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## INSTALLING HEROES OF THE 357TH

To play *Heroes of the 357th*, you need 640K of memory and an EGA, MCGA, or VGA compatible video adapter.

Before playing, you must install the program onto a hard drive. The easiest way to do this is to use the install utility that comes with the game. The install utility creates a directory named P51 on the disk and then copies the contents of all disks into that directory. You need 1.5 megabytes of free space on your hard drive. If you have a problem installing the program, you might not have enough memory available.

1. Boot your computer with DOS (any version 3.0 or greater).
2. Insert Disk No. 1 into drive A (or any appropriate floppy drive). Note: If you're using the 5.25 inch high density version, there is only the one disk to insert.
3. Type A: and press **Enter**. (Type the appropriate drive letter if you have inserted Disk No. 1 into a drive other than drive A.)
4. To install the disk, type Install followed by the drive letter you are installing *from* and the drive letter you are installing *to*. For example, to install from drive A: to drive C: you would type **INSTALL A: C:**. Press **Enter**.
5. Follow the on-screen directions and swap disks when prompted.
6. Once the game is copied onto your hard drive, put your original disks in a safe place.

### Installing Manually

If you're having trouble installing the game using the above install procedure, here's how to do it manually. Below is a step by step procedure for making the P51 directory, copying the files into that directory, and uncompressing them.

### 5.25" Floppy Disk Users

In the following step-by-step procedure, we're assuming that you want to install the game on C: drive from floppy drive A:. If your configuration is different, use the appropriate hard drive and floppy drive letters.

1. At the C: \ prompt, type MD **P51** and press **Enter**.
2. Type CD\**P51** and press **Enter**.
3. Insert the Heroes of the 357th floppy disk into drive A:.
4. Type **COPY A:HEROES.EXE** and press **Enter**.
5. Type **HEROES** and press **Enter** to run the uncompress program and install the complete game into the P51 subdirectory.
6. Once the program has been uncompress, you can delete the extraneous file from your hard drive. Type **DEL HEROES.EXE** and press **Enter**.

7. Type **CD\** and press **Enter** to return to your root directory.
8. To finish installing the game in your P51 subdirectory, type **COPY A:P51.BAT** and press **Enter**.

### 3.5" Floppy Disk Users

In the following step-by-step procedure, we're assuming that you want to install the game on C: drive from floppy drive A:. If your configuration is different, use the appropriate hard drive and floppy drive letters.

1. At the C:\ prompt, type **MD P51** and press **Enter**.
2. Type **CD\P51** and press **Enter**.
3. Insert the Disk No.1 into drive A:.(Note: Type the appropriate drive letter if you inserted Disk No.1 into a drive other than A.)
4. Type **COPY A:HEROES1.EXE** and press **Enter**.
5. Remove Disk No.1 and insert Disk No.2 into the A: drive.
6. Type **COPY A:HEROES2.EXE** and press **Enter**.
7. Type **HEROES1** and press Enter. When the computer is finished executing, type **HEROES2** and press **Enter**. This will uncompress both files and install the complete game into the P51 subdirectory.
8. Once the program has been uncompressed, you can delete the extraneous file from your hard drive. Type **DEL HEROES1.EXE** and press **Enter**. When the computer is finished executing, type **DEL HEROES2.EXE**.
9. Type **CD\** and press **Enter** to return to the root directory.
10. Insert floppy Disk No.1 into drive A:. Type **COPY A:P51.BAT** and press **Enter** to finish installing the game onto your C: drive in the subdirectory called P51.

### Starting Heroes of the 357th

The program automatically detects the best graphics and sound modes for your computer and starts the game in that mode. If you want to play the game in a different graphics mode, see *Startup Parameters*.

**Note:** You may need to remove TSRs present in your system (Terminate-and-Stay-Resident programs, such as Sidekick®) before starting *Heroes of the 357th*. These utility programs can take up space needed to run the program. You can temporarily avoid these TSRs by booting from your original DOS disk. See *Problems With The Game?* for instructions on removing TSRs.

### Starting From a Hard Drive

If you installed the game using the Install utility that came with *Heroes of the 357th*, use the following procedure to start the game.

1. Type **C:** and press **Enter**. (If your hard drive isn't C:, enter the correct letter.)
2. Type **CD\P51** and press **Enter**.
3. Type **P51** and press **Enter**.
4. The game will load the logo screen. Press any key to continue.

### STARTUP PARAMETERS

When you start *Heroes of the 357th*, the program automatically detects the best graphics mode for your computer and starts the game in that mode. However, if you want to start the game in a different graphics mode, you can do so by adding a few extra characters (called arguments) to the start command.

EXAMPLE: Let's say you want to load the game with EGA graphics mode and music generated with an Ad Lib board (you must have an Ad Lib board installed). You'd type **P51 adlib** and then press **Enter**.

The order of the extra arguments doesn't matter as long as there's a space between each argument and they are typed in lower case.

These are the arguments you can use:

<b>vga</b>	Loads game with VGA graphics.
<b>ega</b>	Loads game with EGA graphics.
<b>j</b>	Loads game with joystick flight control.
<b>k</b>	Loads game with keyboard flight control.
<b>lo</b>	Loads game in low graphics detail mode (less detail speeds up game play).
<b>med</b>	Loads game in medium graphics detail mode (less detail speeds up game play).
<b>hi</b>	Loads game in high graphics detail mode.
<b>sound</b>	Loads game with sound on.
<b>nosound</b>	Loads game with neither music nor sound.
<b>pc</b>	Loads game with PC internal speaker sounds.
<b>adlib</b>	Loads game with AdLib sound card sounds.
<b>tandy</b>	Loads game with Tandy sound (VGA required).
<b>quiet</b>	Loads game with neither music nor sound.
<b>music</b>	Loads game with music on.
<b>nomusic</b>	Loads game with music turned off.

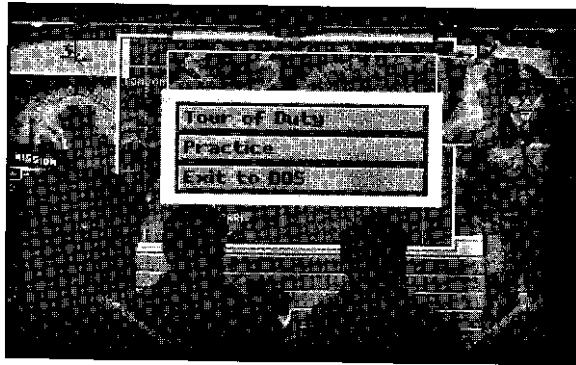
Note: When you quit the game, the program automatically remembers all of that game's startup parameters, as well as all of the options selected from the Options menu (except Time Factor, Unlimited Weapons, and Unlimited Fuel). The next time you start the game, just type P51 and press Enter, and those same parameters and options will be in effect.

## Hand Controllers

There are several hand controllers on the market which plug into the joystick port. Most models have a directional pad on the left and four buttons on the right. The directional pad works exactly like the handle on a joystick. The top button toggles the cockpit and enemy views. The left button fires the machine guns. The right button fires the missiles. The bottom button fires the cannons.

## PRACTICE

After you install and start the program, the Midnight Software Inc. company logo appears. Press **Enter** to go to the title screen. The title screen flashes the credits. Press Enter to go to the *Opening Menu*. Select **Practice**.

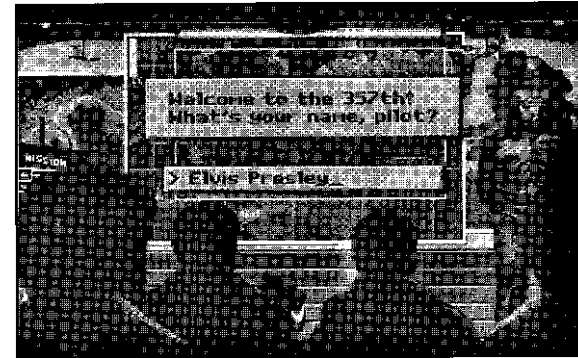


### Selecting Items From The Menus

There are several ways to select items from the menus. You can use either the **up/down** arrows on the keyboard, the arrows on the numeric keypad, or the joystick to highlight items on the menus. Press the **up/down** arrows, or move the joystick handle **forward/back**, to move the highlight **up/down**. To select an item, press **Enter** or press any button on the joystick. Use the way that's most comfortable for you. Hereafter, when outlining procedures, this manual will simply instruct you to select menu items.

## SIGNING OUT A FIGHTER

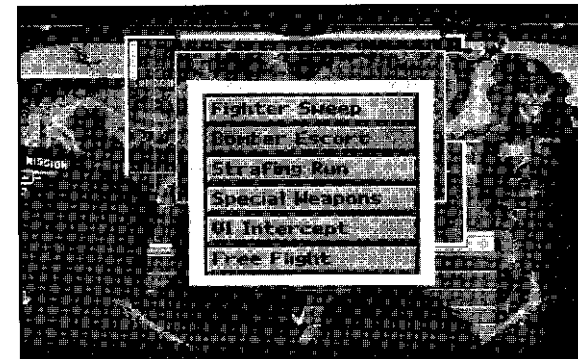
Before you can fly, you have to sign out a fighter. Type in a name (no more than 14 characters) and press Enter.



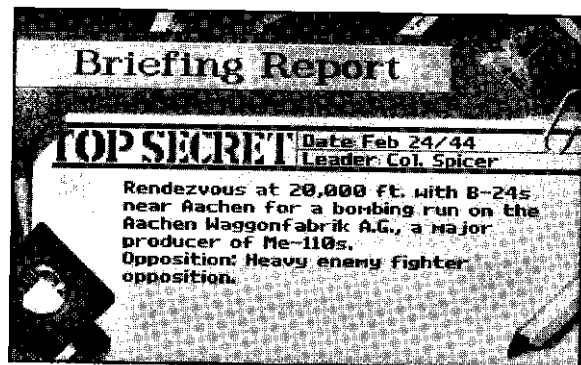
At any point, from now until you re in the air, you can return to the *Opening Menu* by pressing **Esc**. After you outfit the P-51 (see *Fighter Configuration*) you must press **Esc** twice to return to the *Opening Menu*.

## SELECTING A MISSION

Now you're in the briefing room, awaiting orders. Since this is only practice, you can choose what kind of mission you'll fly.

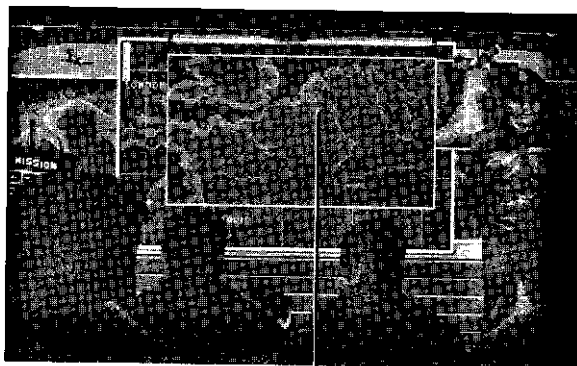


The names of the mission types should give you some idea of what they call for. See *Mission Types* for more detailed descriptions of the mission types. If this is your first time using this simulator, you should select **Free Flight**. The Free Flight mission is a strafing run in Paris in which you can't crash or be shot down. Fly this mission to get a feel for the controls and the weapons.



## Mission Briefing

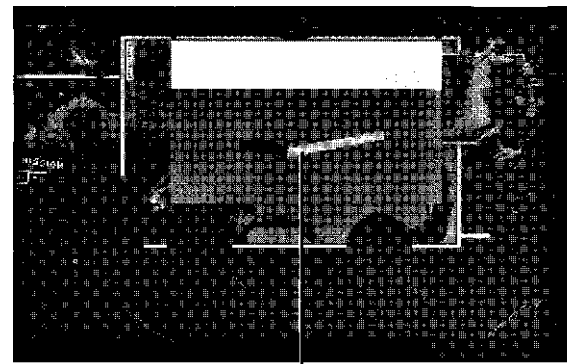
The Briefing Report informs you of your orders and provides useful facts about the mission, such as the name of the city where the target is, the kind of target, the expected level of opposition, who leads the flight, the date the actual mission occurred, etc.



Target site

Once you've read the Briefing Report, press **Enter** to enter the Briefing Room. Your commanding officer shows you the target site — the location is indicated by a white box on the map of Europe. Note the distance between the target site and your base in England and use this determine how much fuel you should carry.

After the commander shows you the target site, watch the Briefing Film. The Briefing Film consists of pictures of the various targets you'll have an opportunity to destroy on the mission you've selected. The film runs at a constant rate unless you speed it up manually by pressing the spacebar. After the film begins, you can cycle through all the targets on the film screen as fast as you like.



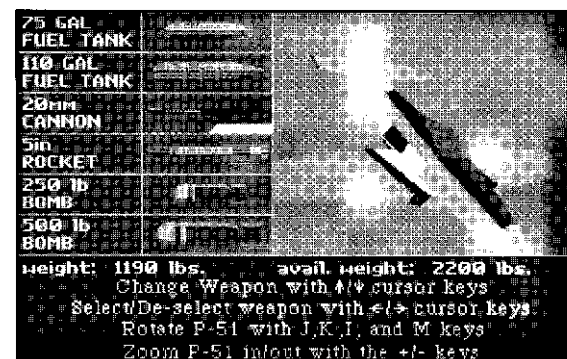
Picture of enemy ground target

Since Free Flight is only a training mission, there are no actual targets on the briefing film. Press **Enter** or the joystick button if you wish to skip past the Briefing Film.

When the Briefing Film ends, the *Fighter Configuration* screen appears automatically.

## CONFIGURE THE P-51

The *Fighter Configuration* screen lets you outfit the P-51 with the armament, ordnance, and fuel tanks you require for the mission you've selected.

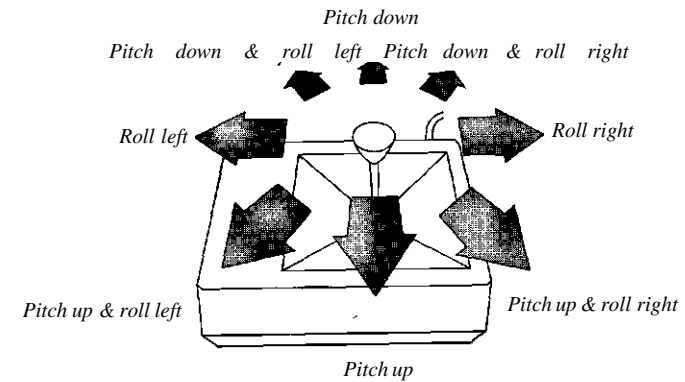


Press the **up/down arrows** or move the joystick up/down to highlight an item; press the **right arrow** or move the joystick right to select. The moment you select an item, the P-51 rolls over and displays the underside of its fuselage, where the tanks and weapons are mounted. Items are added in pairs to maintain the airplane's centre of gravity. The items you select appear on their hardpoints under the wings.

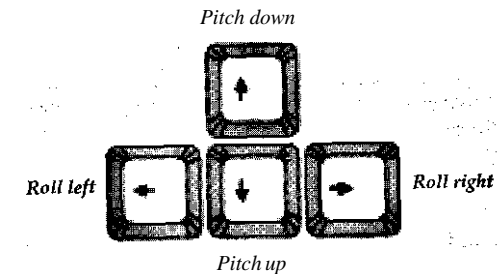
## FLIGHT STICK CONTROLS

The pilot uses the flight stick to roll, climb, and dive. In *Heroes of the 357th*, the flight stick is automatically coordinated with the rudder to produce even turns. You can control the flight stick with a joystick or the keyboard. A joystick is highly recommended.

**Joystick** — The default control. Press **Ctrl-J** to activate the joystick.



**Keyboard** — Press **Ctrl-K** to activate keyboard.



You can remove items as easily as you added them. Press the **up/down arrows** or move the joystick up/down to highlight the item you wish to remove. Press the **left arrow** or move the joystick left to remove the item.

Notice that the combined weight of the pair of items you have highlighted appears at the lower left corner of the menu, where it says **weight**. To the right of that number is the **avail. weight**, which indicates how many more pounds can be added to the P-51. Keep in mind that the heavier you make the P-51, the slower its maximum speed and the more sluggish its handling.

