0. The helicopter is now hovering above the helipad.

6. Turning on the spot is accomplished by applying left or right rudder (key X or key Z).

Transition to forward flight from hover

1. Increase collective (key Q) to between 80% to 100% Torque. Reduce collective (key A) if overtorque warning sounds.

2. Tilt nose of helicopter downwards joystick forward to between 15 and 30 degrees.

3. Speed will be seen to increase. Autostabilizers will slowly raise the nose of the helicopter to a level attitude.

4. Reduce collective (key A) to adjust for VSI = 0 ft/sec i.e. not climbing or descending. The helicopter will now be cruising at a steady forward speed. The Apache is a very agile

helicopter. From a stable hover, it can reach 100 kts in approx. 6 seconds by pulling 100% torque and tilting the nose downwards to approx. 30 deg.

Straight & Level Flight

Forward speed is related primarily to the torque setting & hence the collective lever setting, assuming the helicopter is not autorotating (explained later). Typical speed/torque settings are as follows:

Torque	Speed
44%	60 kts
60%	119 kts
75%	147 kts
100%	159 kts

These values will vary slightly with altitude and changes in helicopter weight resulting from fuel consumption and weapon release. The Apache is fitted with a computer-controlled stabilator which enables the helicopter to cruise at any speed with the fuselage level.

Turning Flight

Providing that the forward speed is greater than 60 kts, turning is achieved by simply banking left or right. Some vertical lift will be lost when banking and the helicopter will begin to descend. This may be counteracted by increasing the collective setting. The helicopter will tend to slow down in a turn unless the pilot dives to sacrifice height to maintain speed.

At speeds under 60 kts, the helicopter will tend to "drift" into the turn, shown by the sideslip ball at the bottom of the artificial horizon. Turns may be assisted by applying the rudder, but this will reduce forward speed.

Fluctuations in rotor rpm occur during a turn because of g force effects. The autothrottle will adjust the turbine rpm accordingly to keep the rotor rpm at approximately 100%.

Slowing down & returning to the hover

1. Gently raise the nose of the helicopter by pulling back on the joystick. The aircraft will begin to slow down and also climb. Maintain the now-up attitude by repeatedly pulling back on joystick (gently!).

2. Reduce the rate of climb by reducing collective (key A) to keep VSI to approximately zero. As the forward speed drops below 60 kts, increase collective (key Q) to counteract sink rate. Allow nose of helicopter to return to level flight as speed approaches zero.

3. Adjust collective as required to achieve a VSI of zero. The helicopter should now be in a stable hover.

4. The helicopter will also slow down when turning, providing that it is not in a dive. Banking repeatedly left and right is another common method of slowing down.

5. Providing that the forward speed is less than 60 knots, the pilot may apply rudder to increase sideslip (sideways drift). The helicopter will slow down dramatically as a result of the large drag forces generated.

Landing

The helicopter may be landed from the hover (vertical descent) or at forward speeds of less than 60 kts.

a) From hover: Lower the collective lever to maintain a steady rate of descent. Maximum VSI at touchdown = 12 ft/s. Ground cushion effect will be experienced below 30 ft, resulting in reduction of the descent rate.

b) Rolling touchdown: With a forward speed of less than 60 kts, gently lower the collective lever to begin descent. Max VSI at touchdown = 12 ft/s. After touchdown, the helicopter will slow down and eventually stop. Steer on the ground by using rudder control.

Taxiing on ground

The helicopter may be taxied on the ground, up to a maximum speed of 60 kts, providing that the engine/rotor rpm are at 100%. Assuming that the helicopter is stationary, raise the collective lever to produce about 20% torque. Pushing forward on the main joystick will accelerate the aircraft, and likewise pulling back will decelerate and eventually stop. Steer by using the rudder.

Refuelling/Rearming/Repairs

By landing or taxiing onto a helipad (not an enemy one!) the aircraft may refuel, reload with weapons, and be repaired. Once on the pad, close the throttle to bring turbine & rotor rpm to zero. The helicopter will be serviced and prepared for the next take-off immediately.

Backward & Sideways Flight

Starting from the hover, the helicopter may be flown backwards by raising the collective lever and raising the nose to approximately 10 degrees. The speed readout will turn cyan to denote backward flight. Keep the nose of the helicopter pitched up to sustain speed. Likewise, the helicopter may be flown sideways by rolling left or right and raising the collective lever. The speed readout does not show sideways speed and the pilot must watch the sideslip indicator on the artificial horizon in order to monitor sideways drift.

Torque Turn

This maneuver allows the pilot to perform a 180 deg turn with a dramatic climb & simultaneous turn.

With a forward speed of 200 kts or more, pull the nose of the aircraft up to approx 70 deg pitch. Hold this nose-up attitude until the speed drops to approx 60 kts. Release joystick & apply rudder until heading has changed by approx 160 deg. Release rudder, adjust roll to zero if necessary and accelerate with nose down attitude. During this manoeuvre, the helicopter will roll, pitch & yaw simultaneously, pulling down on a reciprocal heading.

Aerobatics

The Apache may be flown safely within the following limits:

    Pitch + or - 90 deg
    Roll + or - 110 deg

Control response may become unpredictable
outside these limits i.e. loops and rolls are NOT
recommended!

Autorotation

Autorotation is equivalent to the helicopter
"gliding" through the air and is used when the
pilot wishes to descend rapidly or after engine
failure.

During autorotation, the rotor blades are being
driven by airflow through the rotor disc as the
helicopter descends. This reduces the power
required from the engines and the engine RPM is
automatically reduced to maintain 100% rotor
speed and the "split" between turbine rpm & rotor
rpm can be seen on the bar scales. Autorotation is
best performed at approximately 60 kts. and above
500 ft. Entry into autorotation is made by gently
lowering the collective lever:

a) Engines active
    As the descent rate builds up, the automatic
    throttle control will be seen to reduce the
    turbine rpm. Any fluctuations in rotor rpm
    will be compensated automatically by the
    autothrottle. As the altitude falls to below 200
    feet, the pilot should begin to pull the collective
    lever up to reduce the rate of descent,
    accompanied by raising the nose of the
    helicopter if he wishes to slow down. With
    practice, the pilot will co-ordinate increasing
    the collective and adjusting the pitch angle in
    order to slow down to the hover just a few feet
    above the ground.

b) Engine-off landings
    In the event of failure of both engines or if the
    pilot deliberately closes the throttle in flight,
    engine rpm will reduce to zero. The pilot
    must respond quickly by lowering th
    collective lever before the rotor blades slow

down too much. Rotor rpm is controlled
during the descent by careful adjustment of
the collective lever. Keeping the helicopter
level and the speed between 50 & 60 kts, raise
the collective lever just before touchdown to
bring the rate of descent to below 12 ft/sec

Warnings - limits worth noting!

1. The maximum permissible speed of Apache
   is 197 kts, in a dive. If the speed should rise
   above this, the speed readout will flash red
   and the pilot will get an audible warning. If
   he continues to increase his speed, the
   helicopter will shed a rotor blade at 210 kts,
   resulting in catastrophic loss of control!

2. If the pilot demands too much power from the
   engines (overtorque), the torque readout will
   be in the red, the engine temperature will rise
   into the red, and an audible warning will
   occur. If this warning is ignored, the engines
   will overheat and eventually fail. It is
   possible to hover and fly on one engine but
   flying time is limited if both engines have
   failed!

Helicopter Aerodynamics

The following description is intended only as an
introduction to the subject. We recommend the
following book for further reading:

"The Helicopter - history, piloting & how it flies"
by John Fay, Published by David & Charles.

The rotor blades of a helicopter force air
downwards as they pass through the air. This
results in an upward lifting force. The pilot may
increase this lift by "collectively" increasing the
"angle of attack" of all the rotor blades and the
helicopter will rise. In order to move forwards,

the rotor blades are tilted forwards, thereby using part of the lift to accelerate the helicopter.

The amount of lift generated by the rotor blades increases with helicopter speed. This is called translational lift and results in the pilot requiring less collective as his speed increases. However, as the helicopter continues to accelerate, this extra lift is offset by the build up of large drag forces which in turn must be overcome with higher collective settings. This variation in "operating efficiency" can be visualized as a curve, with its peak at approximately 60 kts. A helicopter requires much more power for a vertical climb than it does for the same rate of climb with forward speed. Its hovering ceiling is much lower than its ceiling with forward speed. Both of these effects are due to translational lift.

Technical Data

Performance
- Maximum speed 197 kts
- Maximum cruise speed 162 kts
- Maximum vertical rate of climb: 1450 ft per min.
- Service ceiling 20,000 ft.
- Endurance: 1 hr 50 min to 2 hr 30 min, according to weapon load and mission profile.

Engines
- Two General Electric T700-GE-701 turboshaft engines. Each rated at 1695 shp

Weight
- Empty: 11,015 lb (4996 kg)
- Primary mission gross weight: 14,694 lb (6665 kg)
- Maximum take-off weight: 17,650 lb (8006 kg)

| Armament | • One Hughes M230A1 chain gun 30 mm automatic cannon with up to 1200 rounds, rate of fire 750 rnds/min. Four underwing strong points to carry up to 16 Rockwell AGM-114A Hellfire laser-seeking anti-armour missiles or up to 76 2.75 inch rockets |

Armament
- One Hughes M230A1 chain gun 30 mm automatic cannon with up to 1200 rounds, rate of fire 750 rnds/min. Four underwing strong points to carry up to 16 Rockwell AGM-114A Hellfire laser-seeking anti-armour missiles or up to 76 2.75 inch rockets

Dimensions
- Rotor diameter 48 ft, tail rotor diameter 9 ft 2 in
- Overall length 58 ft 3 in
- Overall height 15 ft 3 in

Crew
- Co-pilot/gunner and pilot in tandem

History
- First flight (YAH 64) 30th September 1975
- Entered service with US Army in 1984

Summary of Controls

roll left	joystick left
pitch UP	joystick back
pitch DOWN	joystick forward
roll RIGHT	joystick right

Z LEFT rudder
X RIGHT rudder
C change mode of Doppler
N Next objective
P Select weapon system
FIRE button   joystick fire button
Q increase collective
A decrease collective
W open THROTTLE
S close THROTTLE
M MAP
H Pause
J Continue
CONTROL and RETURN together to Abort mission & return to menu.

Instrument Panel Notation

1. Collective lever
2. Torque % (a) Engine 1 (b) Engine 2
3. RPM % (a) Engine 1 (b) Rotor blades (c) Engine 2
4. Throttle indicator
5. TADS - Target Acquisition & Designation System
6. Fuel level
7. Pilot's Visual Display Unit
8. Speed, in knots (yellow = forwards, cyan = backwards)
9. Altitude, in feet
10. Time to objective, hours & mins
11. Vertical speed indicator, VSI, feet per sec
12. Distance from objective, in feet or miles
13. Artificial Horizon
14. Roll symbol
15. Roll angle
16. Pitch angle
17. Sideslip (drift) indicator
18. Doppler
19. Navigation/Compass Heading
20. Bearing
21. Track
22. Engines) Failure Status Panel
23. Weapons)
24. Nav computer)
25. TADS)
26. Score
27. 30mm chain gun ammo supply
28. Rockets
29. Hellfire Missiles

Acknowledgements

Digital Integration would like to thank McDonnell Douglas Helicopters for their technical assistance during the design of TOMAHAWK. We would also like to thank the many pilots who kindly assisted in the testing and evaluation of this product.

All information stated herein is accurate to the best of our knowledge. Although considerable effort has been given to achieving a realistic simulation, approximations have been made due to the limitations of the computer and certain technical data not being available to the public.