It's important to choose the proper configuration for the mission you're going to fly. For example, if the target site is very far away, you need the 110 gallon drop tanks to complete the mission and return safely home. For hints on configuring your fighter for different missions, see *Fighter Tactics*.

When you've finished configuring and examining the P-51, you're ready to taxi onto the airstrip. Press **Enter** or the joystick button to watch the takeoff sequence. If you want to bypass the takeoff sequence altogether and go straight to the air, press **F1**; if you just want to speed it up, press **Enter**.

The takeoff sequence followed by a map of Europe and a depiction of your formation heading to the target site. Now is your last chance to change your mind — press **Esc** to return to the *Fighter Configuration* screen.

## IN THE COCKPIT

You need to develop a "second-nature" familiarity with all the instruments and controls at your fingertips to get full use out of the P-51.

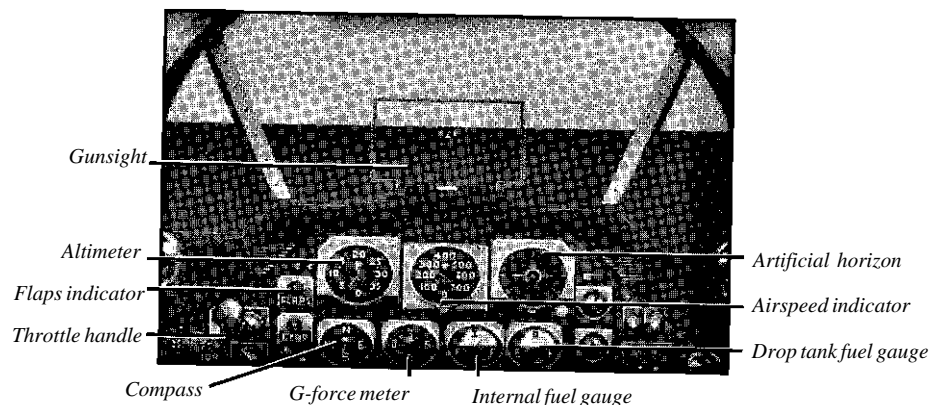
For a complete diagram of all the key commands, turn to the centre of this manual.

Once in the air, press **H** to call up the *Help Menu*. The *Help Menu* lists all the in-flight key commands. This section explains all the commands in detail. When the *Help Menu* is up, the action is paused.

```

ESC      end mission
F1       pilot view
F2       chase plane view
F3       weapon view
F4       front view
F5       left view
F6       right view
F7       top view
F8       combat view
F9       overview

esc: exit help  space: next page
  
```



## Throttle Handle

The throttle handle indicates the percentage of maximum power your motor is putting out. For example, when the needle on the handle points at 75, the engine is putting out 75% of its total power. Each key press increases or decreases the throttle by 5%.

Press the + (plus) key on the numeric keypad to increase the throttle; press the - (minus) key to decrease the throttle.

## Flaps Indicator

When the flaps indicator is highlighted (red), the flaps are down. Putting the flaps down increases the wing's surface area, thus increasing both lift and drag. When the flaps are down, it's easier to pull out of a steep dive. Also, when you're flying low and slow, as on a strafing run, having the flaps down makes the P-51 more manoeuvrable.

Press **F** to toggle flaps down/up.

## Altimeter

The altimeter indicates your altitude. The small hand shows feet above the ground in thousands. When the long hand is turning clockwise, the P-51 is gaining altitude. One complete revolution of the long hand indicates a change in altitude of 1000 feet.

## Compass

The compass indicates your heading. North is at the top.

## Airspeed Indicator

The air speed indicator shows your forward velocity in miles per hour.

## G-Meter

The G-Meter shows the number of g-forces you're pulling. If you pull more than 3 g's, you'll begin to blackout. Ease off to let more blood flow into your brain so you can see. Blackouts are not available in EGA.

## Artificial Horizon

The artificial horizon shows the attitude of the wings to the ground. Think of the wings as a line and the ground as a plane. Whichever way the line in the artificial horizon is tilted, that's the way your wings are tilted.

## Fuel Gauges

The left fuel gauge shows how much fuel remains in your internal tanks. The right fuel gauge shows how much fuel remains in your drop tanks, when you're carrying them.

## WEAPONS CONTROLS

There are four different kinds of weapons to choose from.

### Machine guns

The P-51 comes factory-equipped with six Browning machine guns, three in each wing. You can't get rid of them and you can't add more. They are your primary weapons; you'll rely on them in every mission. The machine guns are mounted to fire in a line directly to the point at the centre of the gunsight. In level flight, destroying a target is not difficult. Aiming your guns while rolling, diving, or climbing is another matter, as you have to lead your target using a deflection angle.

Press the spacebar or the firing button on your joystick to fire machine guns.

### 20mm Cannons

The cannons pack a much stronger wallop than the machine guns, but they have a slower rate of fire. It's difficult to use them effectively in a dog fight, since you can squeeze off only two rounds at a time. Cannons are best used against larger ground targets — such as bridges or a locomotives — where too many machine gun rounds would be required. They fire along the same line as the machine guns. Each cannon carries 43 rounds.

Press 4 on the keyboard to fire cannons.

### 5 inch Rockets

There are eight hard points under the wings for rockets. The rockets are unguided and therefore very hard to aim at moving targets. They're more powerful and have a greater range than the cannons, which makes them good for taking out the largest ground targets — industrial buildings, etc. Be aware that the rockets fire alternately from either wing. The ones from the right wing will fly to the right side of the gunsight, the ones from the left will fly to the left.

Press 1 (one) on the keyboard to fire a rocket.

## Bombs

There are two sizes of bombs to choose from: 250 lb. and 500 lb.

Press 2 on the keyboard to drop a bomb.

## Drop Tanks

Drop tanks are intended for use as auxiliary fuel tanks, but when dropped they can cause destruction. Generally speaking, you'll drop the tanks to make the P-51 lighter so you can manoeuvre more deftly in combat, and the tanks will fall harmlessly onto the wide terrain below. But if you find yourself flying low over enemy territory, you might try to hit a target of opportunity with your drop tanks.

Press 3 on the keyboard to release a drop tank.

## FLIGHT VIEWS

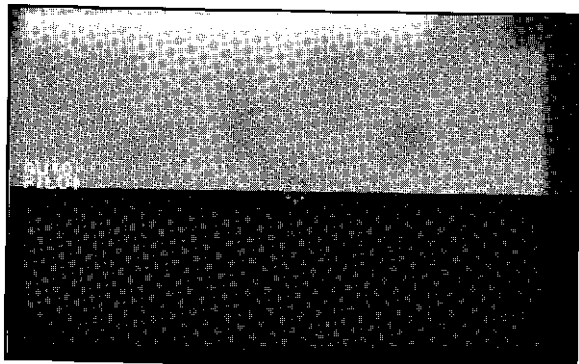
*Heroes of the 357th* comes with numerous different flight views. The two views used most often are the Pilot View and the Combat View. Accordingly, the program uses the number 2 button on your joystick as a toggle switch between these two views.

Press joystick button 2 to toggle between the Pilot View and the Combat View. This command automatically overrides any view on the screen. Keyboard users must use the F8 and F1 keys in conjunction to produce the same effect. The combat view is available only when at least one enemy is present.

### Pilot View F1

At the beginning of every mission, you see the Pilot View with the instrument panel. The Pilot View is the only view that offers the gunsight, so you should return to it often when in combat to fire at the enemy.

You can also hide the instrument panel to give you a wider view of the combat environment. Press backspace to remove/replace the cockpit.



### Chase Plane View F2

The Chase Plane View shows a view from directly behind the P-51, as though you were in another plane chasing yourself.

### Weapons View F3

When you fire a weapon, the Weapons View follows the bomb or the rocket to its target, or until it explodes. You can press F1 to get back to your cockpit after watching the bomb or rocket.

### Front View F4

The Front View shows a view from directly in front of the P-51 looking back.

### Left View F5

The Left View shows a view from the left side of the P-51.

### Right View F6

The Right View shows a view from the right side of the P-51.

### Top View F7

The Top View shows a view of the P-51 from above. The Top View is particularly useful in formation flying, allowing you to keep track of your bombers and wingman.

### Combat View F8

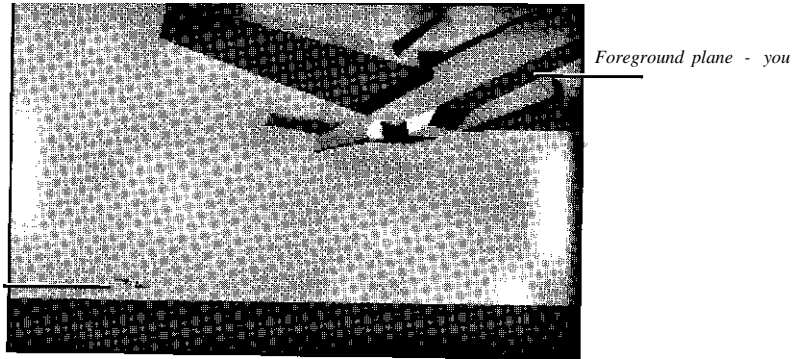
As stated above, the Combat View is critical. If there is an enemy in the vicinity, the Combat View shows you the enemy in his position relative to the P-51. If there is more than one enemy in the vicinity, the Combat View shows you the enemy nearest to your P-51, unless you have selected a different enemy using the E key (see *Engage Enemy*), in which case the Combat View defaults to that enemy.

### Overview F9

The Overview continuously pans clockwise a wide circle around the P-51 from slightly above the plane. This view is useful for taking stock of your general surroundings, both on land and in the air.

### Moving View F10

The Moving View offers a rapidly changing pan of the P-51, from close up to far away, from beneath the wings to overhead. If you're between dogfights and you want a full appreciation of the 3-dimensional world, try the Moving View.



### View to Target **Shift-F1**

The View to Target shows the P-51 in the foreground and the nearest major ground target in the background. Major ground targets are indicated by icons or flags on the flight map (for more information, see *Flight Map*). Some missions, including all bomber escort missions, do not offer any major ground targets, in which case this view remains inactive. The major targets on bomber escort missions, while indicated by icons or flags, are assigned to the bombers.

### View from Target **Shift-F2**

The same circumstances apply to View from Target as to View to Target (see above.) You see the target closest to the P-51 in the foreground and the P-51 itself in the background.

### Fly-by View **Shift-F4**

The Fly-by view show the P-51 and your wingman (if present) approaching the camera and flying past it. The camera then follows the P-51 from behind.

### Other Plane Views **Shift-F6**

This key command toggles through the cockpit views of all the fighters in the air. Note that this is a mode change, in which all view commands work for the plane whose view you chosen. The name of the selected plane is listed on the left side of the screen.

Even though you're looking out of the cockpit of another fighter, you maintain control of all the functions of your P-51- flight stick, weapons, bail out, etc. To return to your own Cockpit View, keep toggling through the Other Plane Views until you come to yours, or press the joystick button 2 twice.

### Wing Leader Views **Shift-F5**

You are the Wing Leader (also called Red Leader and Red One by your wingman). The Wing Leader Views command reverses the **Shift-F6** command and restores the **F** keys to their primary functions. You can accomplish this also by pressing **Shift-F6** until you return to your P-51's view, but **Shift-F5** is usually a little faster, especially when there are more than two planes in the air.

### Bottom View **Shift-F7**

The Bottom View shows the underside of the P-51.

### Reverse Combat View **Shift-F8**

The Reverse Combat View shows your enemy in the foreground and you in the background. It gives you a chance to predict just how your enemy might choose to manoeuvre into an advantageous position.

As with the regular Combat View, the Reverse Combat View shows the perspective of the nearest enemy fighter, unless you have chosen a different opponent with the **E** (Engage Enemy) command. (See *Engage Enemy* for description of Engage Enemy command.)

### COMMAND WINGMAN TO REGROUP

Your wingman automatically engages an enemy at the beginning of an air battle, but if you would rather have him protecting your rear or protecting the bombers, you can command him to regroup. Remember, on escort missions, this command orders him back to the bomber formation, and on all other mission this orders him to fall in behind you.

Press **Shift-R** to Command Wingman to Regroup.

When you issue this command, your wingman disengages from the enemy and regroups. If, on his way back, the wingman encounters a new enemy, he will engage that enemy. When this happens, you must issue the command again if you want him to break off combat. When there are no more enemies in the area, the wingman returns automatically. (See the *Bomber Escort* for more about Command Wingman to Regroup.)

### ENGAGE ENEMY

This command serves two distinct purposes. First, the Engage Enemy command countermands the Regroup command. If you ordered your wingman to regroup and then decide you want him to re-engage his nearest enemy, go ahead and use this command.

Press **E** to countermand the Regroup command.

Secondly, the Engage Enemy command works in conjunction with the Combat View (**F8**) and the Reverse Combat View (**Shift-F8**) by giving you the opportunity to select from among more than one enemy for viewing.

Press **E** to toggle through separate Combat Views (or Reverse Combat Views) of active enemies.



When there is more than one enemy in the sky, pressing **E** shows you the fighter nearest you, just like the **F8** (Combat View) command, except the **F8** command does not give orders to your wingman. Pressing **E** again shows you the next nearest fighter, and so on. Now, when you switch to the Combat View or the Reverse Combat View during that same engagement, you see the last fighter selected by the Engage Enemy command, as long as that enemy fighter is still in the air. When the engagement is over and the next wave of fighters arrives, the command is reset to default to the nearest enemy.

## AUTOPILOT

The Autopilot is active only on Bomber Escort missions. Press **A** to activate the Autopilot. To deactivate the autopilot, move the joystick, change the throttle, or move the flaps.

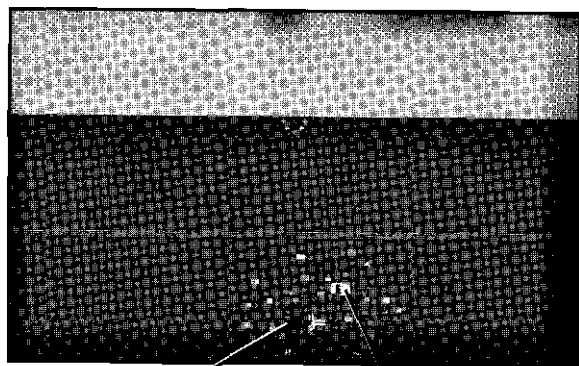
By activating the Autopilot, you command the P-51 to fly the shortest route back to the bomber formation at top speed. This is useful when you get lost, or find yourself too far away from your bombers and want to get back to them as quickly as possible. If all the bombers have been destroyed, the Autopilot becomes inactive. (See *Bomber Escort* for advice on Autopilot.)

## THE FLIGHT MAP

The flight map is useful in virtually every mission. At high altitudes, use the flight map to locate cities and target sites and to track V1 "buzz" bombs. Target sites are marked with colourful icons — when you destroy a major target, the icon representing that target disappears from the flight map.

At low altitudes, use the flight map to locate both major targets and targets of opportunity on the ground. A target of opportunity is defined as an enemy target whose destruction is useful but not critical. Targets of opportunity do not appear as icons on the flight map and their point values are relatively small. (See *Ending A Mission* for a complete explanation of the scoring.)

Press **M** to toggle the flight map on/off.



You

Major targets

The airplane silhouette on the flight map represents the P-51. If you lose your bearings, you should zoom the flight map out to get a larger perspective. When you go down low to strafe, you might like to zoom the flight map in to find targets more easily.

Press **Z** to zoom the flight map in; press **Shift-Z** to zoom the flight map out.

## PILOT BAIL OUT

You can eject anytime you want, but it's always bad form to bail out too early. When you bail out, you will either be taken prisoner or escape capture. Press **Shift - B** or **Shift-J** to bail out.

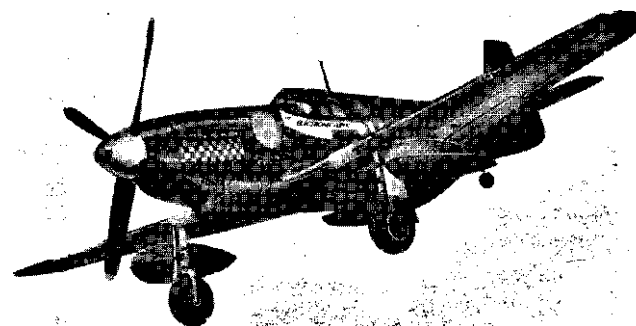
## REPLAY

You can replay the last few seconds of any mission at any time. The replay tape shows a wide-angle panning view of the action. Also, you can change to different views during the replay. The action is paused while you're watching the replay, but resumes automatically when the replay ends.