HARRIER

TEST PILOT

GETTING STARTED

What You Need

- Commodore 64™ or 128™ computer
- Monitor or TV (color recommended)
- Single disk drive
- Joystick (optional, but recommended)
- Optional blank, formatted disk for saving games

Loading Instructions

1. Turn on the computer, disk drive, and monitor. If you are using a joystick, make sure that it is plugged into Port 2.
2. Insert the Harrier Combat Simulator disk into the drive and carefully close the latch.
3. Type"LOAD "*",8,1" and press RETURN.
4. The program will load, after a short time the title screen and main menu will appear. (Note to C128 users: Run Harrier Combat Simulator in 64 mode.)

> Note: make sure that the SHIFT LOCK key is in the up position before starting the program.

Saving and Loading Missions

You may save your mission at any point during play. Remember to have a formatted disk ready before you start the program.

To save a mission, press S. When the saving screen appears, eject the program disk and insert the blank formattted disk into the disk drive. Type in a name for the mission and press RETURN. After saving the mission, play will resume from where you left off.

To load a mission, select LOAD A GAME in the main menu. When the loading screen appears, eject the program disk and insert the disk to which you have saved your mission. Type in the name of the mission you would like to continue and press RETURN. The saved mission will then load and play will resume where you left off.

Keyboard Controls

1	Weapon/AAR display
2	Rearm - only at established ground sites
3	Downward Vertical Thrust
4	Downward 45 Degree Thrust
5	Horizontal Thrust
6	Clear FOFTRAC
7	Bomb Sight (press fire button after selecting bomb sight)
8	Homer
9	Missile Sight (press fire button after selecting missile sight)
0	Normal HUD
Q,W,E,R	Landing Sites (must select Homer before pressing Q,W,E, or R)
T	Engine Sound On/Off
U	Landing Gear Up/Down
I	Infra-red Flares
O	Power Down
P	Power Up
A	Action Arrest-Pause
S	Save Game
F	Flaps
Z	Bank Left
X	Bank Right
C	Chaff
B	Brakes
<	Left Rudder
>	Right Rudder
;	Nose Up
/	Nose Down
Space bar or Fire Button	Fire cannon, or launch bomb or missile
Esc	Aborts the mission

YOUR MISSION

All hell broke loose last night. A group of saboteurs infiltrated a U.S. Marine Base in North Africa and destroyed the entire squadron of Harrier jet fighters—well, almost. In their haste to complete their mission and escape, the terrorists overlooked one Harrier in the hangar. This jet fighter was being outfitted with FOFTRAC, a top-secret, experimental tracking device. There was not time to outfit the Harrier with an ejection system; so you have one, and only one, chance to successfully complete your mission.

Based on intelligence reports, the strike was organized and directed from the terrorists' headquarters—500 miles away in a neighboring country. Because the neighboring country is known to be sympathetic to the terrorists' cause, it's likely that any acts of retaliation will be met with strong ground and air resistance. Your mission is to penetrate enemy territory and destroy the terrorists' headquarters. Failure to complete the mission might mean losing the entire Sixth Fleet on station in the Mediterranean.

Four mobile ground units will aid you in your mission. Move your ground sites progressively toward enemy headquarters, keeping them within range for refueling and rearming. If a ground site falls under attach, destroy the enemy forces and set up a new ground site. The fighting will become more intense as you approach the terrorists' base. Your one big advantage is the Harrier jet's excellent maneuverability.

THE HARRIER

Tailored for the mission that awaits you, the Harrier's design is suited for tactical attack maneuvers and reconnaissance flights. Your Harrier has also been outfitted with certain top-secret systems to help you outsmart the enemy. The instrument display is ideally designed to provide pertinent flight and target information without impairing the pilot's view ahead. Sophisticated radar and tracking devices are highly sensitive, giving the pilot detailed information on the enemy's status.

What sets the Harrier apart from other combat aircraft is its ability to change engine thrust from conventional horizontal thrust to vertical thrust. This provides its renowned ability to perform Vertical/Short Take Off and Landing (V/STOL). V/STOL enables the Harrier to operate from small, difficult-to-detect landing sites close to the line of battle, enabling it to respond quickly to a need for ground support.

In air-to-air combat, the ability to instantly change the direction of air thrust allows the aircraft to decelerate rapidly, which in certain circumstances can be a considerable asset. Known as VIFFing (Vector in Forward Flight), this technique is a major factor in the aircraft's combat success. See the sections entitled "Flying You Harrier" for details on performing these maneuvers.

THE MAIN MENU

MENU SELECTION

Use your joystick to highlight the options you wish to select; then press the fire button.

MODE OF PLAY

DEMO The Demo mode allows you to watch how the Harrier maneuvers in flight and in combat. When the Demo sequence ends, it will automatically start over gain.

PRACTICE The Practice allows you to practice flying the Harrier without risk of enemy attack.

You will not be able to carry out your mission in the Practice mode.

COMBAT PRACTICE The Combat Practice mode allows you to practice combat techniques without worrying about enemy retaliation. You will be able to score points for successful attacks against the enemy. However, you are not able to complete you mission.

COMBAT When you are ready to carry out your mission, select the Combat mode.

After selecting Mission, a menu of sample missions will appear. Select the name of the mission you would like to try. The computer will monitor your progress and notify you when you have successfully completed your mission.

LEVELS OF DIFFICULTY After selecting a play mode, you may choose from 3 levels of flying difficulty: Pilot, Commander and Ace. The Demo mode does not require selection of a difficulty level.

PILOT This is the basic level, and is recommended for the first few missions.

COMMANDER At this level you will begin to encounter the effects of G forces. If you climb too quickly, you will black out (from the blood rushing away from your head) at 9G positive. If you dive too steeply, you will red out (from blood rushing to your head) at 3G negative. Fuel consumption must be monitored carefully at the Commander level as your Harrier burns more fuel than in the Pilot level.

ACE In addition to the factors encountered as a Commander, this level requires greater accuracy in aiming and firing the cannon, as the cannon's range is reduced.

INSTRUMENTS AND SCREEN DISPLAYS

Since the controls and flight features are complex and require skill to operate, it would be wise to familiarize yourself with the Harrier's screen displays and instruments before takeoff.

COMPASS   GUNSIGHT

ALTITUDE

010   00000

PITCH

VSI

+10

ASI
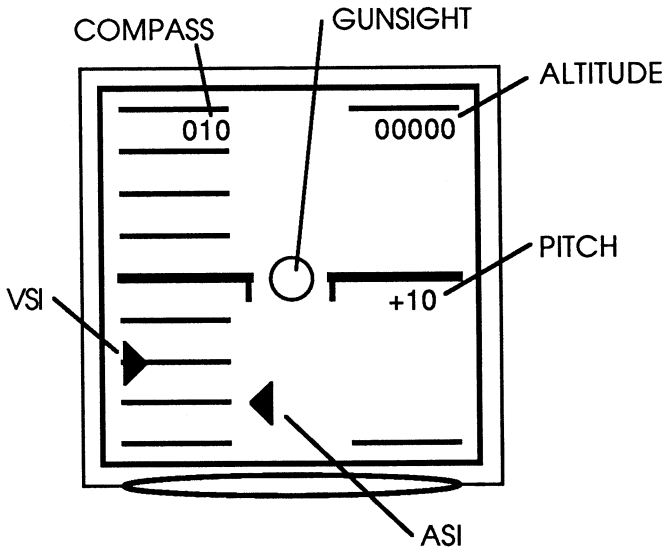
HUD (HEADS-UP-DISDPLAY)	Superimposed on the canopy of your fighter is the HUD, which provides vital in-flight information. From left to right, the displays are:
VSI	Vertical Speed Indicator. Shows whether you are climbing or descending. Useful for guiding your jet while hovering.
ASI	Air Speed Indicator. Shows your forward speed through the air. The scale is marked in increments of 50 knots, with a major marking every 100 knots.
COMPASS	Shows your compass heading from 0˚ (straight north) through 359˚.

SIGHT　　　　　　　Acts as both a gunsight and a roll indicator, showing the position of your wings relative to the horizon.

ALTITUDE

Altitude measured in feet above ground level.

PITCH　　　　　　　The angle of your plane in relationship to the ground. Positive values indicate a climb, negative values indicate a dive.

Additional information can be displayed on the HUD by pressing the following keys:

7　　**BOMB SIGHT** Shows the direction and projected point of impact (indicated by the small horizontal line) if a bomb is released. Note that the impact point will not be displayed if the line is at 12 o'clock. To launch a bomb, press the fire button after selecting the bomb sight.

8　　**HOMER** When you are in the air, press 8 followed by the letter of the landing site you wish to located, Q, W, E, or R. If you are heading toward a site, a long vertical line will appear on the HUD. A short line indicates that you are heading away from that site–change course until the line becomes long and vertical. If you are too far away from a landing site, the Homer will not work and no line will appear on the HUD.

9　　**MISSILE SIGHT** Display a line indicating which enemy plane your sidewinder missile has targeted. This is very helpful when there are multiple targets, and you want to know which target has been sighted. To launch a missile, press the fire button after selecting the missile sight.

0　　**STANDARD DISPLAY** Clears the bomb, missile or Homer sights from the screen and restores the standard HUD.

INSTRUMENT PANEL	The Instrument Panel is located in the lower part of the screen. The panel provides information on flight and weapons status, as well as maps, target radars, and messages and warnings.
MFD (Multi-Function Display)	The MFD displays information about flight status.
THRUST LEVEL	Displays the amount of thrust or power currently used. Press P to increase thrust and O to decrease thrust.
FUEL SUPPLY	Displays the amount of fuel remaining (a full tank will last about 20 minutes at maximum thrust). You can refuel at ground sites.
UNDER CARRIAGE	Displays landing gear status. Green for down, red for up. After takeoffs, landing gear must be up. Just before landing, gear must be down. Press U to engage landing gear.
BRAKES	Green for off, red for on. Use brakes only when landing. Press B to engage brakes.
FLAPS	Green for deployed, red for up. Take the flaps up shortly after takeoff. Bring the flaps down as you are about to land. Press F to engage flaps.
THRUST VECTOR	The Thrust Vector shows the direction of the jet's thrust. There are three thrust directions; horizontal (used in conventional takeoffs and while in the air), vertical (used in vertical takeoffs and landings, and in complex maneuvers) and 45° (used in short takeoffs and landings, and in certain maneuvers). To change the thrust direction, press 3 for vertical, 4 for 45°, and 5 for horizontal.

AAR (AIR ATTACK RADAR)

The AAR is located in the lower right corner of the screen. It indicates the position of enemy aircraft, AAMS (Air-to-Air Missiles) and SAMs (Surface-to-Air Missiles) within a radius of 5 miles and within an altitude band of plus or minus 5000 ft. The scale on the left indicates the altitude of the enemy aircraft. This display will also provide information on your weapons status. Press 1 to toggle between AAR and weapons display. A picture of your plane will appear with the number of bombs and missiles remaining.

At takeoff, weapons inventory is as follows:

2   **SIDEWINDER AIM-9L AIR-TO-AIR MISSILES (AAMs)** With a 5-mile range, these infra-red missiles are most effective in close range attacks.

3   **1,000-LB. BOMBS** These powerful bombs are used for destroying the enemy's ground forces.

9   **FLARES** Use flares to divert the enemy's infra-red missiles.

9   **CHAFF PACKS** Chaff packs disperse a cloud of metal particles designed to reflect the enemy's radar, making it impossible for the enemy to lock on to your position. Use them also to divert radar-controlled missiles.

250 **ROUNDS OF CANNON SHELL** This ammunition has a 2-mile range and is used in close fighting.

FOFTRAC (FRIEND OR FOE TRACKING RADAR)

The FOFTRAC is located in the center of the instrument panel. This is both a map and target display of your area of operation representing an area of approximately 24 miles by 12 miles (one square on the map grid). The following information is shown:

MOUNTAINS   Peaks

YOUR GROUND SITES	Flashing white dots
YOUR TRACK	Trail of white dots
ENEMY GROUND SITES	Red dots
TANKS AND THEIR TRACKS	Moving red lines
ENEMY AIRCRAFT AND MISSILES	Moving red dots

As FOFTRAC is continuously updating the display with flashing moving targets, you can use it to track enemy movements and plan your tactics. To clear your FOFTRAC of invalid tracks, press 6. The message screen will also show the grid coordinates of the area (as noted on the map grid).

NOTE When you fly into a new combat area with no ground sites, FOFTRAC will no longer show ground targets. To gather the information necessary for FOFTRAC to function, you must perform a reconnaissance flight at about 16,000 ft. to the center of the target area (marked by a white dot). At this point, your wing cameras will photograph the area and the FOFTRAC display will begin to operate.

MESSAGE DISPLAY

The Message Display is located above the thrust and fuel indicators. During your mission, appropriate messages, location notices and warnings will be displayed in the message panel.

FLYING YOUR HARRIER

Because of the Harrier's unique ability to hover and to change the direction of thrust, it can maneuver in and out of tight situations and take off and land in small areas. You mission will require many takeoffs and landings while

setting up ground sites. By taking full advantage
of the Harrier's technical features, you will be
able to outmaneuver the enemy.

DIRECTION

Moving the joystick (or using the keyboard
equivalents) left or right will cause the jet to bank
in that direction. The roll indicator displays the
jet's position relative to the horizon. You can also
change direction while hovering by moving the
rudder to the left or right. Do not use the rudder
while flying as the Harrier will maneuver
poorly.

The compass shows the direction heading in
degrees. Due North is 0˚, East is 90˚, South is 180˚,
and West is 270˚. Once you are in the air, make
sure that you are headed in the proper direction.
The enemy's HQ is at North-East, or at a heading
of approximately 45˚.

OPERATIONAL AREAS

Your starting location is the AA operational area.
The enemy's headquarters are located in the P£
operational area in the north-northeast. Upon
leaving an operational area, the message screen
will display the new area's coordinates If you
enter an operational where there is no ground site,
perform a reconnaissance mission to check for
enemy ground forces and to find suitable ground
site locations.

IF YOU ARE LOST

If you fly out of the operational areas, you will
receive a "FOFTRAC WEAK" message. To get
back into operational areas, fly at a heading of
45˚. If you are lost within the operational areas,
the message screen periodically displays the
coordinates of your location.

TAKING OFF

The designated landing sites in this simulation
are shown as prepared areas with beacons at the
four corners. Each site is just long enough for a
conventional takeoff or landing, but it is
advisable to use V/STOL (Vertical/Short Take
Off and Landing) techniques in these tight areas.

NOTE Shortly after takeoff, make sure the flaps and landing gear are up after you are in the air. To give the Harrier more lift, keep the flaps down during takeoff. Once in the air, level the Harrier by bringing in the flaps. If the landing gear is still down after takeoff, the Harrier will vibrate and give you a warning that you are flying too slowly.

1. CONVENTIONAL TAKEOFF

    A. Power up to 80% by pressing the P key until the Thrust Indicator reaches 80%.

    B. At 125 knots (the ASI should be just above the second mark), lift off by easing back on the joystick.

    C. Raise the gear by pressing the U key. Bring the flaps in by pressing the F key.

    D. Reduce power gradually by pressing the O key.

2. SHORT TAKEOFF

    A. Power up to 80%.

    B. Press the 4 key to select 45° thrust.

    C. At 100 knots, lift off by easing back on the joystick.

    D. Raise the gear by pressing the U key. Bring the flaps in by press the F. key. Reduce power as necessary.

    E. Fly at a pitch of less than +10°.

    F. At 150 knots, press the 5 key to select horizontal thrust.

3. VERTICAL TAKEOFF

    A. Press the 3 key to select vertical thrust.

B.   Power up to 100%.

C.   Raise the gear by pressing the U key.
     Bring the flaps in by pressing the F key.
     Reduce power slightly.

D.   At 700 ft., lower the nose slightly to
     increase forward speed.

E.   Press the 4 key to select 45° thrust and
     ease back to zero pitch.

F.   At 150 knots, press the 5 key to select
     horizontal thrust.

HOVERING

After a vertical takeoff and while vertical thrust
is still selected, adjust the power until the VSI
reads zero and altitude is steady–at about 80%
thrust. Moving the joystick forward to pitch the
nose down will cause you to move forward, and
moving the joystick back will reverse the effect
and cause you to move backwards. The skill in
hovering is achieving a balance between these two
movements so there is little or no forward or
backward movement. The Harrier's heading
can be changed while hovering by using the
rudder keys; < for left and > for right. (This is
probably the only time you will ever need to use the
rudder.)

VIFFing

The Harrier's VIFFing (Vector in Forward
Flight) capabilities can also assist you in getting
to a better position for fast evasion and counter
attack. The objective of VIFFing is to force the
attacker to fly past you. By quickly deviating
from the straight line of flight (either vertically,
horizontally or both), your attacker can not
respond quickly enough and flies straight ahead.
Keep in mind that the enemy's jets are faster and
more likely to over shoot a highly maneuverable
target such as your Harrier.

The Harrier is made for VIFFing. Change the
direction of thrust at appropriate times for an

increases in altitude combined with dramatic decelerations. Try the same technique while banking sharply–your rate of turn will increase dramatically. Both techniques can be life-savers in a combat situation.

IMPORTANT POINTS FOR FLIGHT

Listed below are several items concerning drag and gravity to keep in mind while flying:

CLIMBING Speed will decrease as the aircraft climbs unless more power is added. If you try to climb too steeply with insufficient power and speed, you will stall.

STALLING A stall is indicated by a change in engine noise followed by a sudden drop in the nose of the craft. To recover, reduce power, push the joystick forward until flying speed is regained, then level out and increase power at the same time.

DIVING Speed increases as the aircraft dives unless power is reduced. Diving at too great a speed will eventually cause a break-up.

LEVEL FLIGHT In level flight, you can increase altitude by increasing power. To maintain the new altitude, push the joystick forward to return the aircraft to straight and level flight. The reverse procedure will produce level flight at a lower altitude.

LANDING

Landing is substantially more challenging than taking off. First, you must locate a suitable ground site. As detailed before, press 8 (Homer) and then the letter of the landing site you would like to locate (Q, W, E or R). If you are heading in the right direction, you will see a long vertical line on the HUD. If you are heading in the wrong direction or away from the site, you will see a short vertical line on the HUD. Change you course until you see a long vertical line. Head in the direction of the line until you see the landing site on your FOFTRAC. Remember to use the map grid to mark the locations of your ground sites.

As you approach the landing site, you will see the beacons. When you reach the center of the landing site, you will hear a high-pitched tone indicating that the optimum landing location has been reached. Any small hills in the landing site area can be ignored—they are just camouflage. Due to the short landing. Once you have landed at a ground site, you can refuel and rearm your jet. Your jet will automatically be refueled upon landing. To rearm your jet, press the 2 key.

If you are setting up a new ground site, select a location near the mountains for good protection from the enemy's radar. However, it should not be so close to high ground that maneuverability during takeoffs and landings is impaired. As there are no runways, you must perform a vertical landing with no horizontal speed. If you do not land in this manner, the landing will be too rough and the Harrier will crash.

1. VERTICAL LANDING

    A. Approach your proposed landing area at an altitude of 500 ft. and a vertical speed of 400 knots (remember, each mark on the VSI is 50 knots).

    B. Select 45° thrust and maintain level flight. Wait until speed decreases to 200 knots.

C. Lower the landing gear by pressing the U key and the flaps by pressing the F key.

D. Push the joystick forward to decrease altitude. At 200 ft. pull back on the joystick and level off.

E. Select 90° thrust and begin to hover.

F. Reduce power to gently lower to the ground.

2. SHORT LANDING

A. Approach your proposed landing area at an altitude of 500 ft. and a vertical speed of 400 knots.

B. Select 45° thrust and maintain level flight. Wait until speed decreases to 200 knots.

C. Lower the gear by pressing the U key, and the flaps by pressing the F key.

D. Maintain level flight and wait until your speed falls to 120-100 knots. Keep the pitch between 0° and -6° and make sure your speed goes no lower than 100 knots.

E. Adjust the power and pitch to keep your rate of descent at under 10 ft. per second (one notch on the VSI).

F. Upon touchdown, cut all power and apply the brakes by pressing the B key.

3. CONVENTIONAL LANDING

A conventional landing, although possible, is extremely difficult due to the short runways available at ground sites. You will need to

touch down at the extreme edge of the area and immediately cut power and apply the brakes.

SETTING UP NEW GROUND SITES

To reach the enemy HQ, you first need to destroy the enemy ground forces threatening your ground sites. When you have done this, your next move is to set up a new ground site in a neighboring operational area. The area between you and enemy HQ is divided into 512 operational areas; you may move your ground forces to any of these areas. Your objective is to move the four ground sites to strategic locations which will enable you to move closer to the enemy's HQ. When you fly into a new area, begin by making a reconnaissance flight to find an area clear of enemy forces for your new ground site. Select an area that affords enough protection from the enemy's radar, but has adequate access to landing and takeoff locations.

To set up a new ground site, you must perform a vertical landing at the new site location. After you have landed, you can call up your ground staff to move your forces to your current location. Press 8 (Homer), followed by the letter of the ground site (Q, W, E or R) to which you would like to relocate. Your forces will be automatically moved into the area by air drop at a speed of 600 knots. The farther away you relocate a ground site, the longer it will take for your forces to arrive. You cannot rearm or refuel until your forces arrive. If you still have fuel and weapons, carry out locate strikes or maneuvers so that you don't leave yourself open to attacks while you are on the ground.

A high-pitched alarm sounds when the forces have been mobilized. Your forces will be able to prepare the area as a site. If you don't hear the alarm, the location you have selected is not

suitable and another site will be prepared nearby.
Take off and use the Homer to find the new site.

RECONNAISSANCE FLIGHTS

When flying into a new combat area, the
FOFTRAC will no longer show ground targets.
To gather the information necessary for the
FOFTRAC to function, you must perform a
reconnaissance flight at an altitude around 16,000
ft. Fly toward the center of the target area
(marked by a white dot on the FOFTRAC). At this
point, your wing cameras will photograph the area
and the FOFTRAC display will begin to operate.
If the FOFTRAC goes blank while you are still in
the combat area, press 6 to update the FOFTRAC.
If you leave the combat area, you must perform a
reconnaissance flight again to update the
FOFTRAC.

COMBAT

**THE ENEMY
GROUND
DEFENSES**

The enemy tracks your movements using a
ground-based radar. Often times, ground-based
radars are ineffective at very low altitudes. If it
is at all possible, try to come in low for attacks on
the enemy's ground forces. This is a highly
dangerous maneuver. However, if you can avoid
the enemy's radar, your chances at a successful
strike are very good. A more traditional attack
involves coming in quickly from a higher
altitude, dropping the bomb and executing a quick
retreat. The enemy's ground defenses are:

SAM Surface-to-Air Missiles. Radar controlled,
they can destroy targets about 2000 ft. They may
be fully radar-guided, or may function as an
infra-red homing device locked onto your
exhaust.

AAA Anti-Aircraft Artillery. Usually radar-
controlled, they are most often located near SAM
sites.

GROUND FIRE Small arms fire from ground troops. Although nerve-wracking, unlikely to be harmful.

Damage caused by ground or cannon fire is indicated by the progressive failure of your instruments, until you are finally shot down. Remember that the Harrier has not been outfitted with an ejection system; you only have one chance to complete your mission.

ATTACKING GROUND DEFENSES

The enemy's ground defenses are displayed on your FOFTRAC as various red dots and lines. They will appear around your ground sites and move in for the attack. As you approach the tanks and SAM sites, they will be visible on the horizon. The most effective ground attack method is to approach fast and weaving at altitudes less than 500 ft. Mountains can offer some shielding from radar, but may obscure your view of the target until the last minute. You might consider a high, observing approach, followed by a low, fast attack.