Press **R** for a replay view. If you want to change the replay view, press **F9**. If you want to end the replay early, press **R**.

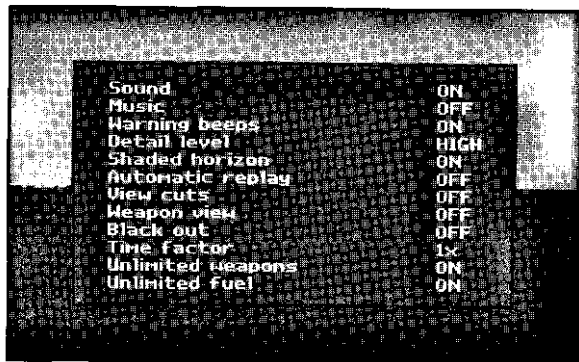
## PAUSE

Press **P** to pause the action. Press any key to resume flying.



## GAME OPTIONS

*Heroes of the 357th* comes with a variety of useful game options. Press **O** to bring up the *Options Menu*. When the Options Menu is up, the action is paused.



Press the **up/down** arrows to highlight an option, and then press the left/right arrows to change the option's setting. When you're ready to resume flying, press Enter to confirm your choices, or press **Esc** to exit without saving changes.

### Sound

Turn engine and weapon sounds **on** or **off**.

### Music

Turn the theme music **on** or **off**.

### Warning Beeps

Warning beeps signal you when the P-51 is in danger of crashing or stalling. You will hear them when the P-51 is descending too rapidly at too low an altitude, or ascending too steeply at too slow an air speed (a stall).

For example, when you're flying at 20,000 feet, you can go into a steep dive without hearing the warning beeps. But if you're at 5,000 feet and suddenly fall into a vertical dive, the warning beeps will come on. This option is particularly useful on strafing runs, when you need to fly low to the ground. If you think you're going to crash, pull back on the flight stick and put your flaps down.

When the warning beeps alert you that the P-51 is about to stall, point the nose downward, pull the flaps in if they're out, and kick the throttle up to 100%. When you're in a stall you can't manoeuvre, and this can cost you your airplane and your life if an enemy has you in his sights.

### Detail Level

This option allows you to select the amount of graphic detail on the screen. The greater the detail, the slower the screen updates the images.

### Shaded Horizon

Available only with VGA graphics. The shaded, or dithered, horizon gives the illusion of distance. If you turn the shading off, the speed of the simulation increases slightly.

### Automatic Replay

When you select this option, the program automatically pauses the action whenever there's a kill and replays the dramatic moments of the battle.

### View Cuts

With the view cuts option on, the program automatically switches to a brief rear view of enemy fighters as they show up to engage you. First you receive the message telling you how many "bandits" are approaching and from what direction, and then you actually see the bandits from behind for a few seconds. When view cuts is on, you can identify the enemy fighters long before you engage them.

### Weapon View **F3**

Turn this option on to automatically follow your bombs or rockets to their targets the moment you release them. The view will follow the bomb or rocket until it explodes or disappears.

You still have control of the P-51 during this view, so be careful not to crash or get flamed.

### Blackout

Available only with VGA graphics. When you have the blackout option on, the screen becomes dark when you pull too many g's, as the blood is forced out of your head and you begin to lose consciousness. These days pilots wear special suits to reduce the effect of g-forces, but you don't have the benefit of that luxury.

### Time factor

The time factors (1/2x, 1x, 2x, and 4x) control the speed of the simulation. When you start out, you are always on 1x. You can use the *Options Menu* to change the Time Factor, or you can use the keyboard. Press **T** to decrease Time Factor; press **Shift-T** to increase Time Factor. To automatically reset the Time Factor to 1x, press **Ctrl-T**.

As soon as enemies come into view, the time factor immediately drops to 1x. If you choose to make the action slower still by setting the time factor on 1/2x, the program will keep it there until you change it. Otherwise, it will default to 1x when you engage the enemy.

## Unlimited Weapons

This option automatically gives you unlimited use of all the weapons in the game: machine guns, cannons, rockets, and bombs. You don't need to select any weapons from the *Fighter Configuration* screen to have them on board when you select this option.

## Unlimited Fuel

When you choose this option you have an endless supply of fuel, regardless of whether you outfitted the P-51 with drop tanks.

## ENDING A MISSION

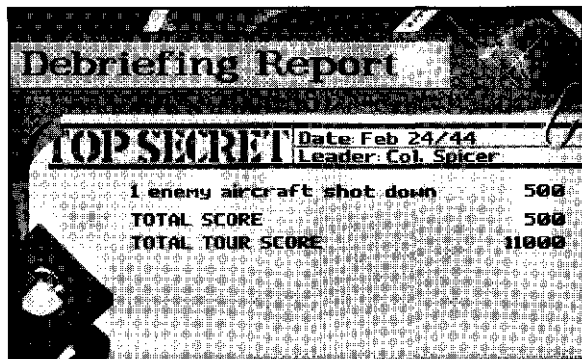
You can end a mission at any time. Press **Esc** to bring up the *Exit Menu*. When the menu appears, press **Y** to end the mission; **Esc** again to resume flying; or **X** to exit to DOS.

If you complete a mission, crash, or get shot down, the program automatically returns you to the base, where the debriefing takes place. Bomber Escort missions, V1 Intercept missions, and certain Strafing Runs end on their own after all the enemy fighters and major targets have been hit and you receive the "mission accomplished" message. Fighter Sweeps and Strafing Runs without major ground targets go on as long as you want them to, or until you run out of fuel.

At the end of a mission you'll see the landing sequence, as long as you didn't bail out or perish. If you want to bypass the landing sequence, press Enter.

If you shot down one or more enemy fighters or bombed a major target, you get to paint a symbol of your kill on the left side of the fuselage.

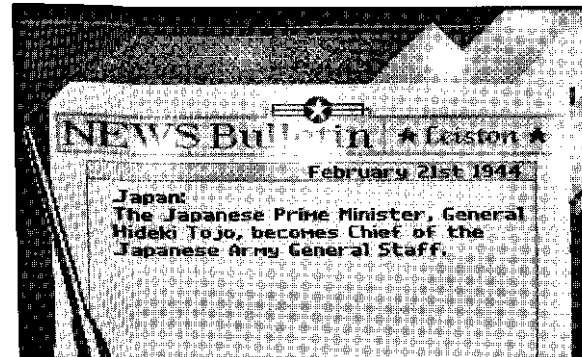
Next comes the Debriefing Report. In the Debriefing Report you learn all the significant facts about your mission and are given a score. The mission score can be positive or negative, depending on how many aircraft you shot down or lost, how many civilian and enemy targets you destroyed, etc. The mission score is added to, or subtracted from, your Total Score.



Press **Enter** or the joystick button to turn to the next page of the Debriefing Report, where you receive a written account of your success or failure, and how it will effect the war.

Once you've read the report, press **Enter** or the joystick button to go to the Squadron Room. Your buddies will make remarks about your performance for the day. If you're not upholding the reputation of the illustrious boys from the 357th, then you are tarnishing it and deserve their scorn. If you are KIA or POW, naturally you won't be there to know what they said about you.

Press **Enter** or the joystick button to open the latest *News Bulletin*. Read the *News Bulletin* to find out how things are going in other parts of the war.



Once you've read the news, press Enter or the joystick button to return to the *Opening Menu*. Once you've flown a mission, a new option appears on the menu: **Replay Last Mission**. This selection allows you to turn back the clock and try the previous mission again, as though you had never attempted it.

## TOUR OF DUTY

The Tour of Duty consists of thirty-four separate missions in the same categories found in the Practice mode. You can't alter the sequence in which the missions are flown — call it fate or the forces of history.

Pilots created during Practice are not saved and so cannot be used in Tour Of Duty. When you enlist a new pilot for the Tour of Duty, that pilot remains on the pilot list unless he is discharged. Pilots are either Active, Killed in Action, or Prisoners of War.

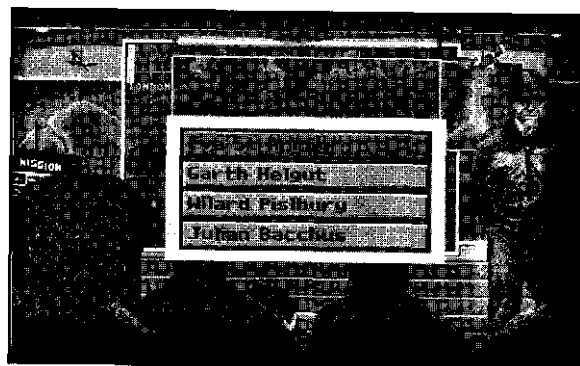
The program automatically saves the stats for each pilot when you quit the game. The next time you select a pilot for the Tour of Duty, you will begin where that pilot left off, without the option to replay his last mission.

After you select Tour of Duty, the *Pilot Selection Menu* appears. Use this menu to choose an active pilot, create a new pilot, get rid of a pilot, bring a pilot back to life, erase all the pilots, look at a pilot's stats, or check the list of top aces.

There is one secret ground target in a certain patrol over Berlin which does not appear on the flight map: Adolf Hitler's bunker. Find and destroy Hitler's bunker and you'll receive a huge bonus.

### Create a Pilot

If this is your first time attempting the Tour of Duty, you need to create a pilot before you can begin flying. The program automatically saves all the pilots you create, so they will always be available unless you delete them. The program prompts you to enter your name if there are no pilots available. If there is at least one pilot available, the program brings up the *Pilot Menu*.



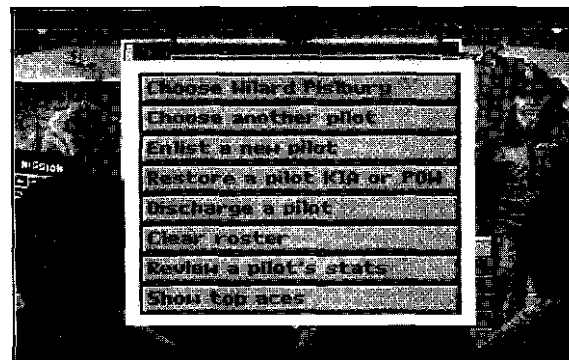
The menu display eight pilot names per page. If the pilot you want is not on the first page of the menu, press the down arrow to highlight the last name on the menu, then press the arrow once more to bring up the next menu. To bring up the previous menu page, highlight the name at the top of the page and then press the up arrow once.

### CHOOSE AN ACTIVE PILOT

When you select **Choose** an active **pilot**, a list of all the active pilots appears. Select the pilot you want to be.

The Briefing Screen appears, followed by the Briefing Film, etc — just like in Practice mode.

When you return to Tour of Duty after performing a mission, you have the opportunity to choose that same pilot again from the top line of the menu. Or you may choose another pilot. If all the active pilots are either killed in action or prisoners of war, none are active. In this case, you must either restore one or enlist a new one.



### CHOOSE ANOTHER PILOT

Select **Choose another pilot** for a list of all the pilots. Select one of the pilots and proceed.

### ENLIST A NEW PILOT

Select **Enlist a new pilot** to bring up the pilot naming box. Type in a new name and proceed.

### RESTORE A PILOT KIA OR POW

Select **Restore a pilot KIA** or **POW** to bring up a list of all the pilots killed in action or taken prisoner. Select a pilot and proceed.

## DISCHARGE A PILOT

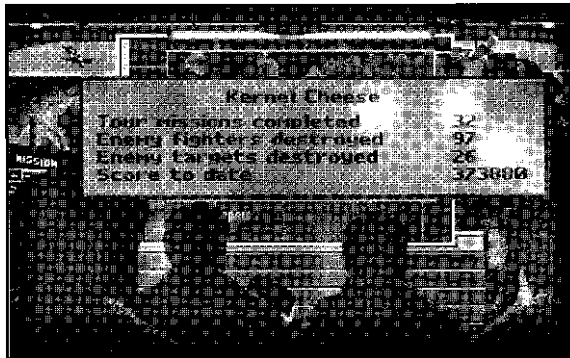
Select Discharge a pilot to bring up a list of all the pilots available for discharge appears. Select the pilot you wish to discharge. The program asks you to verify your selection. Press **Y** to confirm the discharge or **N** to cancel it. Remember, discharged pilots are gone for good.

## CLEAR ROSTER

Select clear roster to delete all pilots, scores, and statistics. The program asks you to verify your selection. Press **Y** to clear the roster or **N** to cancel it. If you press **Y**, you're asked to name a new pilot. Type in a name and press Enter.

## REVIEW A PILOT'S STATS

Select Review a pilot's stats for a list of all the saved pilots. Select one of the pilots from the list.



A box appears showing the pilot's name, number of missions flown, number of targets destroyed, the number of kills in the air, and his score to date. Press **Enter** or **Esc** to return to the *Pilot Selection Menu*.

## SHOW TOP ACES

The list of top aces appears at the end of each Tour of Duty mission, but you can also take a look at it at the beginning of a new mission by selecting **Show top aces**.

A screenshot of a terminal window titled "Top Tour of Duty Aces" showing a list of pilots ranked by score. The data is as follows:

	missions	kills	score
Wilard Pisbury	2	5	12500
Garth Helgut	2	4	12000
Julian Bacchus	1	2	9875
Billy Condon P.O.W.	1	3	9500
Eve St Array	1	2	6875

The aces are ranked in order of points. The pilot with the most points is at the top of the list.

## CONGRATULATIONS

When you distinguish yourself in battle, the high command offers you a hearty congratulations for doing your part in winning the war.

## MISSION TYPES

There are 34 missions contained in the categories below.

**Fighter Sweep:** A well-executed fighter sweep rids an area of enemy fighters. Here you will focus exclusively on air combat tactics. You'll probably need to consult the Enemy View (**F8**) often to get your bearings during the many dogfights you'll have to win to complete the mission. Between waves of enemy fighters, or after the last wave, you can strafe ground targets if you want to. The program will not end a fighter sweep automatically. You must press **Esc** when you want to return to the base.

**Bomber Escort:** On a bomber escort mission, your job is not only to keep enemy fighters from shooting down your bombers, but you might also find time to drop a load of ordnance yourself. Use the autopilot feature to return to your bomber formation if you become detached during a fight. Bomber Escort missions end automatically after the bombs are dropped and all enemy fighters have been shot down.

**Strafing Run:** On a strafing run you are responsible for eliminating ground targets with your guns, cannons, rockets or bombs. Enemy fighters will probably try to thwart your efforts — eliminating them should be your first priority. When strafing, make sure to cut your throttle a little and put out your flaps. This way you can fly slowly and low to the ground while still maintaining lift. Strafing Runs selected from the Practice menu do not end automatically, though when you run out of fuel and/or ammo it's time to return to the base. Press **Esc** to return to the base.

**Special Weapons:** Special Weapons missions are just like Strafing Runs and require the same tactics. The only difference is that on a Special Weapons mission you must take out one or more major ground targets in order to complete the mission. Major ground targets are indicated by colourful icons on the map. When you destroy all the major ground targets, the mission ends automatically.

**V1 Intercept:** The V1 "Buzz Bomb" is an unmanned, unguided, jet-propelled missile. All you have to do is catch up to it and knock it out of the sky, but the longer you wait the more likely it is for the V1 to crash over friendly territory. You may also have to contend with enemy fighters. When you destroy the V1 and kill all the enemy fighters, the mission ends automatically. If you miss the V1, you might as well strafe targets of opportunity until your fuel and/or ammunition runs out.

**Free Flight:** Fly to Paris in an indestructible airplane. In Free Flight, you cannot be shot down or crash. Roam the skies over Paris, dogfighting and strafing at will. Practice gunnery, bombing, aerial manoeuvres without fear of dying. This is not a real mission as there are no objectives — press **Esc** when you want to return to the base.

## GROUND SCHOOL

The following section offers general information about the enemy and the different mission types, and specific advice on how to deal with the more difficult situations you will encounter.