Both bombs and cannon are effective against ground forces. Bombs are relatively easy to use since the bomb sight provides a projected point of impact. To launch a bomb, press 7 and then the fire button. Normally you would fly over the target after releasing the bomb, but this can be risky. An alternative is to perform a maneuver called The Long Toss (see section entitled "Offensive Moves"). This involves banking to the left or right during a rapid ascent after the bomb is launched. The cannon is risker to use, since you need to dive straight at the target for a sure hit.

THE ENEMY AIRCRAFT

Your attackers fly the MIG 23, which has supersonic capabilities. The Harrier is a subsonic fighter, but can achieve supersonic speeds while diving. The MIG has better flight characteristics above 20,000 ft., so your best bet is to engage at a lower altitude so you can fight on your own terms.

The enemy is armed with a cannon and four missiles. The missiles may be either Infrared Homing (IRH) or Radar Guided (RG). When the enemy is on your tail, cannon or IRH will most likely be the chosen weapons, as they perform best at close range. RG missiles may be fired from anywhere behind you and have a much longer range. Your opponent, when in front of you and flying away, may even fire "Fire and Forget" missiles (most likely an RG missile). Use your flares to diver infra-red missiles and chaff packs to diver radar-controlled missiles.

ATTACKING AIR DEFENSES

Ideally, try to position yourself within a 30° "Lethal Cone" behind the enemy. In this position, you have a clear shot at the enemy, whether you are above or below him. It is almost impossible for the enemy to shake you off his tail. If you are in a 45° "Cone of Vulnerability," you have a good chance at hitting your target as well. However, your enemy now has the ability to out-maneuver you.

If you choose to use an AAM (Air-to Air Missile), keep in mind that its range is 5 miles. Press 9 to see if the enemy is within range and set your sights on his craft. Then press the fire button to launch the missile. If you choose to use your cannon, the range is 2 miles and must be shot directly at the enemy. Having achieved a good position behind the enemy, you will also need to be aware of several factors:

1. **THE CHARACTERISTICS OF BOTH YOUR OWN AND THE ENEMY'S CRAFT.** The enemy's jet is much faster than yours, but you are able to maneuver and change directions quickly. Keep in mind that the Harrier can achieve higher speeds while diving.

2. **THE SIDE EFFECTS OF CERTAIN MANEUVERS.** Your ability to turn is a function of speed. Too tight a turn at too low a speed will reduce both altitude and speed; at higher speeds, the rate of turn will be slower.

Your optimum turning speed is about 450 knots. If you keep this in mind, you will be able to make quick getaways or shake off persistent enemies.

3. **THE ENEMY'S RESPONSES.** Remember that the enemy will try to force you to pass in front of him, reversing the situation instantly. Keep close on his tail and position yourself within the 30° "Lethal Cone." This will ensure that you will be able to respond quickly to the enemy's movements.

RADAR WARNING RECEIVER

Your Radar Warning Receiver (RWR) will warn you of enemy radar nearby. A sound and a message will warn you of the enemy's presence, either on the ground or in the air. Be aware that your radar coverage may be incomplete, as the radar may be blocked by parts of the Harrier or by mountains.

Should you be picked up by the enemy's radar, your craft has automatic ECM (Electronic Counter-Measures) to attempt to break the enemy's radar fix. Changing course or diving below 500 ft. will help you elude the radar. Use the Chaff Packs to confuse the enemy's radar or divert missiles.

DEFENSE AGAINST SAM AND AAM ATTACK

If you are unsuccessful at evading the enemy's radar, you will have very little time to react to the enemy's certain attack. Follow some of the pointers listed below for evading or diverting missiles. If the missile explodes in the air, your evasion has been successful.

1. When the radar-lock warning sounds and appears on the message screen, try to evade the missile's lock on your position with a drastic alteration in direction with a turn greater than 90°.

2. If you cannot immediately break the lock on your position, your RWR will warn you of the type of missile launched by the enemy.

Monitor its position on AAR and/or FOFTRAC. Turn toward the missile and start weaving. At the last possible moment, make a drastic change in heading.

3. An additional option is to use your flares (for IRH) or chaff packs (for RG) to divert the missiles. Set them off at the last possible moment. You are equipped with 9 dispensers of each.

OFFENSIVE AND DEFENSIVE MANEUVERS

The best way to become familiar with your aircraft's potential is to perform actual flying maneuvers (in Practice or Combat Practice mode, if you wish). Certain well-known offensive and defensive maneuvers are below. You may want to try your hand at some of these techniques before entering Combat mode.

DEFENSIVE MOVES

Your best defense against enemy aircraft is the Harrier's ability to perform quick ascents nd descents (VIFFing). Another defensive maneuver is the reverse, in which you roll out, or in some way deviate from a straight line, thereby reducing your forward velocity and causing your attacker to fly past you. If you are having a lot of trouble shaking a pursuer, you can try "jinking"–altering your course repeatedly so that the enemy cannot target you in his sights. The maneuvers described below involve a combination of VIFFing and "jinking" techniques.

OFFENSIVE MOVES

The objective is to keep the enemy aircraft in front of you and within firing range. Remember, the enemy has access to the same evasive and counter-attack measures as you! Your success in combat depends on your skill in getting the upper hand and keeping it.

INFILTRATOR II

TEST PILOT

THE STORY CONTINUES

It had rained all day and into the night. So far, nailing that jogger with a road side puddle during the drive over had been the highlight of the evening.

It had been only a few months ago that you, the one and only Johnny "Jimbo-Baby" McGibbits, had flown your DHX-1 Attack Chopper fearlessly into enemy territory, infiltrated the diabolical Mad Leader's military installation, and spared the world from death, destruction, and despair. The evil mastermind, hell-bent on world take-over, had been utterly thwarted at your hands. You returned from your mission to a hero's welcome beyond anything even you — discoverer of the anti-starvation drug hungadin, Super Bowl MVP, pioneer in quintuple bypass surgery, and inventor of latex undergarments — could imagine .

Every day for a week, front page headlines of every major paper in the country sang your praises. On the eighth day, your name was on page 23 of the local paper. Now, you're yesterday's news - not a good situation for a born hero who craves the limelight.

Yet another famous jock had opened yet another restaurant, and yet again you had been asked to lend your presence to yet another gala opening. The usual collection of have-nots, would-be's, and has-beens had turned up like sewer water at a filtration plant, and you checked your watch to see if you still had time to catch the Stooges on the tube tonight.

In your boredom, your mind drifted to the slightly overweight blond in the overtight sequined dress leaning up against the bar across the room. Just as your thoughts got interesting, you felt someone brush up lightly against your overcoat. You turned just in time to see a vaguely familiar-

looking little man in a trench coat disappear up the stairs toward the door. Instinctively, you reached down to check your pocket, where you discovered a small piece of paper. You knew instantly that you had just gotten out of your rut.

A quick glance at the paper was all you needed to decode the encrypted message it contained: "Report to HQ immediately for mission briefing. The Mad Leader has reorganized his forces. Situation extremely critical."

What Am I Supposed to Do, Again?: Your general goal in each of three separate missions is to fly the helicopter behind enemy lines to a specified spot, complete a ground mission within the enemy installation, and then fly back to Home Base. All three missions follow this same sequence, although specific destinations and goals change as described later in the manual and in the on-screen mission briefings that appear before each mission begins.

For starters, you're going to have to learn how to fly the helicopter. However, out of compassion, we've given you the option to skip the first flight sequence and move directly to the first ground mission. Sooner or later, however, you'll have to learn to fly the chopper.

Trouble is, the DHX-2 Attack Chopper from Whizbang Enterprises doesn't exactly come with cruise control and power steering. This is a two-fisted, full-contact, hope-you-ate-your-vegetables kind of helicopter. Even though it's a super-advanced, ahead-of-the-art, this-is-not-a-drill, technological miracle machine, if you don't hang on for dear life and steer the *)%#+!!! thing, you'll be all over the sky, or perhaps you'll just fall out of it! Of course, the folks at Whizbang Enterprises would blame it on "unusually active upper air currents."

Once you're airborne, the idea is to set the correct course and navigate your way to the enemy camp,

avoiding enemy aircraft as you go by using trickery or, if need be, by blasting them into the great blue yonder before they can do likewise to you. If your helicopter crashes or gets shot down, you'll start the mission over at your Home Base. When you become the ace pilot that your Aunt Mabel promised us you'd be in her letter of recommendation and can fly behind enemy lines and land the helicopter safely, you'll begin your first ground mission.

The ground mission has nothing whatever to do with the conversion of lost souls and is not operated by the clergy. Rather, you must infiltrate the enemy installation on foot to complete the mission described in the on-screen briefing (and in the manual). The pitfalls include land mines, enemy guards and time. An on-screen clock tells you how much time you have left to complete the mission and get back to the helicopter for the return trip to Home Base. On the bright side, you're given a variety of helpful household items such as gas grenades, a brain implant, sleeping gas, a mine detector, and phony papers to help you get past the more gullible guards. In addition, you have five lives with which to work. You lose one life whenever you are captured by a guard, step on an undetected land mine, or run out of time.

If you use up all five lives without completing the ground mission, you'll have to start the whole darn mission over in the helicopter at Home Base. If you complete the ground mission successfully, then get back in the helicopter, set your course for Home Base, and don't blow the flight home, because if you do, your successful ground mission gets wiped out and you must start the mission from the beginning in the helicopter at Home Base, except in the case of the first mission, where you are always given the option to skip the first flight sequence. If you complete an entire mission successfully, including the flight to enemy territory, the ground mission, and the flight back home, your progress will be saved on the program disk. Thereafter, you'll always be

given the option to begin the next mission, or repeat any mission that you have completed already.

Sequence of Events

Here's a synopsis of the three missions. It's not going to be nearly so easy as it sounds, however.

MISSION 1

1. Fly the helicopter to a designated spot in enemy territory and land safely and properly. (Note: The flight sequence in Mission 1 is optional. If you wish, you can proceed directly to step 2 by making the appropriate selection from the Mission Menu that appears after the title screens.)

2. Complete the first ground mission. Your general objective is to discover the Mad Leader's chemical labs and neutralize a vat of deadly nerve gas.

3. Return to the helicopter, fly back to Home Base, and land safely.

MISSION 2

1. Fly the helicopter to a second designated spot in enemy territory and land safely and properly.

2. Complete the second ground mission. Your general objectives are to discover all of the Mad Leader's missile storage rooms, deactivate the missiles, and then cause a meltdown of the Mad Leader's nuclear reactor.

3. Return to the helicopter, fly back to Home Base, and land safely.

MISSION 3

1. Fly the helicopter to a third designated spot in enemy territory and land safely and properly.

2. Complete the third ground mission. Your general objective is to find the Mad Leader

and install a brain implant in his noggin to turn him into a productive member of society.

3. Return to the helicopter, fly back to Home Base, and land safely.

The newly reorganized Whizbang Enterprises, having emerged successfully from bankruptcy proceedings, charges of gross negligence, a 223- count indictment for plant safety violations, insurance fraud litigation, tax evasion hearings, and a class action suit, proudly presents:

THE NEW, IMPROVED GIZMO™ DHX-2 ATTACK CHOPPER

OWNER'S FLIGHT MANUAL (REVISED EDITION)

SECTION 1: STEP-BY-STEP FLIGHT INSTRUCTIONS

The following instructions are provided to get you up and running as quickly as possible. More detail about chopper controls, instruments, weapons, defenses, computer operations, communications, and landing are provided in separate sections of the manual.

Note: If you have a version of the program that allows you to use the keyboard instead of a joystick, use the appropriate directional keys and fire key as indicated on the enclosed reference card whenever the instructions tell you to use the joystick or fire button.