### The Clock

Ever since pilots carried radios in their planes, the clock has been used to communicate the general direction of bogeys (unidentified aircraft) relative to the pilot. Imagine your aircraft as the fixed point in the centre of a huge clock. The nose of your plane always points to 12. Enemy aircraft are identified as being located at positions on the face of the clock, with relative altitude indicated as low or high. For example, "Bogey at 3 o'clock" would indicate an aircraft to the right; "Bogey at 3 o'clock low" would indicate an aircraft below and to the right.

## ENEMY FIGHTERS

Below are descriptions and flight characteristics of all the enemy fighters you will face. In general, the enemy fighters are dark on top and light on the underside, and friendlies are light on top and dark on the underside. If you want to see a close-up of the enemy fighters, press **Shift-F8** when the enemy is present in the skies. The briefing reports for some of the missions specify only the expected level of fighter resistance, not the actual type of fighters you will be engaging.

### BF109

The Messerschmitt 109 is a light, highly manoeuvrable fighter. Somewhat slower than the P-51, the Bf-109 can neither outrun nor outclimb you, but at lower altitudes you'll have a hard time drawing a bead on it in close combat. Few of the enemy pilots will climb to engage you when you have a significant altitude advantage, and the Bf-109 pilots are particularly leery of high-altitude combat. For armament they carry two MG-17 machine guns and one 20-mm MG-151 cannon.

### ME-110

Although slower and somewhat less manoeuvrable than the Bf-109, the Me-110's powerful cannons can make up for its performance deficiencies. Avoid head-on passes in general, and especially head-on passes with Me110s, as you will almost certainly sustain heavy damage if not lose the P-51 altogether. When a flight of Me110s is approaching, point your nose upward to attain greater altitude, or turn inside toward the angle of their approach. Using this latter tactic, you should be able to take out some or all of the Me110s as they pass to one side of you, without taking any hits. If one or more get by on the first pass, you should be able to outmanoeuvre them and take them down without exposing yourself to too much danger.

### Fw-190

The Focke-Wulf 190 is more dangerous than the Me-110. It performs nearly as well as the P-51 at any altitude and is more heavily armed. In dogfights with Fw-190s, the better pilot usually prevails.

### ME-262

The Messerschmitt 262 Sturmvogel is a thorn in the side of the Yoxford Boys. With its two wing-mounted turbojets, it's much faster than the P-51, and its four cannons can rip you (or one of your bombers) to shreds in seconds. On bomber escort missions, try to keep the 262s occupied and away from your bombers if you can't actually shoot them down. As long as your bombers reach the target, site and drop their load, your mission is accomplished.

## BATTLE DAMAGE

When the P-51 takes too many hits, a series of messages appears from your wingman warning you to return home while you can still save your plane. If you wish to follow your wingman's advice, press **Esc** and then **Y** to return to end the mission. If you haven't completed your objective, the mission will be counted as a failure.

Even though you've been hit, as long as the P-51 hasn't burst into flames you can still fly it normally. You just have to be careful not to take any more rounds or run into any flak. And there's an off chance that, even without being hit again, the P-51 will burst into flames from the damage it's already absorbed.

## FLAK

There's nothing you can do against flak, except take care of business as quickly as possible and get out of the area. If you are forced to fly low, as on a strafing run, and the enemy is firing off a lot of flak, you have little recourse but to pray you don't get hit. The chances are good that the P-51 won't be brought down by flak, but there are no guarantees in war.

## FIGHTER TACTICS

### FIGHTER SWEEP

The purpose of a fighter sweep is to clear an area of enemy fighters. There are no bombers to protect, so your auto-pilot and recall wingman commands are not functional. As in all missions where your first encounter is a gaggle of bandits flying toward you, it's important to take out as many of the enemy as possible in the first pass.

After the first pass, use necessary tactics to position yourself to get a good shot on the enemy. Tactics during fighter sweeps vary according to the kind of airplane you're facing and your skill as a pilot — see the fighter descriptions above for general comments about the different enemy fighters.

If you're skilled enough, you can earn a lot of extra points during fighter sweeps by taking out targets of opportunity on the ground. Fighters come in waves, so if you wipe the first wave in short order you have time to swoop down and strafe ground targets before the next wave arrives. There is a risk inherent in this practice, though; if you return to dogfighting altitude too late, the enemy fighters will have the drop on you. Experience makes all the difference in most of these missions.

# PULL OUT KEYBOARD MAP



# COMMAND SUMMARY

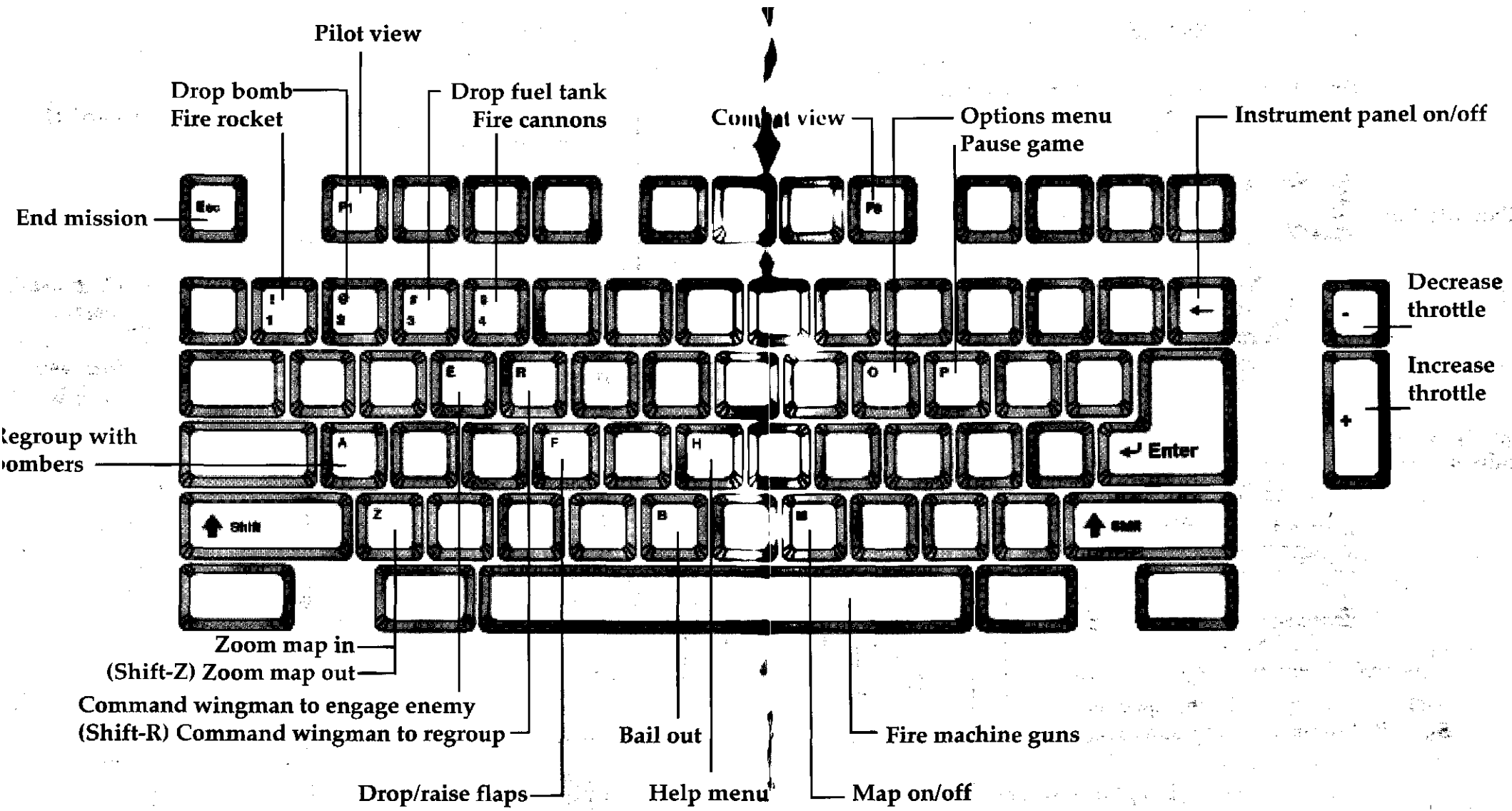
## COMMAND SUMMARY

### Flight Views

<b>F1</b>	Pilot View
<b>F2</b>	Chase Plane View
<b>F3</b>	Weapons View
<b>F4</b>	Front View
<b>F5</b>	Left View
<b>F6</b>	Right View
<b>F7</b>	Top View
<b>F8</b>	Combat View
<b>F9</b>	Over View
<b>F10</b>	Moving View
<b>Shift-F1</b>	View to Target
<b>Shift-F2</b>	View from Target
<b>Shift-F4</b>	Fly-by View
<b>Shift-F5</b>	Wing Leader Views
<b>Shift-F6</b>	Other Plane Views
<b>Shift-F7</b>	Bottom View
<b>Shift-F8</b>	Reverse Combat View

### Weapons Controls

<b>Spacebar</b>	Fire Machine Guns
<b>1</b>	Fire Rocket
<b>2</b>	Drop Bomb
<b>3</b>	Drop External Fuel Tank
<b>4</b>	Fire Cannon





**Miscellaneous**

<b>Esc</b>	End Mission
<b>H</b>	Show Help Menu
<b>O</b>	Show Options Menu
<b>P</b>	Pause Game
<b>R</b>	Show Replay
<b>M</b>	Toggle Map on/off
<b>Z</b>	Zoom Map in
<b>Shift-Z</b>	Zoom Map out
<b>T</b>	Decrease Time Factor
<b>Shift-T</b>	Increase Time Factor
<b>Ctrl-T</b>	Normal Time
<b>Ctrl-K</b>	Select Keyboard Control
<b>Ctrl-J</b>	Select Joystick Control
<b>Ctrl-C</b>	Center Joystick

**Flight Controls**

<b>A</b>	(Autopilot) Regroup With Bombers
<b>F</b>	Toggle Haps up/down
<b>E</b>	Command Wingman to Engage Nearest Enemy
<b>Shift-R</b>	Command Wingman to Regroup
<b>Backspace</b>	Toggle Cockpit on/off
<b>+</b> (keypad)	Increase Throttle
<b>-</b> (keypad)	Decrease Throttle
<b>Shift-J</b>	Pilot Eject
<b>Shift-B</b>	Pilot Eject

**BOMBER ESCORT**

The Yoxford Boys fly bomber escort missions primarily. The most important objective in a bomber escort mission is to keep the enemy from shooting down your bombers. As a rule of thumb, never stray too far from the bomber formation in pursuit of an enemy fighter.

Enemy fighters come in waves, often approaching head-on or nearly head-on. With the help of your wingman, try to take out all the fighters in the first pass. Sometimes you will miss one or more of the fighters. You wingman will always pursue an enemy (unless you command him to regroup), and it's up to you whether to help him, stay with the bombers, or pursue another enemy if one is present.

Don't let an enemy fighter take you too far away from the formation. If you're having trouble finishing off the survivors of a first pass, return to the bomber formation using autopilot and wait for them to come to you. Press the F8 key often to keep track of where enemy airplanes are.

**STRAFING RUN**

It's most important to remember to keep your flaps down and your throttle up when flying low. But watch your airspeed; pull your flaps in and lower your nose if it falls below 200 knots. Stalling this low is often fatal.

A strafing run can be easy or difficult, depending on whether or not the enemy sends up fighters to defend his territory. If there are fighters in the air, you should get rid of them first, as the low altitude required for a successful strafing run leaves you in no position to dogfight.

If there is flak in the air, you might find it wise not to hang around too long after finishing your business. Getting killed by flak is kind of a fluke, but it does happen, and the longer you fly around in it, the better chance it has of taking you out.

All weapons are useful in strafing runs. A few rounds from the machine guns can destroy the smaller targets. The cannons are good for barges, bridges, small buildings, and other medium size targets. Rockets are more powerful still, and have a long range. Bombs and drop tanks, accurately placed, will destroy major targets.

**SPECIAL WEAPONS**

This is a fantasy strafing run on the river Spree near Berlin. There is no enemy opposition, and you are encouraged to carry weapons no Yoxford Boy ever fired from a P-51. Practice flying low and aiming rockets and cannon-fire at distant targets, and see if you can guess right with your bombs. No special advice here; just use your throttle to control your speed.



## V1 INTERCEPT

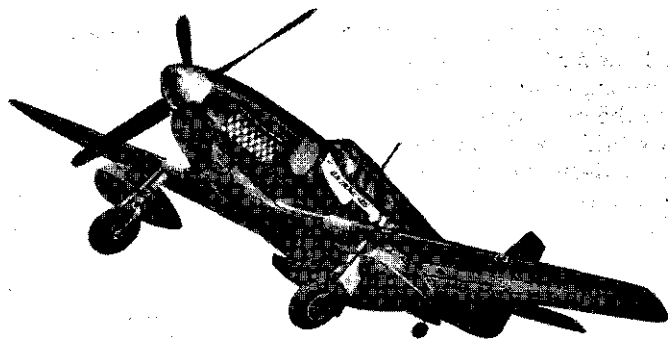
The V1 Intercept missions are among the most difficult in the simulation. Typically, the V1 won't arrive until you're well into your patrol. While you're waiting to spot it, you'd do well to drop down and strafe as many targets as you can. But don't drop your flaps here, as you will need a lot of speed climb back up when the V1 arrives.

V1s usually come from the East at 10,000 feet. It's best to be at between 10,000 and 12,000 feet before it appears. If you're still strafing when you get the message that a V1 has been sighted, drop your bombs and tanks, switch on your flight map (if it's not on), and beat it quickly up to 10,000 feet.

The P-51, not carrying any drop tanks or bombs, is slightly faster than a "buzz bomb". The best way to take out the V1 is to position yourself due west of it and then fly east, straight toward it. The buzz bomb appears on the flight map, so you can line yourself up easily, especially if you kick the time factor down to 1/2x. If you're lucky, you can take it out in a head-on pass.

If you find yourself behind the V1, make sure you drop all bombs and tanks and then jam the throttle forward. At top speed, you'll eventually catch the V1 before it explodes in a London suburb, as long as you have enough fuel.

If you're too close to take it head-on, but not yet behind it, pull back on the stick until you are inverted, roll to level yourself out, and then come in from behind at top speed.



# THE YOXFORD BOYS

Adapted from a work by Merle Olmstead of the same title

There can be no doubt that America's entrance into the European theatre during World War II hastened Germany's demise, if not thwarted Hitler's dream of global domination. For the first time in military history, "air superiority" was tantamount to victory. Whereas in the Great War legendary pilots fought many uncoordinated and largely insignificant skirmishes in the skies above the armies, the pilots,

gunners, and bombardiers in World War II manned aircraft of great speed, with the power to cause massive destruction. Gone were the days of chivalrous knights jousting for honour and glory in motorized kites, while on the battlefields below enemies and compatriots alike died by the thousands of disease, starvation, exposure, and battle wounds. Now air forces had a potent hand in ending conflicts and sparing lives. And the primary role of fighter pilots in World War II was to escort bombers safely to strategically selected targets, where the bombers would attempt to destroy the enemy's ability to make war.

When the U.S. Air Force arrived in Europe in 1942, Britain's beleaguered Royal Air Force was barely holding its own against Goering's indomitable Luftwaffe. But a few years later the Luftwaffe was so crippled that it could offer only a

token resistance to the Allies' relentless bombing runs. During the last year-and-half of the war, one fighter group of America's 8th Air Force distinguished itself as most formidable—the 357th—known to friend and foe alike as "The Yoxford Boys".

The 357th began operational training officially on December 1, 1942 at Hamilton Field on the shore of San Pablo Bay, just north of San Francisco. Four of the officers assigned early in the training period

were to remain with the Group throughout most of its existence: Major Donald Graham, Major Robert Romaine, Captain Alfred Craven, and Captain Irwin H. Dregne. Combat elements of the Group consisted of three fighter squadrons: the 362nd, 363rd, and 364th. In command of the squadrons were Major Hubert I. Egnes, Captain Stuart R. Lauler, and Captain Varian E. White, respectively. That two of the three commanders, -Egnes and White, -were combat veterans was a rare distinction indeed for the embryonic unit. The original cadre had little to work with apart from the men themselves. There were no aircraft at all, nor vehicles of any kind for that matter; and office furniture consisted of empty crates. The Group was not intended to do any flying from Hamilton Field. Nonetheless, the 357th began to take shape.

In March of 1943, the Group now

*"Gone were the  
Gone were the  
days of  
chivalrous  
chivalrous  
knights jousting  
knights jousting  
for honour and  
for honour and  
glory."  
glory."*

formed into some semblance of order, the 357th was transferred to the desolate surroundings of the Army Air Base at Tonopah, Nevada for in-flight training. It should be noted that during World War II more American pilots died (and more aircraft were lost) in training than in actual combat; and 357th's stint in Tonopah bears that out. In a one month period during June and July, there were eight training fatalities and numerous bail-outs and ground accidents. The frequency of such calamities soon decreased, and by the end of the summer the pilots and ground crews had gained the experience it would take to make a first-class fighter group.

In October, for their last phase of training before transferring to overseas for combat duty, the Group's three squadrons were separated. The 362nd went to Pocatello, Idaho, the 363rd to Ainsworth, Nebraska, and the 364th to Casper, Wyoming. It was at these three bases that the pilots learned to serve as escorts to bombers, mostly B-24s. This would be their primary function. It's important to note that such a protracted and specified training regime proved instrumental for the United States Air Force's success against the Luftwaffe. While it was important to join in the war against Hitler without adieu, it was necessary to make sure that the pilots and attendant ground-crews maintain a high level of excellence. Indeed, the Allies pressed the war to its conclusion by bombing Germany's

*"In a one month period there were eight training fatalities"*

petroleum refineries; and the Luftwaffe Command, short on fuel for training operations, sent up young, poorly-trained, though well-indoctrinated Nazi flyers to combat well-trained American fighter pilots. This fact accounts, at least in part, for the astounding success of the 357th Fighter Group in Europe.

On December 7th, trained exclusively in the now somewhat obsolete P-39, the pilots of the 357th arrived at a newly constructed airbase in Raydon Wood, County Suffolk, England. The group commander was Lt. Col. Edwin S. Chickering. Once in place, the Group was assigned to General Lewis H.

Brereton's 9th Air Force under the 700th Fighter Wing as part of the IX Fighter Command. The first North American P-51B Mustangs began to arrive a few weeks later, painted olive-drab. The Royal Air Force (RAF) had been using the American designed P-51 for some time, but for the pilots of the 357th it was a new species altogether. The Mustangs were slow in arriving, and while the pilots waited for their mounts, they took ground-school courses in aircraft identification, communications, and weather conditions.

By New Years Day, the 357th had 15 P-51Bs. The principle virtue of the B series was its improved power plant: the Packard-built Rolls Royce Merlin. These new motors offered superb high-altitude performance, something badly lacking in the Allison powered P-51A. Outfitted with two 75 gallon drop tanks, the P-

51B ensured an unprecedented radius of action, allowing bomber escort missions deep into the heart of Germany. By mid-January, at least one veteran squadron-the 354th-had used the new P-51B to full advantage. Soon the pilots of the 357th would get a chance to show their stuff.

Late in January, officers from the 358th Fighter Group arrived in Raydon Wood and announced that they were to take over the airbase. This was news to the commanders of the 357th, as they had received no official transfer orders. In a few days, the resulting confusion subsided as the orders were confirmed unequivocally by the top brass. It seemed there had been high-level debate concerning the best use of the P-51. Initially, all the P-51s were slated for the 9th Air Force to help in the upcoming invasion of occupied France; but General William E. Kepner thought they would be best used for bomber escort missions into Germany. His arguments won out, and on January 14 the RAF and AAF agreed that the majority of the P-51s would go to the 8th Air Force. Hence, the 357th swapped their base in Raydon Wood for a base 40 miles away, near a village named Yoxford just three miles from the coast of the chilly North Sea.

By February 5th, there were 74 P-51s on hand, bringing the 357th nearly to full strength, and making it the first P-51 fighter group in the 8th Air Force. On February 9th the Group, now a little more than a year old, was placed on full operational status, and its first mission was

*"The astounding success of the 357th Fighter Group in Europe"*

scheduled for two days later. The Group's first few missions were uneventful, except for one bail out over the North Sea due to mechanical failure. Lt. Robert W. Brown of the 262nd Squadron, unable to re-start his failed engine, jumped from his cockpit at 6000 feet, striking his legs on the tail group as he fell away. It was his dubious

distinction to be the first of many 357th pilots rescued by the RAF's vigilant Air Sea Rescue service. Brown contracted pneumonia from bobbing in the frigid water for 30 minutes (twice the normal survival time) with one leg broken and the other fairly

mangled. Soon after rescuers pulled him into the boat he slipped into a coma, which lasted for more than two weeks. Happily, Lt. Brown survived.

It wasn't until a change in command that the 357th saw any real action. On February 17, Lt. Col. Chickering was transferred and replaced by Col. Henry R Spicer, formerly Executive Officer with the 66th Fighter Wing. Col Spicer, sporting a fierce moustache, had risen rapidly through the ranks. A lieutenant when the war began, it took him scarcely a year and a half to become a full colonel. A consummate pilot and undaunted man's-man, Col. Spicer checked out a P-51 for the first time on February 19. The next day he flew a long combat mission to Leipzig, Germany.

Since the previous Autumn, plans had been underway to mount an all-out campaign to wipe out the German fighter force, or at least

cripple it substantially, as a prerequisite for the coming invasion of Europe. Operation ARGUMENT emerged in November 1943 as the main plan through which this goal could be achieved. The plan needed one week of clear weather for the heavy bombers to carry out a systematic series of attacks on the German aircraft factories. The

ensuing winter months afforded no such favourable conditions. Then, on February 19, 1944, word came down from the Weather Section of the USAF that clear weather over central Europe was probable for the next seven days, soon to be known by the Allied forces as "Big Week."

The operations during Big Week were directed at aircraft factories in Germany and occupied Poland. The first day of the attack was an overall success, with 941 heavy bombers dropping their loads at a cost of only 21 killed. Against modest opposition from the Luftwaffe, the pilots of the 357th claimed just two enemy fighters destroyed and two damaged on their first day of real action. Only four P-51s were damaged, all from flak.

Their next escort mission was more successful in terms of kills, with a total of seven Bf-109s brought down, including one by Col. Spicer; but the Group paid the price of two pilots. Col. Spicer claimed two more victories on February 24 on an escort mission to smash an Me-110 factory in Gotha, establishing himself as the group leader in more ways than one. On the last day of Big Week, Col. Spicer lead 47 P-51s to Regensburg,

*"Lt. Robert W. Brown jumped from his cockpit at 6000 feet, Lt. Brown survived."*

where they were scheduled to rendezvous with bombers. The unusually high number of aborts that day illustrates some of the problems often faced by airmen of this era. Two pilots turned back because their wing tanks would not feed, one for a lost wing tank, one because his prop was throwing oil, two for rough engines, and one because he misread a hand signal. The 362nd Squadron ran into all the action that day, scoring five kills and losing two pilots.

It's hard to accurately gauge the effects of Big Week's concerted attacks on German fighter production facilities, but as it marked the beginning of full-scale long range fighter escorts into Germany, it represents a turning point in the air war over Europe. Far from beaten, the Luftwaffe remained dangerous for months to come, but it was unable to respond in significant numbers to the Allied invasion four months later. Importantly for the 357th, that week marked their inauguration into the war. Untried at the beginning of the week, by week's end the group was well on its way to being a battle tested unit. It had inflicted losses on the enemy, and it had paid the price in its own losses.

On March 4, the 357th escorted one formation of 31 B-17s to Berlin. Cloud cover was heavy, and the bombardiers used radar to target their ordnance, with insignificant results. Against light fighter resistance, the 357th downed just three enemy aircraft and lost only one P-51. As a bombing run, the mission is barely worth mention; but

since it marks the first time U.S. Forces had struck the German capital, it's noteworthy in the records of the Yoxford Boys. One day later, Col. Spicer, group commander for scarcely two weeks and already very popular with the men for both his leadership skills and his airmanship, would fly his last mission. The 8th Fighter Command had called for the 357th to escort

bombers to Bordeaux, France, a very long haul to southeast corner of the country. On the whole, the mission was a success, with most of the bombers dropping their loads on target and the 357th claiming seven killed and four damaged. Col. Spicer and his wingman, Lt.

John Pugh of the 362nd Squadron, were heading back home from the battle over the target area when Spicer's P-51 was hit by flak. Spicer radioed his wingman that he intended to climb up as high as he could and ride as far as possible before bailing out. When the Mustang caught fire, the colonel bailed out and was picked up by the Germans, who sent him to a POW camp. Toward the end of the war, the colonel was sentenced to death for uncomplimentary remarks about his captors. But the sentence was never carried out, and Spicer survived the war.

That same mission to Bordeaux marked the beginning of a harrowing episode in the life of another hero of the 357th: First Officer Charles Yeager. Yeager, who had notched his first kill the previous day, was hit in a brief engagement with enemy fighters and forced to bail out.

*"One day later, Col. Spicer would fly his last mission"*

Wounded in both feet, he was picked up by the French underground and spent three weeks in several French homes recuperating from his wounds. Finally, he made it across the border into Spain on March 28, with one companion, a Lt. Patterson. Patterson was hit in the leg by a rifle round during the escape, and Yeager later received the Bronze Star for staying with his wounded fellow escapee.

Meanwhile, the untimely loss of Col. Spicer did not postpone the duties of the 357th for even a day. The mantle of command fell on the shoulders of the Deputy Commander, Lt. Col. Donald W.

Graham, and on March 6, before his promotion had been made official, Graham lead the group out on its biggest day yet. Believing that the skies would be clear, the High Command deemed it a perfect time for a visual bombing of Berlin, the German capitol being all but unscathed by previous aerial attacks. Specifically, the bombers were after the Erkner Bearing plant, the BMW engine plant, and the Bosch electrical works. But, as it turned out, the skies over Berlin were cloudy, and the 1626 tons of bombs brought by the 8th were badly scattered across the city. Being the only fighter group in the area, 48 pilots of the 357th bore the brunt of a fierce Luftwaffe resistance. When the fighting was over, they claimed 20 enemy planes destroyed and suffered no losses, by far the best showing of any fighter group that day. As it happened, a flight of five from the 264th Squadron found

themselves at treetop level near the airfield at Ulzen after downing a lone Bf-109. These five pilots took this opportunity to strafe the airfield, including several aircraft, the control tower, and a nearby locomotive for good measure. This was the 357th's first successful ground attack, unplanned as it was.

Two days later, the Yoxford boys again were assigned to escort a box of bombers to Berlin. This time the Luftwaffe put up a much weaker defense. Total claims for the day amounted to six, one of which went to Major Thomas L. Hayes. The victory, plus two earlier 109s and two Japanese planes shot down in the Pacific Theatre, made him the first ace in the Group. Hayes was one of the five pilots who had strafed the airfield at Ulzen the day before, which whetted his appetite for ground attack. He led his flight down to deck again, where he and Capt. Glendon Davis V each destroyed a locomotive on the main line west of Brandenburg.

During these early missions, some of those who would become the Group's high scorers had begun to show their ability. Lt. John England and Capt. Joseph Broadhead of the 362nd, Capt. Clarence Anderson and Lt. Donald Bochkay from the 363rd, and Lt. Richard Peterson of the 364th had all scored multiples, but none had reached the mythic pinnacle of ace. The end of the first month of operations showed claims of 59-3-17 (59 destroyed, 3 probably destroyed, and 17 damaged) in the air and 0-4-0 on the ground.

**"First Officer  
Charles Yeager  
later received  
the Bronze  
Star"**

The Group got a week's respite in March, during which pilots and ground personnel alike enjoyed the unprecedented luxuries of ample sleep and unhurried breakfasts. The vacation ended on the 16th with a mission to Munich. 42 Mustangs set out, but by the time the Group reached the rendezvous point at Stuttgart ten pilots had aborted because of mechanical problems, leaving only 32 fighters to protect the bombers. It was over Stuttgart that most of the combat took place. The 357th took on some 40 or more Messerschmitts, Focke-Wulfs and Dorniers. Beside the 357th's now

characteristically lopsided victory score over the Luftwaffe (12 kills vs 2 in this battle), most noteworthy on this day was the triple scored by Capt. Jack Warren, who single-handedly shot down two Me-110s and one Bf-109. Coupled with two previous victories, these three kills made Warren the first pilot to reach ace status with all five scores as a 35th pilot. March continued quietly, with frequent missions but little action. A few pilots increased their kill totals, a few died from severe weather conditions, and the war continued.

On March 28th, the 362nd Squadron conducted its first strafing attack on an airfield, ten miles south of Paris. While less glamorous and knightly than dogfighting, strafing runs could be just as dangerous. Airfields surrounded by automatic weapons, competently manned, saw the deaths of many fine pilots. Events

on March 29th, last mission of the month, underscored the constant threat posed by the elements. A few seconds of poor visibility and a moment of uncertainty sometimes lead to disaster in the air. Soon after takeoff, while climbing through overcast skies, two flights became mixed and Lts. Gutierrez and McGinley collided and crashed into the Channel. Air Sea Rescue units were on the scene in short order but found no survivors. To cap an already bad day, Lt. Edwin Sutton did not return for unknown reasons.

April started off very slowly. On the 8th there was a sortie with about 15 German fighters over Brunswick. Five enemy planes were shot down. The eventual leading ace of the Group, the renown Leonard "Kit" Carson, shared his first career victory that day with another flyer. Three days later, in the same familiar area, ensued one of the most spirited and violent engagements of the entire air war. The battle was so confusing that some of the many kills went unattributed. The fight started near the target area after two German spotter planes picked up the formations at the enemy coast line on the way in. As Luftwaffe fighters began to swarm around the bombers, a group of unwitting P-38s bounced the 357th while it was still in formation and carrying drop tanks. Luckily, there was no immediate harm, and the 52 Mustangs were prepared to defend their charges when 50 single-engine enemy fighters attacked from below while 8 others attempted to create a diversion

**"48 pilots of the  
357th bore the  
brunt of a fierce  
Luftwaffe  
resistance"**

by diving in from above. Instantly, the squadrons broke up into flights and elements and went after the enemy planes. As battles swirled across the skies, the still present P-38s got involved in the melees, and it quickly became apparent that P-38 pilots were operating on the theory that "if it has one engine, shoot at it!" As the air battle moved to Brunswick and on the Magdeburg, several P-51s were fired on by P-38s, including one which was busy destroying a Bf-109 that had just fired on a bomber crew descending in their parachutes. This was a good illustration of the difficulty in identifying friend or foe in the confused and rapidly changing events of aerial combat.

Later in the month, the Allies' tireless bombing of German military targets and the favourable margin of air-to-air combat victories appeared to be taking some of the bite out of the Luftwaffe. For two consecutive days in mid-April, the group escorted bombing runs to Germany without opposition. These two "free" missions, coming on the heels of some of the most intense fighting experienced by the Group thus far, had a calming effect on most of the pilots' nerves. But in every air force, regardless of uniform or nationality, there are a few pilots who thrive on the thrill of combat, and these few often extend their tours voluntarily. John England, the Group's fourth leading scorer at the end of the war, extended his tour five times, so attached was he to the exhilaration of air-combat.

To the large majority of fighter pilots, however, it was a job to be finished as soon as possible. (There was at least one man who joined the profession to impress a woman.) To most of them, a long combat mission was a grueling experience. Strapped into a seat for five to eight hours, usually with an oxygen mask rubbing the face raw, head continually on a swivel, often fighting bad weather and temperamental instruments, sweating out the flak- it was tough on the average man's nerves, even when the Luftwaffe chose not to fight. The Berlin runs continued into May with good results. The third full month of operations ended on May 9th, and it was the most successful month to date for the Group, with 73 destroyed, 3 probables, and 20 damaged. The three month air totals were 152-8-44.

By the early Spring of 1944, Allied planners had reached a decision which would have a devastating effect Germany's ability to continue the war-the "oil campaign" was about to begin. Well aware of their precariously low supply of petroleum products and of the vulnerability of oil refineries, the Nazis had long feared the coming attacks. The campaign was begun by the 15th Air Force during April, with the 8th scheduled to join in on April 21st. But continuing bad weather delayed its initial participation until May 12th. Late as it was, it was a spectacular beginning, with over 1,700 tons of bombs falling with excellent results on synthetic oil plants deep in

Germany and occupied Czechoslovakia. The Luftwaffe reacted violently and in force, inflicting heavy losses (34) on the bombers. 100 single engine fighters, in waves of about 30, tore through the bombers and then reformed for another pass. When the 357th arrived the 2nd wave of enemy fighters were attacking. In the melee that followed, ten Bf-109s and four Fw-190's were shot down. Once again, the pilots of the 357th acquitted themselves admirably, losing only two P-51s, the pilot of one surviving as a POW. Later in the the month they attacked targets in occupied Poland for the first time and shot down a few Me 410s.