Taking Off/Getting Headed in the Right Direction:

1) Press the B, S, and I keys to get the chopper started.

2) When RPM's reach 2300 or more, pull straight back on the joystick to lift off the pad. Keep the joystick pulled back until you reach an altitude of at least 600 feet.

3) Get the proper ADF (Automatic Direction Finder) heading for your mission. To do so, press T to bring up the computer terminal screen. The correct ADF heading appears on the lower left of the screen. Press the space bar to leave the computer terminal screen and return to the cockpit view.

4) Set your ADF heading. To do so, press * to bring up the communications screen, and then press A to activate the ADF field. Next, type in the ADF heading numbers, but don't type the decimal point. Press the space bar to return to the cockpit view.

5) Maneuver the joystick until the pointer on your ADF dial points straight up, indicating that you are pointed toward your ADF destination. (The ADF is the center gauge in the top row of gauges on the instrument panel.)

6) To accelerate forward, hold down the joystick fire button and push the joystick forward until you reach 450 knots as indicated on the air speed indicator.

7) To double your air speed, press + to turn on the turbo booster.

8) To pause during a flight, either press * (communications screen) or T (computer terminal). Action is suspended while either of these screens is displayed.

9) Keep your eye on the warning lights at the top of the screen. The warning lights alert you to conditions that require immediate attention. If the "B" warning light flashes, slow your speed to reduce strain on the engine until the battery cools down. If the "O" warning light flashes, either press the - key to turn off the turbo booster or, if you have activated Whisper Mode, press W to deactivate it until the engine oil cools down (make sure that you're above 200 feet if you deactivate Whisper Mode).

10) As much as possible, keep the pointer on the ADF dial pointed straight up to keep you on course. You may find yourself overcompensating with the joystick in an attempt to right your course until you get used to things. Monitor the ADF dial closely as you fly.

11) When you reach the ADF destination, the ADF dial spins wildly. See the section entitled "Landing" for details about how to land.

Dealing With Other Aircraft:

1) Whenever you see other aircraft, act quickly to avoid a battle. Press * to bring up the communications screen.

2) Press S to go into send mode.

3) Now type REQUEST ID and press Return.

4) In a few seconds, the other pilot will give an ID code and request your ID. If you think the code name given is that of an ally, press S and then type INFILTRATOR and press Return. If you think the code name given is that of an enemy, press S and then type OVERLORD and press Return. You'll learn to identify friends from foes with experience, although occasionally you'll come across psycho pilots who will attack regardless of the code name you give.

5) If you don't request an ID quickly after you spot another aircraft, the other pilot will ask you for your ID, and you won't have the benefit of knowing the other pilot's code name. In this case, take your best guess and identify yourself as either Infiltrator or Overlord. You'll know you guessed incorrectly if you find yourself under attack.

6) When under attack, press G to arm the cannons (guns) or R to arm the heat-seeking missiles (rockets). If you plan to use the cannons, press H to bring up the Heads Up Display cross hairs. To hit the enemy aircraft when using the cannons, the craft must be lined up in the HUD cross hairs. Press the fire button to fire the selected weapon. Victory or defeat is your only escape from a battle once it has begun. You can't just run away.

7) To decoy an enemy heat-seeking missile headed your way, press F to set the flares, then press the fire button to deploy the flares. To decoy an enemy radar-guided missile

headed your way, press C to set the chaff, then press the fire button to deploy the chaff. The "H" incoming missile warning light on your instrument panel flashes when a heat-seeking missile has been fired at you. The "R" incoming missile warning light on your instrument panel flashes when a radar-guided missile has been fired at you.

Landing:

1) If the ADF dial flashes and spins wildly, you have reached the correct destination.

2) Reduce your speed to "000," as indicated on the speed indicator on the instrument panel. To do so, press the - key to turn off the turbo booster (if you had it on), then press and hold the fire button and pull back on the joystick until you have no forward speed. Let go of the fire button.

3) Push the joystick forward to begin your descent. Watch the altimeter on the instrument panel. Keep your rate of descent slow.

4) Keep the artificial horizon on your instrument panel level. Don't bank the chopper. If you come down too fast or at an angle, you'll crash.

5) Before you reach an altitude of 200 feet during descent in enemy territory, press W to activate Whisper Mode. However, be careful not to turn Whisper Mode on too soon, or you'll overheat the engine oil. If you descend below 200 feet without Whisper Mode active, the enemy will hear your approach and capture you when you land.

6) Bring the chopper down slowly, gently, and evenly. Reduce the altitude to 0. The DHX-1 shakes and rattles as it touches down. Be careful not to bank, accelerate, or spin even

after you have reached the ground or you may crash.

7) If you have landed properly at the correct destination, on-screen prompts will tell you what to do next. If nothing happens when you land, you must be in the wrong spot. In this case, take off again and use the ADF to reach the correct destination. If you are captured by enemy guards when you land, you either forgot to turn on your Whisper Mode or you turned it on after you had descended below 200 feet.

SECTION 2: GIZMO DHX-2 CONTROLS

In general, helicopter movement is controlled by the joystick, or by a combination of the fire button and the joystick. You can make the helicopter climb, dive, accelerate, decelerate, bank, and spin. You can use spin to make minor changes in your course heading. Normally, you'll bank the helicopter to make a turn.

JOYSTICK CONTROLS

Climb   Pull back on the joystick.

Dive   Push the joystick forward.

Accelerate Hold the button down and push the joystick forward.

Decelerate Hold the button down and pull the joystick back.

Bank Left   Push the joystick to the left.
Bank Right Push the joystick to the right.

Spin Left   Hold the button down and push the joystick to the left.

Spin Right Hold the button down and push the joystick to the right.

KEYBOARD CONTROLS

B Turns on the battery.
S Initializes the computer and communications systems.
I Turns on the ignition.
G Arms the cannons (guns).
R Arms the heat seeking missiles (rockets).
F Sets the flares for use.
C Sets the chaff for use.
H Toggles the Heads Up Display (HUD) on and off.
W Toggles Whisper Mode on and off.
+ Turns the turbo booster on.
- Turns the turbo booster off.

*   Brings up the communications system.

T   Brings up the computer terminal.

The **space bar** serves two functions, as listed below.

- Deselects weapons or defense systems (cannons, missiles, flares, chaff) after they have been armed.
- Returns to cockpit view from Communications screen and computer terminal screen.

SECTION 3: THE INSTRUMENT PANEL

Your instrument panel gives you vital feedback. The more you know about all those flashing lights, twirling dials and beeping sounds, the less likely your chopper is to fall down and go boom all the time. For example, the instruments tell you when an enemy missile is headed your way and what kind of missile it is. If you know your stuff, you'll know what to do with this information to avoid the missile. Among other things, the instrument panel keeps you abreast of altitude, course heading, weapons and defense selections, air speed, and fuel level.

Keep your eye on the gauges as you fly. The DHX-2 requires constant monitoring to keep it on course and at a safe altitude. A surprising number of crashes occur simply because the pilot is unaware of a chopper's descent. The instrument cluster also alerts you to mechanical problems as they occur, some of which you can do something about if you're paying attention.

Artificial Horizon

The artificial horizon indicates your present attitude (degree of tilt or bank). It also indicates climb or dive by the location of the horizon line in relation to the stabilization point. The rate of climb and dive also is displayed. If the artificial horizon is level and centered in the gauge, you are flying straight and level.

Directional Compass

The compass displays the directional heading of the Gizmo in degrees and is shown in both analog and digital format. The dial is accurate within 23 degree increments; the digital readout is accurate to smaller values.

Fuel Gauge

This horizontal bar displays remaining fuel. The tank is empty when the fuel indicator bar disappears.

Oil and Battery Temperature

The two bar graphs at the top of the screen display the oil and battery temperatures. When either bar reaches the danger zone, heat is critical and the temperature warning lights flash and a warning beep sounds until you take corrective action. If either the battery or oil overheat too much, your engine will blow.

To reduce battery temperature (the B graph on the upper left), slow your speed to reduce strain on the engine until the battery cools down.

To reduce oil temperature (the O graph on the upper right), turn off the turbo or whisper mode until the oil supply cools down. Keep in mind that turbo and whisper modes heat up the oil quickly. Keep your eye on the oil temperature gauge when using either.

Warning Lights

One or more of the six warning lights at the top of the cockpit flash while a warning beep sounds if there's mechanical trouble with your chopper. Each warning light displays a letter to indicate the source of the problem. The meaning of each letter is given below.

Engine damaged
Battery overheated
Oil overheated
Fuel low
Altitude level below 200 ft.
RPM deficiency in engine or rotors

The warning lights alert you to conditions that require immediate attention. You have some control over the situation when your battery or oil overheats (see "Oil and Battery Temperature" above) and when your altitude is low. However, engine damage, low fuel, and RPM deficiency can't be corrected while in flight. Reach your destination as soon as possible and try to avoid further damage from air combat. Also, note that whenever you land at the proper landing site behind enemy lines during a mission or whenever you return to Home Base to complete a

mission, your helicopter is serviced, so that the next time you fly the chopper, any damages will have been repaired and your chopper will have been refueled.

Airspeed Indicator This dial shows the Gizmo's present airspeed, in knots. The digital readout under the dial displays the same information. Without use of the turbo, maximum speed is 450 knots. With the turbo engaged, you can reach a maximum speed of 900 knots.

ADF The ADF, or Automatic Direction Finder, helps you reach the correct destination. Therefore, it's advisable to program the ADF immediately after takeoff. **Once programmed, the ADF always points toward your destination. If you are moving forward and the ADF points straight up, you'll reach your target eventually, regardless of the compass heading.** When you move off course after the ADF has been programmed, the ADF moves to indicate the direction you need to spin (for minor heading changes) or bank (for more significant heading changes) the chopper to get back on course. Again, when the ADF points straight up, you're headed in the right direction.

Note: At first, you'll probably find yourself over-correcting your course a lot as you try to keep the ADF pointing up. Stay with it. You'll get the hang of it.

Note that if the ADF blinks on and off, it has not been programmed properly at the communications terminal. **When you reach the correct destination, the ADF flashes and spins around the dial wildly.** At this point, slow down and begin landing procedures immediately.

Altimeter

The altimeter displays your present altitude in feet. The dial measures altitude in 60-foot increments, so use the digital readout for greater accuracy. Each sweep around the dial by the dial's hand represents a change in altitude of 1000 feet. Maximum altitude is limited to 8000 feet. If your altitude falls below 200 feet, the low altitude warning light goes on and a warning beep sounds.

RPM Indicator

The RPM (Revolutions Per Minute) indicator displays the rate at which the blades of the chopper turn. The RPM remains constant, as long as the engine isn't damaged or out of fuel, once the optimum rate of 2300 or so RPM is reached. Helicopter blades do not speed up or slow down to move the helicopter. Rather, the tilt angle of the blades determines movement. The onboard computer systems monitor and maintain steady RPM's. You can't fly the helicopter until the blades reach 2300 RPM. A takeoff alert sounds when the blades reach 2300 RPM, indicating that you are cleared to take off.

Missile Warning Lights

The missile warning lights to the left of your instrument panel flash to indicate that a missile is headed toward your Gizmo. If the R light is on, then a Radar-guided missile is headed your way, and the chaff must be used to decoy the missile away from your chopper. If the H light is on, then a Heat seeking missile is headed toward you, and the flares must be used to decoy it. Note that if your defense systems are knocked out by enemy fire (as indicated by the defense system status indicator on the computer terminal), your missile warning lights may become inoperable.