The latter part of May was as full of action as the former was devoid of it. Lt. Bob Foy, who with 20 kills would end the war two kills behind Kit Carson, scored a triple on May 19th on a now familiar but seldom dull run over Berlin.

On the 21st, the 357th set out on a ride across Germany for its first "Chattanooga Choo-Choo" ground attack mission. For a change there were no bombers to watch over, as the job was to shoot up any ground targets worthy of a burst of 50 calibre ammo. The three squadrons split up North of Berlin and set out in different directions. Most of the flights encountered little or no enemy fire and merrily strafed whatever they could find: train cars, airfields, oil trucks, etc. But one group stirred up a hornet's nest at Tarnowitz Aerodrome. Ground fire was so heavy that the flight had to head back

**"This was the 357th's first successful ground attack, unplanned as it was"**

almost as soon as it arrived, and even so two pilots were killed, three P-51s were lost, and some nine or ten aircraft returned with damage.

Except for the 26th of May, the Group flew a mission every day for the remainder of the month. In addition to continuing its campaign against Nazi oil, the 8th Air Force began lending assistance to the tactical air forces in their preparation for Operation Overlord. This included attacks on Normandy's heavily fortified coastline, where airfields, com-munications and transport lines, artillery em-placements stood ready. While largely unmanned, these targets needed to be made unserviceable in preparation for the Allied invasion of German occupied France.

D-Day came on June 5th, 1944. The 357th flew eight missions that day and four the next, most without event. The Luftwaffe was all but absent from the fighting, and, as it became apparent that the tactical air forces could handle ground support on its own, help from the 8th Air Force dwindled. The Luftwaffe's limited resistance during the week following D-Day testifies to the effectiveness of both Operation Argument and Overlord. Normandy now secure, the 357th continued flying missions to France and Germany in an effort to further weaken the Nazi war machine.

After the 16th, the 357th returned to its usual escort duties. German planes were scarce for the most part, and the Luftwaffe squadrons who

**"32 of the 357th took on some 40 or more Messerschmitts, Focke-Wulfs and Dorniers"**

braved combat usually fared badly. On the 20th the Group added a new type to its list when two pilots shot down a Fieseler Fi Storch. The downing of the inferior Storch by a P-51 is indicative of how the air war was going and would continue to go for the Nazis. Four days later, Lt. Nicholas Frederick became the first 357th pilot to land at an Allied air strip in France and then fly home. Clearly, the German occupation forces were losing control.

An historic mission occurred on June 29th, when the 8th Air Force escorted 1150 B-17s and B-24s on a bombing run over Leipzig. Many pilots scored

multiple kills against the Luftwaffe, and only 17 bombers were lost—none to enemy fighters. In an enthusiastic message at the end of the day, General Kepner ("Old Man" of VIII Fighter Command, as he signed the message) commended all groups," particularly the 357th and the 361st, for the most outstanding escort job ever performed." With almost five months of combat behind it, the 357th claimed 3841/2 airplanes destroyed, all but 27 in the air. Two pilots were on the ace list, with one Clarence Anderson at the top, for now.

The Group spent the remainder of the year primarily on escort missions, which were becoming more and more routine. Due to the poorer and poorer turnout by a reeling Luftwaffe, the kills tapered off slightly; but by January of the next year the 357th had its 40th ace and held the 8th and 9th Air Force record

for the most enemy aircraft shot down in one day, with 56.5 kills on January 14. On that historic day Capt. Chester Maxwell and Lt. Raymond W. Bank scored triples, and a host of pilots scored double kills. Lt. Gen. Jimmie Doolittle, Commander of the 8th Air Force, recommended the 357th for a Distinguished Unit Citation: "You gave the Hun the most humiliating beating he has ever taken in the air. Extend my personal admiration and congratulations to each member of your command, both ground and air, for a superb victory." At the end of one year in England the Group score stood at 545 enemy aircraft destroyed in the air and 54 on the ground.

By February 1945 the Luftwaffe was dying under the steamroller of overwhelming Allied air power. It was short of everything except aircraft, the most critical shortage being aviation fuels and, as a result, the near elimination of training hours and a drastic reduction in operational flying. But contrary to the declining activity of the Luftwaffe as a whole, the frequent and aggressive attacks on the bombers by Me-262s increased markedly during March. The pilots of these jets made every effort to avoid combat with escorting fighters, concentrating instead on the bomber boxes. To counter this new threat, new escort tactics were devised: Instead of the former loose perimeter around the bomber boxes, the fighters now moved in closer to the bombers, permitting them to turn into attacking jets and drive them off

before they could break through. It was found also that the escort could not permit itself to be lured away in pursuit of the jets, because the latter, with their superior speed, were able to turn back into the bombers, leaving the slower Mustangs far behind.

On the 19th of March the Me-262s scored heavily on the B-17s, sending four of them down. Col Evans' mission report indicated 19 chutes were observed from the four bombers. But March 24th showed the return of Allied superiority, as the 357th scored 16 kills with no losses and a good number of ground targets destroyed during an area patrol over the Ruhr Valley. The 8th Air Force continued its escort and strafing missions, gradually reducing the number of functional Axis airfields.

As in many parts of the world, in mid-April there was considerable dismay at the death of President Franklin D. Roosevelt; and memorial services were held in the base chapel on the 15th. Across the Channel in Europe, Hitler's Third Reich was tottering and would soon fade into history as another dark page. With the number of airfields available to the Luftwaffe severely reduced, the remaining fields were packed with aircraft and provided lucrative targets for strafing. One was Neuruppin, about 40 miles north of Berlin, where an estimated 150 aircraft were dispersed in the woods north of the field. The 357th arrived on the scene just as the 339th Fighter Group and other assorted flights

**"Regardless of nationality, there are a few pilots who thrive on the thrill of combat"**

finished beating up the area and quickly joined in the action. Col. Dregne, the last to leave the area, reported 50-60 fires burning at that time; and claims submitted were for 23 aircraft destroyed, including a lone He 177. The description of this action gives a good picture of the state of the war in early April- an almost defenceless airdrome under attack by so many Allied fighters that the biggest danger for the P-51 pilots was collision.

In the days following, there were escort missions on the 11th, 16th and 17th of April. That day Col. Dregne led 64 P-51s to Aussig, where the bombers hit the chemical works.

The 19th of April 1945 was the last time the 357th was to fire its guns in anger, and it was to be the Group's best day against the Me-262s. It was, appropriately enough, a bomber escort to Pirma, Czechoslovakia in two formations led by Lt. Col. Jack Hayes. The Germans sent up a slew of Me-262s, but most of them avoided combat. And late in the afternoon of April 25, four Mustangs led by Lt. Ed Hyman in his "Rolla U-Bar" G4-P flew the last wartime mission of the 357th. Thirteen days later World War II in Europe also ended.

By the middle of July advance air and ground parties had left for Germany and the Army of Occupation. The move to an ex-Luftwaffe station at Neubiburg, near Munich, spelled the end of the "old" 357th. Great numbers of old-timers and officers began departing for home. Because of the lack of maintenance personnel, the number

of P-51s in commission dropped to about ten. In August 1946, the 357th Fighter Group reached the end of the line when deactivation orders became effective. The following day, the unit was redesignated the 121st Fighter Group and assigned to the Ohio National Guard. The orders concluded with the statement that the 121st was

"entitled to history, battle honours and any colours earned by unit during previous active service." The present 121st Tactical Fighter Wing, with head-quarters at Lockbourne Air Force Base, is a fully combat ready unit assigned to the Tactical air

Command.

In fifteen months of combat, the accomplishments of the 357th Fighter Group had been varied and many. It had flown 318 combat missions and had claimed 592-15-118 enemy planes in the air and 120-74 on the ground. Of the enemy planes destroyed in the air, 314 1/2 were Me 109s, 181 1/2 were FW-190s and 20 were unidentified in Group records, though most were 109s and 190s. In accomplishing these claims, 43 pilots became air aces and 9 became air/ground aces. Cold statistical figures cannot adequately picture the cost of these scores, but they do show that it wasn't easy. A total of 144 pilots were lost, either in action or through accidents, but almost half of them returned from prison camps after the war. In June 1945 there were 73 pilots known dead or still missing in action. This did not include the 13 killed in training in the States. May they all rest in peace.

**"In June 1945 there were 73 pilots known dead. May they all rest in peace."**

## APPENDIX OF AIRPLANES:

### North American P-51D Mustang

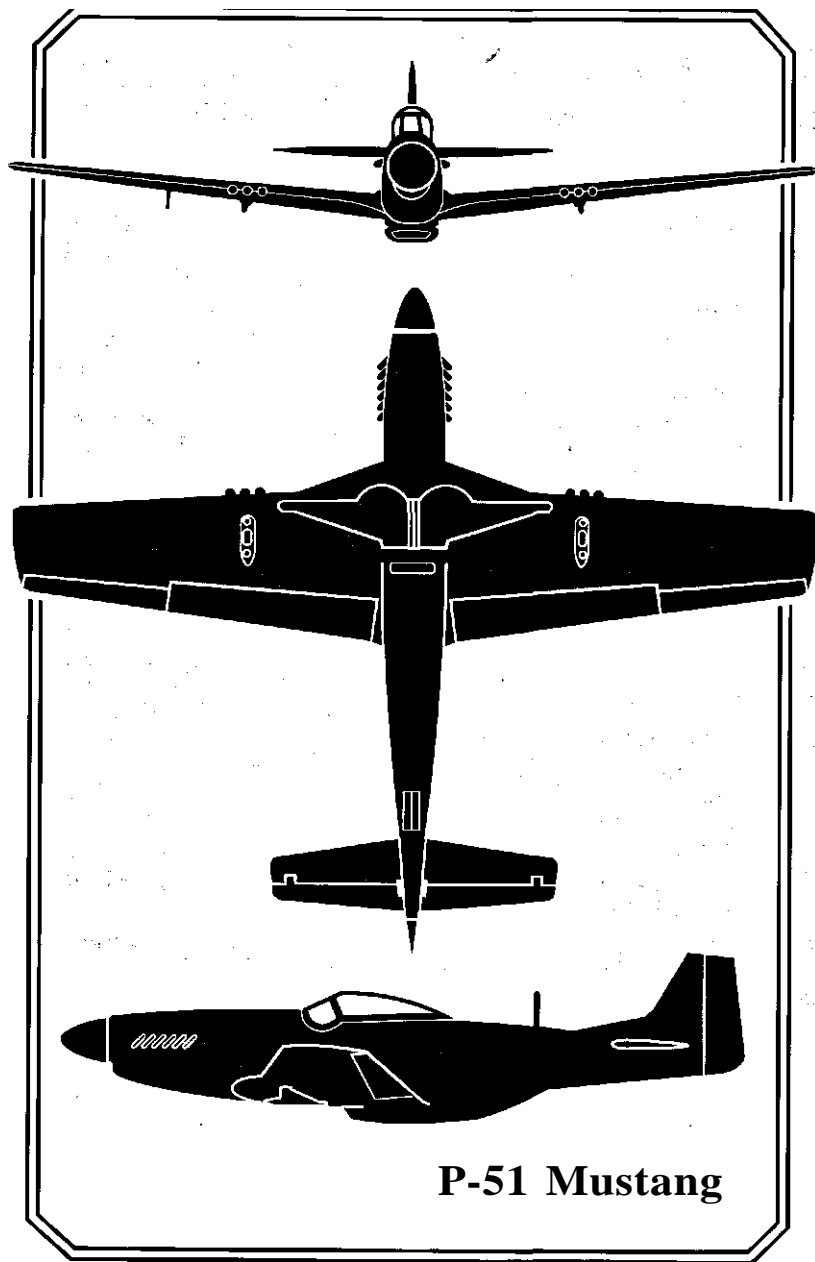
Without a doubt the most famous fighter plane of World War II, the P-51 Mustang was originally rejected by the USAAF. It was originally designed and built as a ground attack aircraft for the RAF. North American's president promised the British a fighter superior to the P-40, in spite of its being powered by the same engine. And he was able to deliver on that promise because of the P-51's revolutionary new airframe. On its first test flight the Mustang exceeded the top speed of the P-40 by a full 25 mph. The RAF got its first P-51s in November of 1941, but before North American could go ahead and sell them to the British the USAAF wanted to take a look at them. But after extensive testing by experienced combat pilots (who unanimously favoured the new fighter), the USAAF did not place an order.

The Mustang's one shortcoming lay in its Allison motor, which performed poorly at medium to high altitudes, where most air-combat took place. For this reason, the RAF outfitted its first Mustangs with cameras and used them for reconnaissance. Realizing that the superior airframe of the Mustang was being cheated of its full potential by a sub-standard motor, in November of 1942 the RAF sent five of them to Rolls-Royce to be outfitted with the best Merlin supercharged engines. Predictable as the result might have been, the airplane astonished pilots and engineers alike. The marriage had produced a plane at least 50 mph faster (440 mph), with a much swifter rate of climb and a substantially greater range. Equipped with drop-tanks, the P-51D could traverse up to 2,300 miles, making it ideal for long range escort. Its six .50 calibre machine guns made it both a formidable opponent in the air, and an effective troop and airfield strafing. Also, the Mustang could carry 2000 lbs. in bombs, and it was occasionally called upon to do so. Mainly, though, the P-51 Mustang was an awesome fighter. In the course of its service in Europe Mustang pilots destroyed nearly 9,100 enemy aircraft both in the air and on the ground—a full 49 percent of all his lost aircraft, not counting the some 230 V-1 "buzz-bombs" it shot down. So fast and agile was the fighter that it even notched several victories over Germany's first jet-aircraft. After the war, the Mustang saw duty in Korea, where it performed well until the MiGs showed up.

Specifications: *Type:* Single-seat fighter; *Power plant:* One 1,590 hp Packard-built Rolls-Royce Merlin V-1650-7 liquid-cooled engine;

*Wingspan:* 37.0 ft; *Length:* 32.2 ft; *Height:* 13.7 ft; *Weight:* 7125 lbs; *Maximum Speed:* 437 mph; *Climb:* 3,475 ft/min; *Ceiling:* 41,900 ft; *Range:* 950 to 2,300 miles;

*Armament:* Six Browning MG53-2 machine-guns in wings.