SECTION 4: ARMAMENTS AND DEFENSE SYSTEMS

Your DHX-2 Attack Chopper provides you with 20mm cannons and heat-seeking missiles to attack other aircraft. To defend against enemy attack, your chopper includes flares (to decoy heat seeking missiles) and chaff (to decoy radar-guided missiles). **To operate the cannons, missiles, flares, or chaff, you first must "arm" or ready the desired device, and then fire it by pressing the fire button (or fire key, in some versions of the program).** You can tell which device is armed by checking the flare and cannon indicator buttons at the lower left of your screen and the chaff and missile indicator buttons at the lower right. The button that flashes represents the armed device. Only one of the four armament devices can be armed at one time. Any of the armaments can be damaged or rendered inoperable by enemy fire.

Cannons

You have unlimited ammunition in your Whizbang Whizzer™ 20mm cannons. Use your HUD (Heads Up Display) to help you zero in on an enemy aircraft when you want to use the cannons. The HUD is a computer-generated image of aiming cross hairs superimposed on your windshield. An enemy in the HUD cross hairs can be damaged or destroyed by your cannon fire.

Missiles

A freshly-serviced chopper carries only four missiles, so use them judiciously. An enemy must be visible to be hit, but doesn't have to be in the cross hairs, so the HUD is not necessary when using missiles.

Flares

Use the flares to decoy enemy heat-seeking missiles. A heat- seeking missile mistakes the magnesium flare for your exhaust. An enemy heat-seeking missile is headed your way when the heat-seeking missile warning indicator (the "H" to the left of the RPM indicator) flashes. A freshly-serviced chopper carries six flares.

Chaff   Unlike heat-seeking missiles, radar-guided missiles must be deceived by dropping strips of metal, called chaff, into the sky to create a false radar image of the Gizmo. An enemy radar-guided missile is headed your way when the radar-guided missile warning indicator (the "R" to the left of your speed indicator) flashes. A freshly-serviced chopper carries six chaff.

SECTION 5: IMPORTANT SPECIAL FEATURES

The following special features are vital to the successful chopper pilot. Your DHX-2 Attack Chopper features Heads Up Display (HUD) to aid your cannon accuracy, a Turbo Booster that doubles your air speed instantly, a Whisper Mode for quiet landings that don't alert enemy guards, and a pause feature. Each of these features is described below.

Heads Up Display
The HUD superimposes a computer-generated image of aiming cross hairs on the windshield. Use them to aim at a target when firing the cannons. With your cannons armed and firing, any aircraft that passes through the cross hairs should be hit. Missiles don't require visible tracking methods, so the HUD is not necessary when using them.

Turbo Booster
When activated, the turbo booster doubles your air speed (to a maximum of 900 knots). It also causes the oil to heat up at a fast rate, so use the turbo booster sparingly, and turn it off if your oil overheats (as indicated by the "O" warning light at the top of the screen). The turbo booster indicator (the "T" to the right of the altimeter) lights when the turbo is on. Enemy fire can knock out the turbo booster.

Whisper Mode

Whisper Mode silences the chopper, and must be activated whenever you attempt to make a secret landing behind enemy lines. If you don't activate Whisper Mode when you land or fly below 200 feet behind enemy lines, the noise will alert enemy ground personnel, who will await your capture. When Whisper Mode is activated, the Whisper Mode indicator (the "W" to the right of the directional compass) lights. **Remember, you must activate Whisper Mode before you fly below 200 feet when landing behind enemy lines or you will be captured.** Also, Whisper Mode causes intense heating of your engine oil. Watch to make sure your oil doesn't overheat. Avoid activating Whisper Mode too soon.

Pause

To pause the action, bring up either the computer terminal screen or the communications screen.

SECTION 6: THE COMPUTER TERMINAL

The computer terminal, when viewed from the cockpit, is the small screen located on the lower right. When you bring up the computer terminal, you'll be presented with a tactical display map, Gizmo status indicators, a weapons/defenses inventory, and the correct ADF destination frequency. Each of these features is discussed below.

Tactical Map

The top left section of the computer terminal displays your tactical map, which shows an outline of the Country. The Gizmo's present position is represented by a pulsating circle. If you have programmed the ADF properly, your destination behind enemy lines is shown as a pulsating square. However, if your computer system has been damaged by enemy fire, the tactical map may be blackened out and unusable.

Status Indicators

The upper right section of the computer terminal displays the Gizmo status indicators, which show the current condition of all vital Gizmo functions. If the condition of a particular function is satisfactory, its status indicator light is steady. If a particular item has sustained severe damage from enemy missiles, its status indicator light changes color and flashes. Detailed descriptions of the various status indicators follow.

COMMUNIC(ATIONS) - If the communications computer is damaged, you can't send or receive messages, or program your ADF, if you have not already done so (all the more reason to program the ADF immediately after takeoff).

DEFENSES - Your defense systems include the flare and chaff dispersers, and the missile warning systems. If damaged, you can't drop flares or chaff, and you can't detect the type of enemy missile that approaches your Gizmo.

TACTICAL - If the computer terminal tactical map is damaged, you can't view your current position or your destination.

TURBO - If your Whizbang Whomper turbo boost system is damaged, your turbo will be unusable and your Gizmo's maximum speed will be limited to a mere 450 knots.

ENGINE - If your Whizbang Whirler engine is damaged, it's bye-bye baby (Jimbo-Baby, that is)! You will experience a loss of control of your Gizmo and plummet to earth.

WEAPONS - If your Whizbang Waster heat-seeking missiles and Whizbang Whizzer 20mm cannons are damaged, you may not be able to fire any missiles, or your guns may fire erratically.

Weapons/Defenses Inventory
The lower right section of the computer terminal displays the Gizmo weapons and defenses inventory. The LED bar graphs indicate the number of missiles, chaff, and flares that remain. A freshly-serviced helicopter includes four missiles, six flares, and six chaff.

ADF Destination Frequency
The lower left section of the computer terminal displays the ADF (Automatic Direction Finder) frequency. This frequency must be typed into the ADF field on the communications screen so that the ADF dial in the cockpit points you toward your flight destination behind enemy lines.

SECTION 7: COMMUNICATIONS

The communications screen provides a vital link between you and the other pilots, some of them friendly and some not, who fly by to check you out. Whenever you catch a glimpse of another aircraft in your vicinity, you should punch up the communications screen immediately to request the ID of the unknown visitor. In addition, the communications screen gives you access to the ADF (Automatic Direction Finder), which you must program in order to find your way to your destination. The communications activities that can be performed from the communications screen are detailed below.

Programming the ADF

The correct programming of the ADF is vital in order to reach your flight destination. First make sure that you know the correct ADF destination frequency for the destination that you want to reach. The ADF destination frequency numbers can be found on the computer terminal screen. To program the ADF from the communications screen, first press the A key to activate the ADF field, then type in the correct ADF numbers (don't type the decimal point). If you type the correct number, your ADF is programmed, and you won't have to program it again during this particular flight. Keep in mind that the ADF dial on your cockpit instrument panel will not home in on your flight destination if it has not been programmed or if it has been programmed with an incorrect frequency. If the ADF dial doesn't point the way for you, you'll fly aimlessly. Check to make sure that everything has been set properly. Also, program the ADF immediately after takeoff, because the ADF can be ruined by enemy fire.

Sending a Message   Press the S key to go into send mode from the
communications screen. From send mode, you
can transmit messages to other aircraft. After
you press S, use the keyboard to type in the
message that you wish to send. Your message
appears at the top of the screen as you type. Press
RETURN (or Enter) to transmit the message that
you typed. Note that no punctuation is accepted in
the message field. When the communications
system is in send mode, an "S" flashes below the
ADF field on the communications screen.
Messages are used either to request the
identification of another aircraft or to identify
yourself. Messages should follow a certain
syntax to make sure that your meaning is clear.
See "SECTION 8: AIR TRAFFIC" for details
about communication with other aircraft.

Receiving a   From time to time, you'll receive messages from
Message   other aircraft in your vicinity, which either
identify the aircraft or request your
identification. When the messages are received,
the communications screen comes up
automatically, with the message at the top of the
screen.

SECTION 8: AIR TRAFFIC

As you fly the DHX-2, you'll encounter other
aircraft. Some may be other infiltrators also
trying to upset the Mad Leader's plans, while
others may be staunchly loyal to the Mad Leader
and his evil goals. You'll run into three types of
pilots: the friend, the foe, and the psychopath.

When you see another aircraft, you must
determine whether it is a friend or a foe. Since
there are no distinguishing markings on your
chopper, and because helicopters are not an
unusual sight over the Country, other pilots will
try to determine your loyalties and intentions by
talking to you over your communications system.
You should always try to communicate with an
unidentified aircraft before its pilot
communicates with you. As soon as you see an
aircraft for the first time, bring up your
communications screen. Then, press the S key to
activate send mode. The only phrases that the
communications systems of other aircraft can
interpret are listed below.

REQUEST ID (to inquire about the identity of an
aircraft you have spotted)
INFILTRATOR (to identify yourself to a friend)
OVERLORD (to identify yourself deceptively to
an enemy)

Type REQUEST ID and press RETURN (or
Enter) to send the message to the unidentified
craft. In a few seconds, your communications
screen reappears with a message from the
unidentified aircraft. The message includes the
pilot's code name and a request for your
identification. With experience, you'll be able to
distinguish the code names of your allies from the
code names used by the enemy. You might want to
make a list of friendly and unfriendly code
names as you discover them. Press the S key to
activate send mode. Now type INFILTRATOR if
you think the other pilot's code name is that of an

ally, or type OVERLORD if you think the other
pilot's code name is that of an enemy. Then press
the RETURN (or Enter) key. If you give the
correct ID to the other aircraft, you'll continue
your mission unmolested by the other pilot. If you
give the wrong ID, the other aircraft will attack.
Once an attack is initiated by either party, you
must destroy the other aircraft or be destroyed.

If you receive a request for your ID from an
unidentified aircraft before you have made an ID
request yourself, you must guess about the other
pilot's loyalties without the benefit of knowing the
pilot's code name. It's a 50/50 proposition, so press
S to activate send mode on the communications
screen, type either INFILTRATOR or
OVERLORD, press RETURN (or Enter), and hope
for the best.

Oh, by the way, we weren't kidding about the
psychopaths out there. A few of the other
infiltrator pilots have snapped from the strain,
and it really doesn't matter what code name you
use in a response. They always will attack, and
you'll have to fight against a former friend,
turned deadly foe!

**SAMPLE ALLY
CODENAMES:**   Acme, Nimrod, Parky

**SAMPLE ENEMY
CODENAMES:**   Blammo, Dedhed, Slasher

SAMPLE EXCHANGE 1:	You:	REQUEST ID
	Other:	NIMROD REQUESTING IDENTIFICATION
	You:	INFILTRATOR
	Other:	GOOD LUCK JOHNNY

SAMPLE EXCHANGE 2:	You:	REQUEST ID
	Other:	BLAMMO REQUESTING IDENTIFICATION
	You:	OVERLORD
	Other:	YOU ARE CLEARED TO PROCEED

SAMPLE EXCHANGE 3:

You: REQUEST ID
Other: SLASHER REQUESTING IDENTIFICATION
You: INFILTRATOR
Other: DIE YOU CAPITALIST TRAITOR DOG
          (Other aircraft begins attack)

FREQUENTLY ASKED QUESTIONS ABOUT SAFE FLYING

Here at Whizbang Enterprises, we care about you - the customer. And if you crash, well, we can't honestly say we'd get too upset about it. We'd just sell you another brand new Gizmo. Unless, of course, something of a terminal nature happens to you, and we can't at least find a friend, associate, loved one, or bum on the street to sell your pilot's license to. Then we mind. That's why we've put together this helpful list of things to do and not to do when flying your fantastic new Gizmo DHX-1 or deluxe model DHX-2.

Q : What buttons do I push to get my Gizmo going?
A : Turn on your Battery and Computer system. Then hit the Ignition button. That'll start her up.

Q : How do I do that?
A : Shut up.

Q : How do I get to my destination?
A : Use your Automatic Direction Finder (ADF). Get the correct ADF Frequency from the Computer Terminal. Then go to the Communications screen and program the ADF by typing in the number. Back in the cockpit, use the ADF Dial on the instrument panel as your navigational guide. When it points straight up, you're headed toward your destination. When you are over your destination (when the ADF Dial spins wildly), follow proper landing procedures.

Q : What is a destination?
A : If you take off from Home Base, your destination is one of three enemy base camps. If you take off from the base camp after completing a ground mission, your destination is Home Base.

Q: How far can a Gizmo fly?
A: Shut up.

Q: How should I land the Gizmo at my destination?
A: If the ADF Dial is spinning around and flashing, you are over your destination. The destination will be either an enemy base camp or your own Home Base. Turn off the Turbo (if it's on). Reduce you airspeed to 0 knots. Begin your descent. Turn on your Whisper Mode, but make sure it doesn't overheat your oil. Never fly below 200 feet when above an enemy camp without your whisper on! Keep your descent slow and land the chopper gently and evenly. If you land at an angle, you'll crash.

Q: How do you spell relief?
A: Shut up.

Q: What dangers are there during flight?
A: While there are several things to watch out for, usually you'll be your own worst enemy. Monitor the chopper's Warning Lights in the cockpit. If your oil overheats, turn off the Turbo or Whisper Mode until it cools down. If your battery overheats, reduce your speed. Watch your altimeter to maintain a safe altitude. Check the Status Indicators on the Computer Terminal to find out what still works and what doesn't, particularly when you are under attack.

Q: How do I deal with unidentified aircraft?
A: Very carefully. Whenever you see one, quickly bring up your Communications screen, go into Send Mode, and Request ID before the other pilot gets a chance to ask you for your ID. When they respond, they'll give their code name, and also ask for yours. Learn to differentiate the code names of the good guys from the code names of the bad guys. Go into Send Mode again and answer

Infiltrator if you think the other pilot is a good guy, or answer Overlord if you think he's a bad guy. If an unidentified aircraft asks for your ID before you can ask for his, you'll have to guess about whether to respond Infiltrator or Overlord. Always answer a request for your ID, even if you have to guess about the correct response. If you give the wrong answer, the other aircraft attacks you, and you must use your missiles and cannons to destroy the other aircraft or be destroyed. There is no other escape once an attack is underway. Occasionally, you'll encounter a psychopathic pilot who doesn't care who you are. A psycho pilot will attack you no matter what code name you give.

Q: How do I attack another aircraft?
A: Use your Missiles and Cannons to attack the other aircraft. When using the Cannons, activate the Heads Up Display (computer-generated cross hairs). The other aircraft must be lined up in the cross hair's of the HUD in order to shoot it down with the Cannons. When using Missiles, the other aircraft must be visible out your windshield in order to have a chance to score a direct hit. You won't have much luck with the Missiles if your chopper is spinning around. Fly straight so that the enemy remains visible out your windshield after you fire. Keep in mind that your best defense is to avoid attack in the first place.

Q: How do I defend myself from attack?
A: Deploy a Flare to decoy a heat seeking missile and Chaff to decoy a radar-guided missile fired by the other aircraft. When you do, the missile heads for the Flare or Chaff instead of your chopper. The Heat-seeking missile warning indicator on your instrument panel flashes when a heat seeking missile is headed your way. When a radar-guided missile has been fired at you,

the Radar-guided missile warning indicator on your instrument panel flashes.

Q: How can I make tens of millions of dollars without having to work very hard?
A: Get into the Attack Chopper business. As a matter of fact, I believe we currently have numerous openings in our test pilot division. You can work your way up.

THE MCGIBBITS GUIDE TO GROUND INSTALLATION INFILTRATION

SECTION 1: OVERVIEW OF GROUND INFILTRATION MISSIONS

After you fly to the correct location behind enemy lines, land you chopper safely, and follow the on-screen instructions, your point of view changes to an overhead perspective of the helicopter at the landing site, with you standing next to the chopper. From here, you embark on a ground mission within the Mad Leader's installation.

There are three ground missions. Your specific objectives within the installation for each mission are described in the section of the manual entitled "SECTION 2: SPECIFIC MISSION OBJECTIVES." In addition, a summary of the current mission is given in the on-screen briefing that appears before you start up the chopper at Home Base.

The installation consists of nine sections (screens) which, if viewed from an overhead perspective, would form a 3x3 square. To explore the installation, move the joystick in the direction you want the Infiltrator to go. Many areas of the complex are patrolled by guards. Stay out of their line of sight as much as possible, because they'll call you over and ask to see your papers if they see you. You'll learn how to use the papers, gas grenades, or sleeping gas in your "inventory" to deal with the guards in the section of the manual entitled "SECTION 3: THE INVENTORY."

Many ground mission objectives are carried out inside the buildings. You'll need to search the buildings for security cards that unlock doors,

electronic keys that turn off alarms, radiation suits to protect you, and lots of other times.

You'll also be looking for specific locations in which you must carry out the particulars of your mission. For example, you'll need to find the Mad Leader's missile room in order to be able to use the missile deactivator in your "inventory." It is advisable to draw yourself a map to chart your path when you discover locations that are required for completion of the ground mission. A hand-drawn map can save you a lot of meandering when time is of the essence. An on-screen clock tells you now much time you have left in which to complete the mission. To stop the timer and pause the game, press the space bar, which takes you to the inventory screen. The timer does not run while the inventory screen is displayed. Press the space bar again to resume.

You have five "lives" with which to finish the mission. Whenever you are captured by enemy guards, step on an undetected land mine, or run out of time, you lose one life, and you must start the ground mission over from the chopper landing site. If you lose all five lives, the mission is terminated and you'll find yourself back at Home Base in the chopper, where you'll have to start the entire mission over.

Once you finish a mission, return to the chopper, walk the Infiltrator into the chopper's door, and then make the return flight to Home Base. You won't be able to get back into the chopper unless all of the objectives of the ground mission have been completed. In addition, a message appears on your inventory screen to indicate that the mission is complete. (Press the space bar to reach the inventory screen.)

SECTION 2: SPECIFIC MISSION OBJECTIVES

MISSION 1

Your goal is to penetrate the Mad Leader's chemical labs and neutralize a vat of deadly nerve gas. Obviously, you'll be looking for something that neutralizers the nerve gas, as well as trying to find the chemical labs. There may be a few obstacles that you'll have to overcome along the way. Hint: In the final analysis, a certain color is probably your best.

MISSION 2

Locate and disable all of the missiles in the Mad Leader's installation. While you're at it, cause a meltdown in the reactor, too. You'll need to make use of a couple of the special items in your inventory to handle this mission. Hint: In creating a meltdown, timing is everything. Things have to match up just right.

MISSION 3

Find the Mad Leader and mess with his brain. To get through his thick skull, use the brain implant in your inventory. The brain implant will turn the devilish Mad Leader into a model citizen and protect society from any more of his abuse. A set of cards will help get you through this mission. Hint: Things aren't always what (or who) they seem to be. Catch the waves!

SECTION 3: THE INVENTORY

The Infiltrator carries an infiltration kit, or inventory, which includes sleeping gas, papers, a missile deactivator, a brain implant, gas grenades, a mine detector, coolant evaporator, and a brain scanner.

READYING AN INVENTORY ITEM FOR USE

An item from your inventory must be selected as the active item before it can be used. The current active item is indicated at the bottom of the main game screen. The inventory screen shows the items that are available to you and, in the case of gas grenades and sleeping gas, how many or how much you have left. To reach the inventory screen, press the space bar. Press the space bar again to return to the game.

From the inventory screen, you can select the item that will be active whenever you subsequently press the fire button on the main game screen. To do so, use the joystick to move the flashing rectangle until it frames the desired item. Or, to change the active item without switching to the inventory screen, simply press the appropriate key as follows while either the main game screen or the inventory screen is displayed:

BRAIN IMPLANT	–I
BRAIN SCANNER	–B
COOLANT EVAPORATOR	–C
GAS GRENADES	–G
MINE DETECTOR	–M
MISSILE DEACTIVATOR	–D
PAPERS	–P
SLEEPING GAS	–S

In addition, important items found during your search appear in a text line at the bottom of the inventory screen. You never have to select an item that you find to activate it. Rather, it will function automatically, but only when you "use" it in the right place.

The inventory screen also serves as a pause or break in the action, because the time does not run while the inventory screen is displayed.

PAPERS   These are your fake identification papers. When a guard sees you pass by, he'll ask to see your papers. You must respond quickly and carefully, or you may arouse the guard's suspicion and set off an alarm. A guard's requests and responses appear at the bottom of the screen. A guard who speaks to you taps his foot impatiently (and, outside of buildings, change color).

When a guard asks for your papers, select the papers as the active item from your inventory. Then move the Infiltrator directly next to the guard and press the fire button.

The guard will take a look at your papers. If he has no problem with them, he'll let you know and you can go on. On the other hand, if the guard suspects that you papers are bogus, he'll say so and you have only a few seconds either to gas him with a gas grenade or the sleeping gas, or run away.

After you use gas, don't hang around a sleeping guard. Move on to another screen, because if you're still there when he awakes, an alarm sounds. Run away only as a last resort, because running tips off the guard. When you run, the guard sets off an alarm throughout the complex, which, even if you get away, will make the rest of your mission more difficult.

SLEEPING GAS   You have a hidden canister strapped inside your jacket that contains a colorless, odorless sleeping gas. Use it to make a guard fall asleep for several seconds and forget what has transpired. This is particularly useful if a guard hassles you about the authenticity of your papers. Under most circumstances, you might try the papers to fool the guard before you resort to sleeping gas. The bar graph on the inventory screen shows you how much sleeping gas you have left.

To use the sleeping gas, select it as the active item, make sure that the Infiltrator is close to the guard you want to gas, and then press the fire button. The guard falls down in a heap.

GAS GRENADES   A gas grenade has the same effect as the sleeping gas, except that it has greater range. When used inside a building, all guards in the room in which it is dropped fall asleep. You start a ground mission with 15 gas grenades. However, you may find more when you search furniture.

MINE DETECTOR   The Mad Leader has planted land mines here and there on his grounds. If you step on a land mine while using the mine detector, the mine won't harm you. If you step on an undetected mine, it's curtains. Mines usually are scattered in the forest and in restricted areas.

To use the mine detector, select it as the active item, then press and continue to hold down the fire button as you move the Infiltrator along the mine-infested terrain.

As long as you hold down the fire button, the mine detector makes a distinctive sound, exposes the mines beneath the surface, and protects you from harm.

MISSILE DEACTIVATOR   The missile deactivator comes into play in the second ground mission. You must find the missile storage rooms in order to use the deactivator.

To use the missile deactivator in a missile storage room, select it as the active item, then press the fire button.

If you are in one of the missile storage rooms when you use the deactivator, a four-digit missile decoder appears on your screen. You must deactivate the missile by typing in the correct four-digit warhead disable code. You'll have to guess the code numbers. When you guess correctly, the number remains on the screen and

you'll move on to the next digit. But once you make an incorrect guess, all the number you may have guessed correctly disappear and you'll have to start over. You may want to write down code numbers as you get them right.

COOLANT EVAPORATOR

You'll need the coolant evaporator in the second ground mission. Use it in the Reactor Control Center, but be careful. The coolant evaporator is only effective if it is used at the right time.

BRAIN SCANNERS

The brain scanner is important to the completion of the third ground mission. The brain scanner generates a brain wave pattern of the person on whom it is used. A brain wave readout can be useful in making sure that a person is, in fact, who they appear to be.

BRAIN IMPLANT

Use the brain implant in the third ground mission. The brain implant causes amazing behavioral changes in the person within whom it is implanted.

To use the brain implant, select it as the active item, walk up to the front of the chair in which the person on whom you intend to use the implant sits, then push and hold the joystick forward to implant the unit in the brain.