**P-51 Mustang**



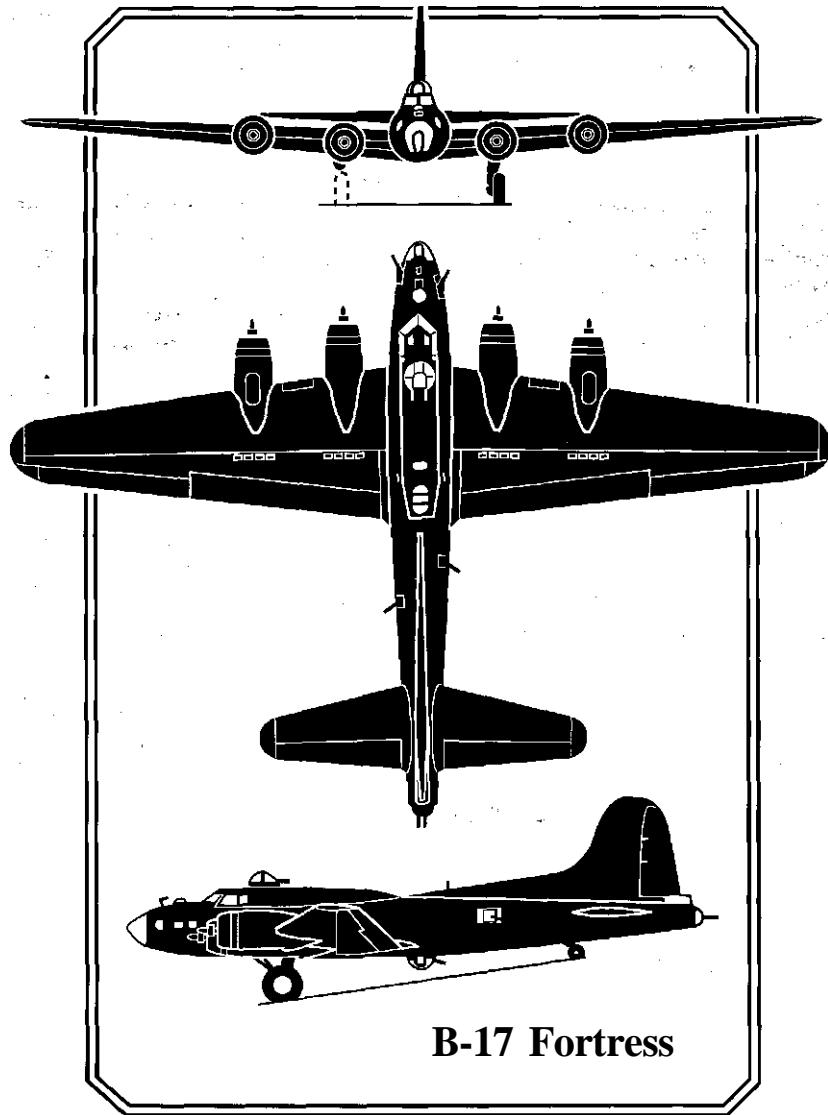
## Hoeing B-17F Flying Fortress

Originating as a private venture by Boeing, the B-17 got off to a shaky start when the prototype crashed on takeoff in military trials. But evidence showed that human error was to blame, and the USAAC placed a small order in 1936. The first B-17 powered by a turbocharged engine was the B-17B, 39 of which the USAAC took delivery of in 1938. As war became imminent in Europe, the RAF ordered 20 versions of the subsequent B-17C, which they tested and helped improve. The next two models had better armour and self-sealing gas tanks.

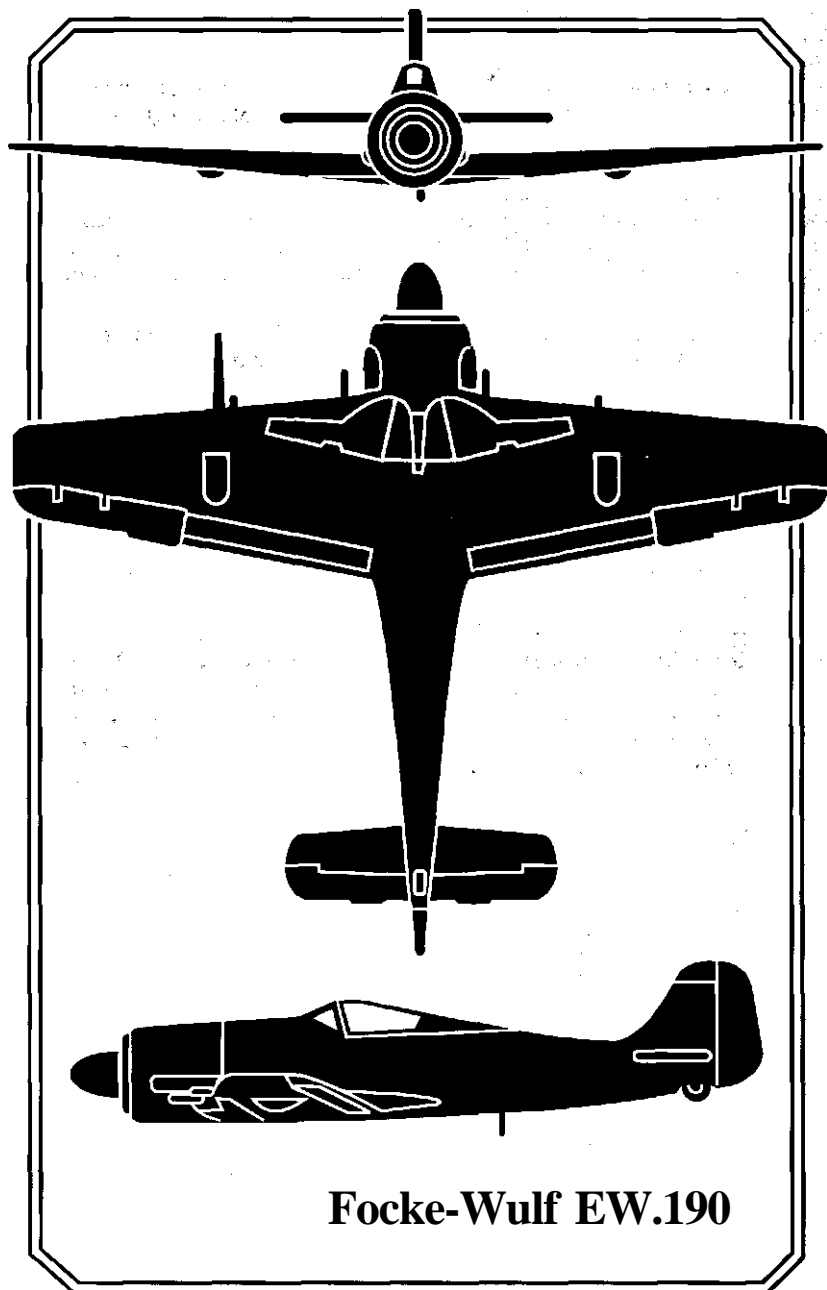
It was the B-17F that best befitted the appellation "flying fortress". It carried one .30 inch and twelve .50 inch guns positioned from nose to tail, and up to 17,600 lbs of bombs. Despite its heavily armoured airframe and wealth of defensive weaponry the B-17F suffered severe losses against the Luftwaffe fighters over Germany, where it bore the brunt of U.S. daylight bombing missions. Numerous variations on the Flying Fortress cropped up, including transports, air-sea rescue aircraft, even pilotless, radio-controlled bombers. In all, more than 12,700 B-17s were built.

*Specifications:* *Type:* High altitude bomber; *Power Plant:* Four 1,200 hp Wright R-1820-97 Cyclone nine-cylinder radials with exhaust driven turbochargers.

*Wingspan:* 103.8 ft; *Length:* 73.8 ft; *Height:* 19.1 ft; *Weight:* 31,150 lbs (loaded); *Maximum Speed:* 317 mph; *Ceiling:* 35,000 ft; *Range:* 1,100 miles; *Armament:* 13 0.50 machine-guns and 17,600 lbs in bombs.



**B-17 Fortress**



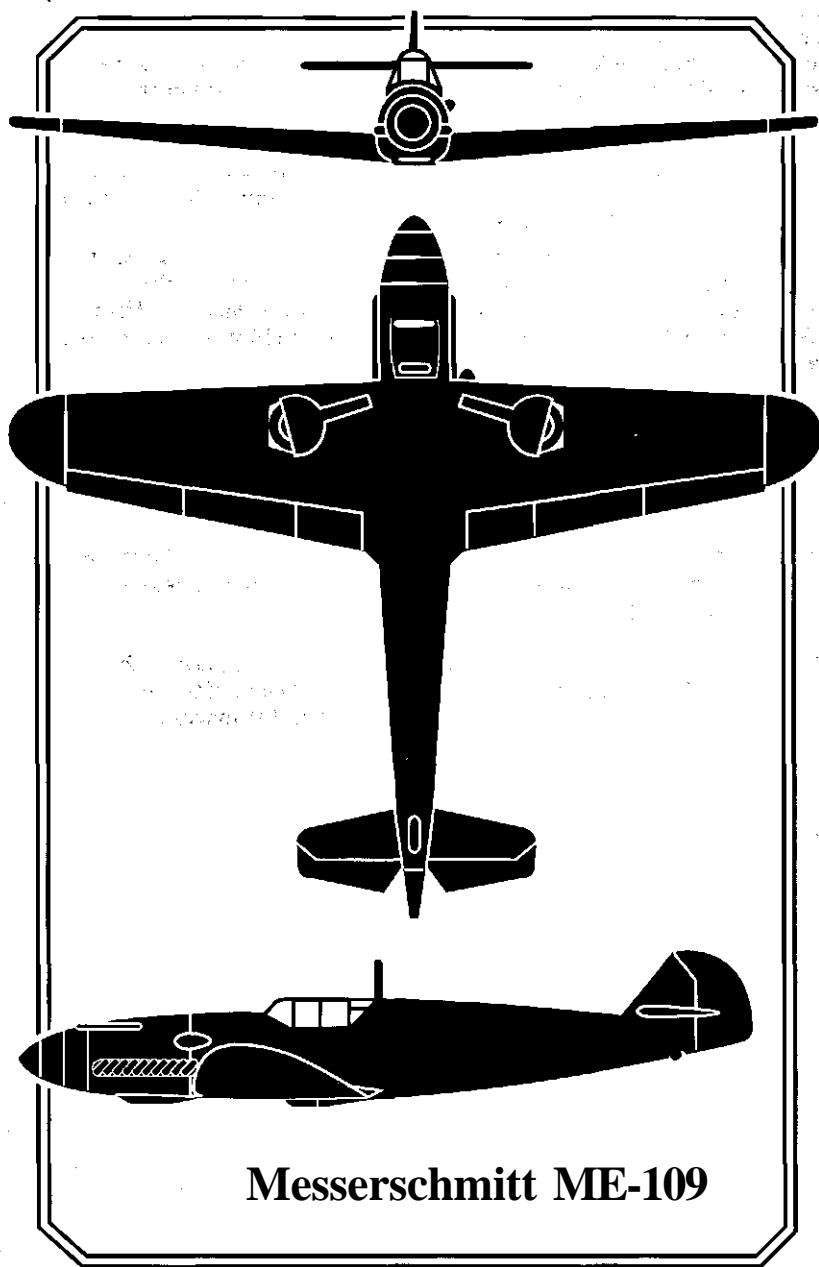
**Focke-Wulf EW.190**

### Focke-Wulf FW-190 A-8

Patterned after the Hughes racer which had broken the air-speed record in the U.S., the FW-190 was a marvel in compact design. The bulky but reliable air-cooled radial engine posed a challenge to engineers, whose task it was to reduce drag and increase manoeuvrability; and the engineer, Kurt Tank, succeeded admirably. What he and his team came up with was a very small, light-weight, all-metal fighter-bomber capable of carrying heavy armament. Indeed, it was the most heavily armed single-engined fighter of its day. Although the first 190s were in service before the war began, the RAF knew not of their presence. Their first appearance in the air-war over France in 1941 caused a great deal of alarm to the Allies. Not only was the FW-190 a far superior fighter to the Spitfire V, but it outnumbered her as well. Curiously, it never supplanted the Me-109, which it was designed to replace.

Not until the Mustang arrived on the scene did the Allies have an effective counter to the FW-190A, versions of which first appeared in June, 1941. The last version of the A-series, the 190A-8, was produced in greater numbers than any of the previous sub-types and modified to accommodate a power-booster, which could be used for ten minutes at a time at five minute intervals. The only drawback of the A-8 was its relatively poor handling at high altitudes, and for this reason it served mostly as a ground-attack aircraft. Of all the Luftwaffe's different weapons, the FW-190 in its dozens of versions had the greatest utility. It was adapted to long-range missions, to fire anti-ship weapons and 21 cm. mortars, and to a dozen other purposes. There was even a ramming sub-type outfitted with armoured leading edges. Arguably, it represented the crowning achievement of German aerial combat technology.

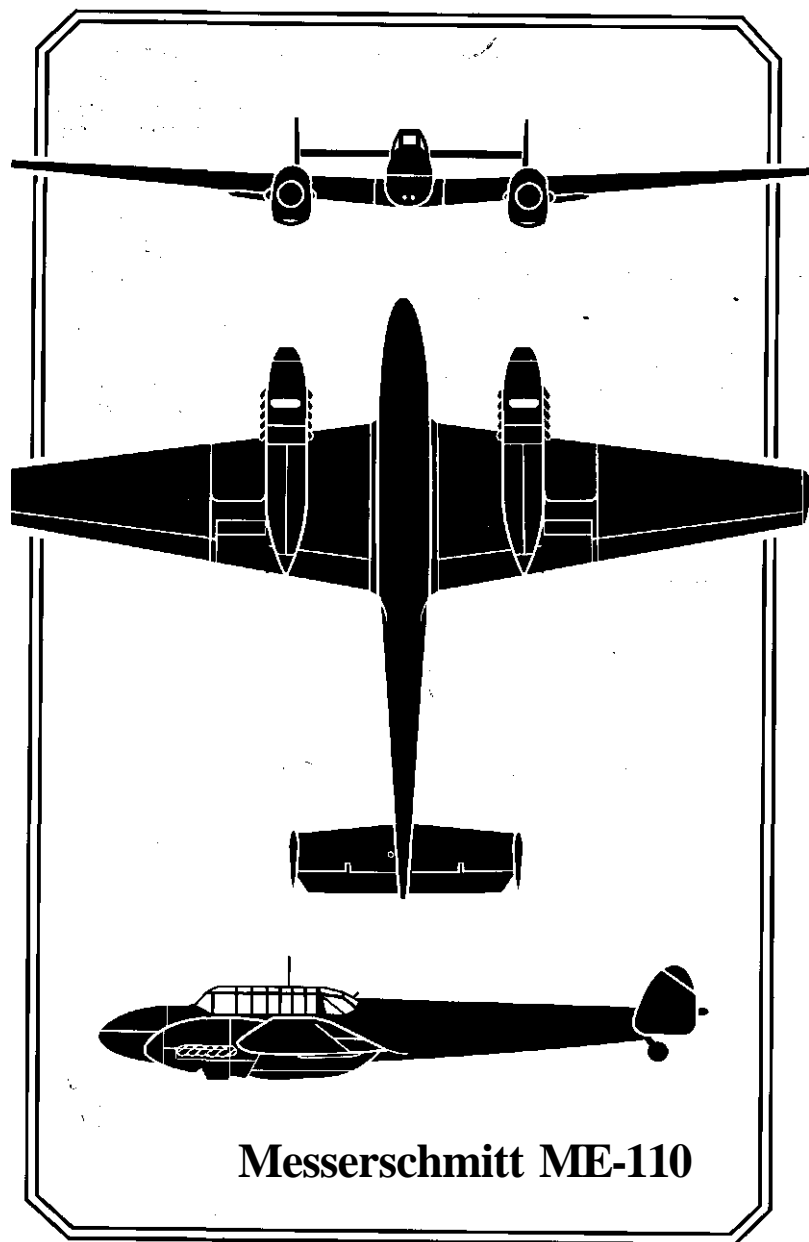
Specifications: *Type:* Single-seat fighter-bomber; *Power Plant:* One 1,700 hp BMW 801 Dg 18-cylinder two-row radial engine; *Wingspan:* 34.5 ft; *Length:* 29.0 ft; *Height:* 13.0 ft; *Weight:* 7,055 lbs; *Maximum Speed:* 408 mph; *Climb:* 2,350 ft/min; *Ceiling:* 37,400 ft; *Range:* 497 miles; *Armament:* Two 13mm MG 131 machine-guns above engine, four 20mm MG 151 /20 cannon in wings.



### Messerschmitt BM09G Gustov

By far the most important fighter in the Luftwaffe's potent arsenal, the first Bf-109 came off the line in 1935 and subsequently developed during operations in the Spanish Civil War, where 109s dominated the air. Perhaps the most advanced aircraft of its day, the Me-109 was one of the first low-wing monoplanes. The definitive 109E was ready in great numbers by the time Germany invaded France, and time and time again it showed its superiority over all of its opponents, save the Spitfire. The 109G enjoyed a fuel-injected power plant, which improved its performance greatly. As g-forces became greater, fuel-flow to the motor became more and more of a concern for pilots engaged in dogfights. Naturally, fuel-injection eliminated that problem.