FOUND ITEMS

Special items that you find as a result of searching inside buildings, such as security cards, do not need to be selected in order to be active. These items work automatically when you use them in the right spot. In general, you need to move the Infiltrator directly in front of the location where you think an item that you found should be used and push the joystick forward to use the item.

SECTION 4: INFILTRATON OF BUILDINGS

Buildings are made up of dozens of rooms and corridors and are several stories tall. Use the building elevators to move from one level to another. To use an elevator, just walk the Infiltrator into the elevator doors. He'll emerge from the elevator on the next level up or down (each elevator links only two stories).

The exploration of buildings is a paramount importance. Every item pertinent to your mission can be found inside the buildings, and many of the steps necessary to complete the mission take place at specific locations inside the buildings. The following paragraphs give you an idea of what to do inside the buildings.

MAPPING UNIT

Inside the buildings, a Mapping Unit appears at the bottom of the screen. The Mapping Unit diagrams the rooms of a building as you discover them. The flashing box represents the room you're in. The color of a room tells you if the room is important or not, as described below.

Red: Red designates a room of great importance to your mission.

Green: Green designates the building entrance or an elevator.

Blue: Blue designates a room of no special importance.

Note: These colors may vary in some versions.

SEARCHING FURNITURE

Inside buildings, you can search through chests and cabinets for gas grenades, security cards, and other useful and not so useful items. However, only furniture on the far wall of a room can be searched.

To search furniture inside a building, first move the Infiltrator directly in front of the furniture to be searched so that his back is to you. Then push the joystick forward and hold it there until a message appears at the bottom of the screen to tell you what you've found.

CHANGING UNIFORMS

In addition to the furniture, you'll find several coat racks inside the buildings. Sometimes, a change of uniform is all you need to deceive the guards so that they won't trouble you for your papers all the time.

To change uniforms, move the Infiltrator directly in front of a uniform that hangs on a coat rack so that his back is to you, and then push the joystick forward and hold it there until you hear a tone and see text at the bottom of the screen to indicate that you've changed uniforms.

UNLOCKING DOORS

To unlock all of the doors in the enemy compound, first find the security card. Next, find the security room, which has a lock status indicator light on the wall with a passcard slot directly beneath it.

To unlock the doors, move the Infiltrator directly in front of the security card slot so his back faces you. Then push the joystick forward. When the doors in the compound are unlocked, the lock status indicator light changes from red to green (colors may vary in some versions).

TURNING OFF ALARMS

An electronic key is hidden in one of the buildings. If you set off an alarm, you can turn it off if you have the electronic key and can make your way to the electronic control center.

To use the electronic key, stand directly in front of the card slot on the far wall of the electronic control room and push the joystick forward. The alarm will stop. Note that the card only works once to turn off an alarm during a ground mission.
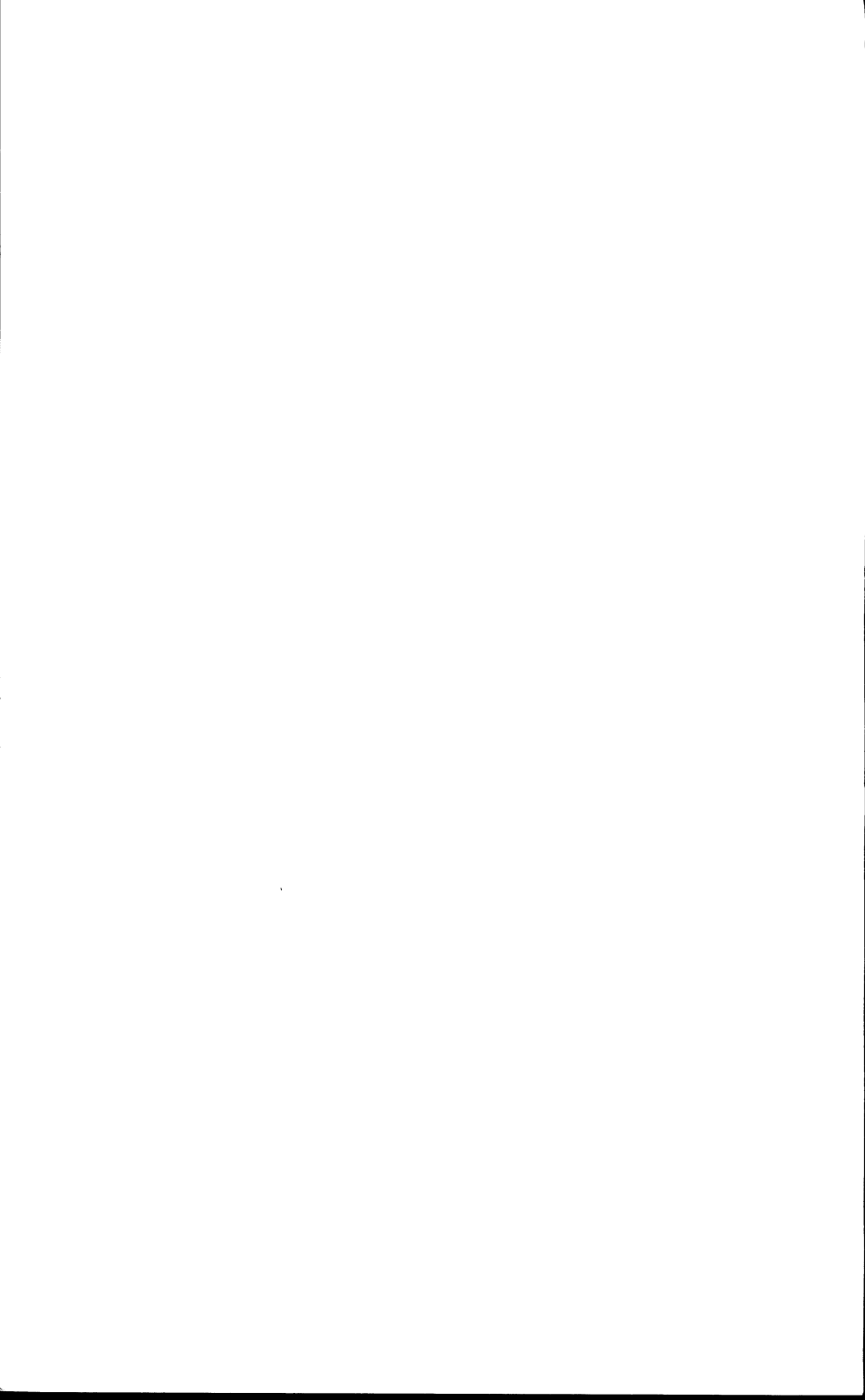
SECTION 5: MISSION COMPLETION

When you think that you've finished a ground mission, check your inventory screen. It displays a message to inform you when a ground mission is successful. When the ground mission is complete, return quickly to the landing site and walk the Infiltrator into the chopper's door. You'll find yourself back in the cockpit, ready to begin the flight back to Home Base. If you haven't completed the mission properly, you won't be able to get into the helicopter.
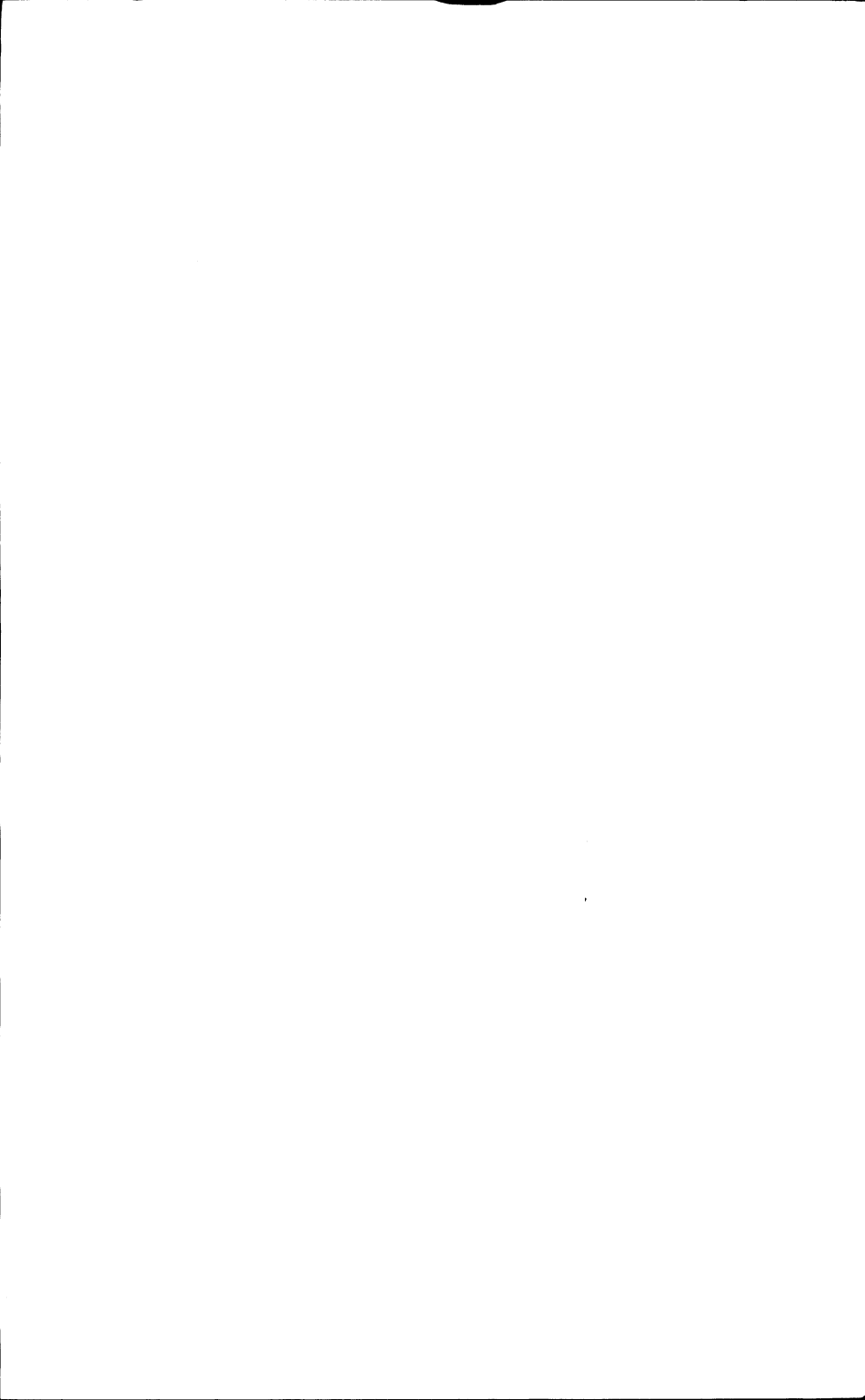
For the flight home, follow the same flight procedures that got you here. Remember to program the ADF frequency for Home Base (the ADF frequency can be found on the computer terminal). You'll have to deal with the same obstacles during the flight home that you dealt with during the flight to enemy territory. You have unlimited chances to fly to Home Base, so don't worry if you crash. You can't begin the second mission until you finish the first mission, and you can't begin the third mission until you finish the second mission.

On the other hand; if you have it back to Home Base from enemy territory and land safely, the mission will be recorded as a resounding success, and you'll be given the opportunity to begin the next mission. If you stop playing after finishing an entire mission, the next time you load the program, you'll be given the opportunity to either go on to the next mission or repeat a mission that you've completed already.

DWEEZIL MCGIBBITS (NO RELATION TO THE INFILTRATOR), PRESIDENT AND CHIEF EXECUTOR OFFICER AT WHIZBANG ENTERPRISES, HAS THIS TO SAY ABOUT THE NEW GIZMO™ DHX-2: *'WHAT DO YOU MEAN IT JUST EXPLODED?'*