An outstanding fighter in its own right, the Bf-109 occasionally carried bombs. Along with two 7.9 mm machine guns on the engine crankcase and one formidable 20 mm cannon firing through the airscrew hub, it could be made to deliver 1000 lbs. worth of payload. But it was used mainly as a fighter, and occasionally as an escort. However, as an escort for slower bombers it ran into trouble. The 109's greatest virtue was its manoeuvrability at high speeds, in the 350 mph range. At slower speeds other fighters, such as the Spitfire and the Hurricane, could out-turn it; so in a sense it was too fast to be a reliable escort. Specifications: *Type*: Single-seat fighter; *Power Plant*: One Daimler-Benz DB 605AM inverted-V-12 liquid-cooled engine rated at 1,475 horse power for take off and 1,355 h.p. at 18,700 ft.; *Wingspan*: 32.5 ft; *Length*: 29 ft; *Height*: 8.2ft; *Weight*: 5,893 lbs; *Maximum Speed*: 428 mph; *Climb*: 4,000 ft/min; *Ceiling*: 38,000 ft; *Range*: 460 miles; *Armament*: Two 13mm cannon MG-131 machine-guns above engine, one 20mm MG-151 cannon in propeller hub.



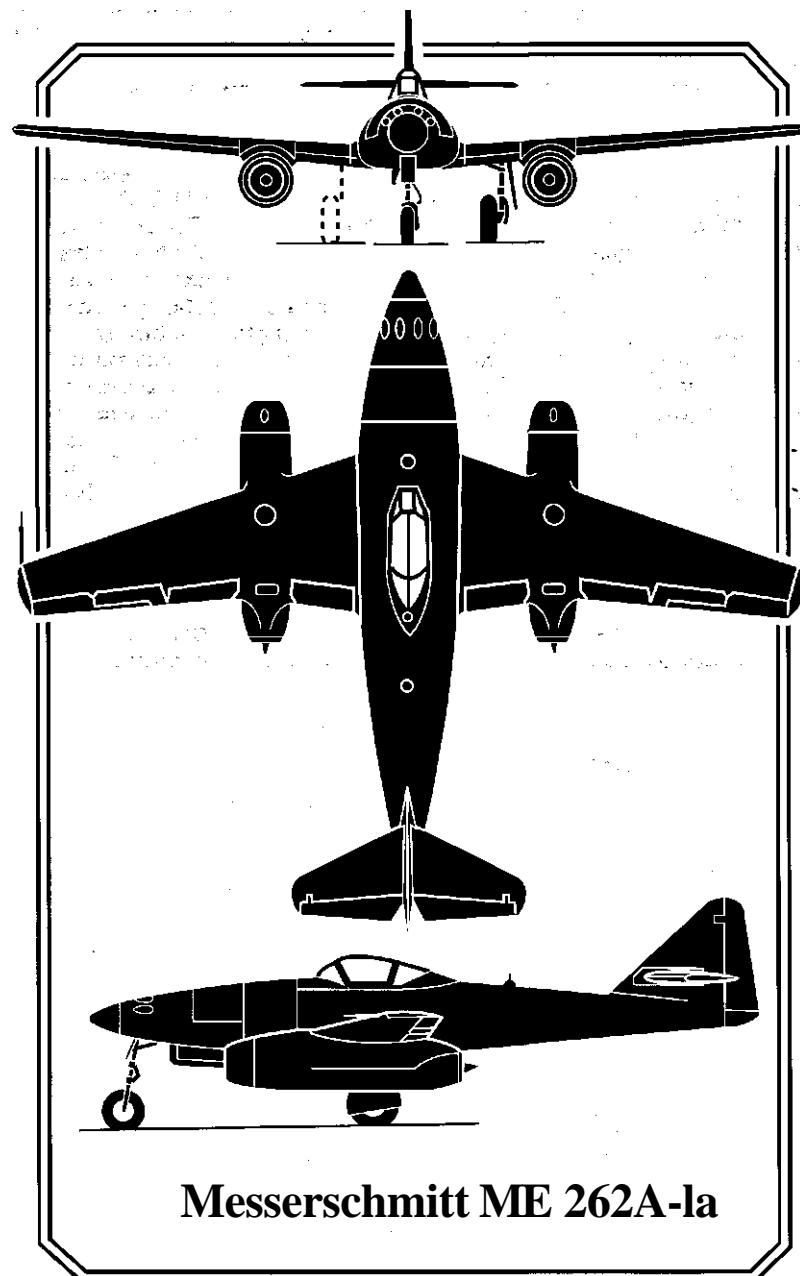
**Messerschmitt ME-110**

### **Messerschmitt Me-110G Zerstoror**

The Me-110 represented one of the best of many mostly unsuccessful attempts by various nations to answer the need for a long-range escort fighter capable of battling the smaller, single-seaters. The intention behind the Me-110 was to build .1 fast, heavily armed two- or three-seater that made up in firepower what it lost in manoeuvrability. The concept might have been sound, but no plane including the Me-110 fulfilled the theory's promise. A pilot coming up against an Me-110B had to contend with two 20 mm. nose-mounted cannons, four 8 mm nose-mounted machine guns, and one 8 mm machine gun in the rear of the cockpit. But most single-seaters could outmanoeuvre it well enough to minimize the advantage of its superior armament.

Until the Battle of Britain the Me-110 had made a good accounting of itself, but when it came up against Hurricanes and Spitfires its woeful inadequacies were immediately apparent. Before long Me-109s had to escort the M-110s which in turn escorted the bombers. Such a ridiculous state of affairs pointed up both the 110s shortcomings and the Luftwaffe's growing disorganization and ineptitude. The one area in which the Me-110G cannot be justly maligned was in its role as a night-fighter. Its powerful weaponry wreaked destruction on countless Allied bombers when their escorts were least effective.

*Specifications:* *Type:* Three-seat fighter; *Power Plant:* One 1,100 hp Daimler-Benz DB 601A engine; *Wingspan:* 53.3 ft; *Length:* 42.8 ft; *Height:* 13.7 ft; *Weight:* 4,330 lbs; *Maximum Speed:* 342 mph; *Climb:* 2,255 ft. min; *Ceiling:* 32,800 ft; *Range:* 520 miles; *Armament:* Two 30mm Mk 108 cannons, one MG 151 cannon and one 7.9mm MG 81Z twin machine gun.



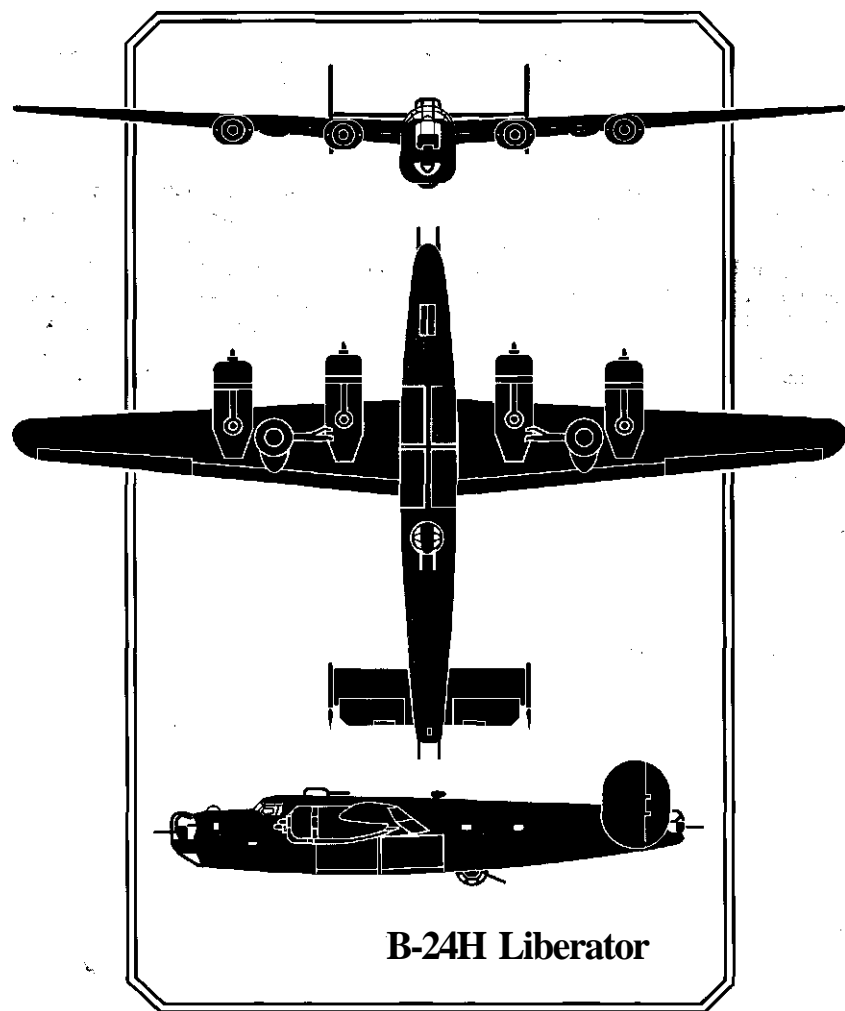
**Messerschmitt ME 262A-1a**

### Messerschmitt Me-262 Sturmvogel

Another example of bureaucratic interference and delinquency on the part of the German High Command came in its treatment of the Me-262. Hitler was obsessed with the idea of having the supreme, jet-powered bomber, when what he really needed was a fighter that could deal effectively with the myriad Allied bombers visiting daily devastation on Germany's industrial complex. Had the Sturmvogel been introduced in time and in sufficient numbers, it could well have re-taken the skies over Germany and helped prolong the war.

While Hitler undoubtedly wasted precious time insisting that the Me-262 be developed as a bomber, there were other problems which held it back, particularly in the development of a reliable turbojet engine. The project began in 1938, but the first flight-cleared turbojets did not arrive until the November, 1941, and even these proved faulty. In spite of the technological problems and a certain amount of apparent official indifference, which might have actually been political overcaution, in 1944 the Sturmvogel succeeded in being the first turbojet warplane to engage enemy aircraft. But then it was too late to make much of a difference. Its virtues were simple: superior speed and powerful armament. As an interceptor it was unparalleled. Indeed, it marked the beginning of a new age in aircraft. Fast enough at better than 540 mph to obviate the need for dogfighting, it carried four 30 mm cannons, which packed enough wallop to down the stoutest Allied bombers. Only 100 or so actually saw operations, and of these only a handful were shot down, while the rest sent down far more than 100 opposing aircraft.

Specifications: *Type:* Single-seat fighter; *Power Plant:* Two 1,980 lb thrust Junker Jumo 004B single-shaft axial turbojets; *Wingspan:* 41.0 ft; *Length:* 34.8 ft; *Height:* 12.6 ft; *Weight:* 8,820 lbs; *Maximum Speed:* 540 mph; *Climb:* 3,940 ft/min; *Ceiling:* 37,565 ft; *Range:* 652 miles; *Armament:* Four 30mm MK108 cannon in wings.



### Consolidated Vultee B-24 Liberator

The Liberator was conceived five years after the B-17 and, while inferior to the older bomber in some respects, was produced in staggering numbers. Indeed, the industrial effort behind it far exceeded that of any previous aircraft. Its performance advantages over the B-17 were marginal at best, and at top speed it was actually harder to control, posing problems for the average pilot. Still, it had a longer range than any plane of its day, being was the first to cross the mid-Atlantic gap, where schools of German U-boats lurked.

It had a distinctive design, with a slender Davis wing situated above deep bomb bays. This wing was ideal for cruising which, along with its enormous fuel capacity, accounts for its terrific range. The "Lib's" great size necessitated that its correspondingly long gears be retracted outward by electric motors. In fact, just about everything on board was operated electrically. The first versions were sent to the RAF, who deemed them unready for combat and used them to start the Atlantic Return Ferry Service. But improved defenses soon brought it into action, and by war's end more than 2,738 Liberators served US Bomber Groups in Europe and the Pacific. The B-24 saw action on every front in WWII for 15 allied nations. More versions were produced than any other plane, and total production exceeded 19,200. The accomplishments of these Liberators justified such numbers, and lent credence to its moniker.

Specifications: *Type:* Long-range bomber with normal crew of 10; *Power Plant:* Four 1,200 h.p. Pratt & Whitney R-1830-65 Twin Wasp 14-cylinder two -tow radials; *Wingspan:* 110 ft.; *Length:* 62.2 ft.; *Height:* 18 ft.; *Weight:* 37,000 lbs.; *Maximum Speed:* 290 mph; *Climb:* 900 ft/min; *Ceiling:* 28,000 ft.; *Range:* 2,200 miles; *Armament:* Ten .50 inch Browning machine guns and 8,000 lbs in bombs.

# PROBLEMS WITH THE GAME?

If you are having a problem installing or playing the game, we want to help.

First, please make sure you have read the installation and start-up section of your manual thoroughly, and make sure you have at least 1.5 megabytes free on your hard disk. If you have followed the directions in the documentation, and are still having trouble installing or operating the software, here are some hints that might help solve the problem. Before attempting any of the following suggestions, please make sure you are familiar with the DOS commands being used. Consult your DOS manual for more information.

## TSRs/Device Drivers/DOS shells

TSR stands for Terminate Stay Resident. A TSR is a program, like SideKick® that automatically executes itself when you start up your computer from a hard drive. They are generally installed in your autoexec.bat file. Device Drivers and DOS shells also are loaded automatically. They are usually installed in your config.sys file.

These TSRs or Device drivers sometimes interfere with games, or take up valuable memory the game may need, and it is generally recommended that you not run any such programs, device drivers, or shells when attempting to install or play a game.

## DOS Boot Disk

If you are having trouble installing, experiencing unusual lockups, or other problems that do not appear normal, we suggest you try starting up your system with a DOS Boot disk. Here are the steps for creating a DOS boot disk. Please follow these steps exactly.

1. To create a DOS disk you will need a blank disk the same size as your A: drive.
2. Type **C:** and press **Enter**.
3. Place the blank disk into drive A:
4. Type **FORMAT A: /s** and press **Enter**. Note: If you are formatting low density disks on a high density drive, use the following commands:  
  
5.25 inch low density disk: **FORMAT A: /s /n:9 /t:40**  
  
3.5 inch low density disk: **FORMAT A: /s/n:9/t:80**  
  
You will be prompted to insert a blank disk into drive A. Do so if you haven't. Press the Enter key when you are ready.
5. Once the disk is finished formatting you will be asked whether you wish to format another or not. Answer **N** and press **Enter**.
6. You now have a DOS boot disk. You can start your computer from this disk by inserting it into the A: drive and restarting your machine. Your computer will boot up to the A: prompt. This boot disk bypasses the autoexec.bat and config.sys on your hard drive and starts up your computer in as clean a DOS environment as possible. Try re-installing the software if you were having trouble doing so, or try starting the software from the drive and directory you installed to. If the software you are trying to run requires a sound driver or mouse driver, don't forget to execute those before starting your game.



# ABOUT THE ARTISTS



## BRIAN HILCHIE

Brian was born in 1962 in Sarnia, Ontario, though he has lived most of his life in the Ottawa area. He received a bachelors degree in mathematics and computer science from the University of Waterloo in Waterloo, Ont., as did his brother and one sister. His other sister has a degree in fine arts. While at university he lost his mind and wrote a C compiler and development system for the Commodore 64 and 128 which was sold under the names C Power by Pro-Line Software and Power C by Spinnaker. After an ill conceived attempt at a masters degree in artificial intelligence, he joined Aero Animation in Ottawa where he worked on a number of games including Thud Ridge. At Aero he met Dan Hoecke, with whom he later became a partner. In his spare time he enjoys bicycling, reading, music, and movies.

## DAN HOECKE

In 1981, Dan was managing the Graphics Department of Ottawa's Nabu Manufacturing, when he first began designing graphics for video games. He knew immediately that this was more fun than producing brochures. Soon he was designing game graphics and package artwork at Sydney Development for the Atari CVS and Colecovision Games machines. These included Colecovision conversions of Activision's "River Raid" and "Keystone Kapers". Graphics for Commodore 64 titles soon followed which included the best selling "Quest for Tires" and "Grog's Revenge", based on cartoonist Johnny Hart's "B.C." comic strip. "Quest for Tires" won Billboard's top award for best use of Graphics and Sound. Other titles followed such as "Desert Fox", "Dambusters" and several educational products, based on the "Wizard of Id" comic strip, such as "Wiztype" and "Wizmath".

Newly formed Aero Animation was Dan's next stop and here he worked on games such as "Divebomber" for Amiga, Atari and Dos computers. He met Brian Hilchie while teamed on "Thud Ridge" and in 1989 they formed Midnight Software Inc. Dan and his wife Christine have a six year old daughter, Erin, and a five year old son, Kael. They live in Nepean, just outside of Ottawa, Ontario, Canada.

