

FIRST OVER GERMANY

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Each of our games undergoes extensive playtesting prior to its release. Through this process we hope to uncover and correct any errors in programming. However, due to the complex nature of our simulations, some program errors may go undetected until after publication. In addition to errors in the program, there are occasionally problems with the disk itself. We experience the industry standard of approximately a 3 to 5% failure rate of duplicated disks. Before assuming that a disk is defective, make sure to check your disk drive. Up to 95% of the disks returned to us as defective will run fine on our computer systems. Often the problem is with a disk drive that needs servicing for alignment, speed, or cleaning.

Should you have a defective disk, please return the disk only (keep all other parts of the game) to our Customer Support Department, along with a note describing the problem you have encountered. A replacement disk will be provided upon our receipt of the defective disk.

Should you uncover an error in the program, return both your game disk and any "save game" disks to our Customer Support Department. Please enclose a description of what was taking place in the game when the error occurred. Upon correction of the program error, we will return an updated disk to you.

Always make sure to include your name, address, and daytime telephone number with any correspondence. We will do our best to see that any problems are corrected as soon as possible.

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APPLE II AND IBM COMPATIBLE COMPUTER INFORMATION:

Many of our games will work on Apple II and IBM compatible computers. Most of our games will work on an Apple II GS in the Apple II emulation mode.

If you own an Apple II GS, Apple compatible or IBM compatible computer we suggest that you consult with our Technical Hotline at (415) 964-1200 any workday between the hours of 9 a.m. and 5 p.m., Pacific Time, to see if an SSI game you're considering purchasing is compatible with your computer. If we have insufficient data to determine compatibility, you may wish to purchase the game and test for compatibility yourself. If the game proves to be incompatible, you may return it within 14 days with your dated receipt and we will refund your money. Or, if you return the game within 30 days, you may exchange the game for another.

FIRST OVER GERMANY GAME RULES

INTRODUCTION

First Over Germany is a simulation of a B-17 bomber group in World War II. The simulation covers the actual events surrounding the formation of the 306th Bomb Group, its training, transition to Thurleigh, England, and twenty five missions that a pilot might have flown at that time.

In September of 1942, 82 pilots and copilots arrived at Thurleigh, England to begin their part of the war effort. Of these men, 26 completed their tour, 20 were missing in action or prisoners of war, 25 were killed in action, 3 were evadees, 3 were sent home wounded, and 5 were transferred to other units.

Colonel John Regan (ret.) was one of the men who completed a tour of duty. He arrived at Wendover with 9 hours experience in a B-17. Then a second lieutenant just out of school, he was made an instructor pilot. He completed his tour as a Lieutenant Colonel at the age of 23.

FIRST OVER GERMANY is designed to give you a chance to play the role of a young pilot and see how you make out. To survive and prosper takes luck, but if you are a good pilot, make the right decisions, and have steel nerves, you can

cut the luck to a minimum. Your chances become better as you and your crew gain experience. Good Luck!

PLAYING FIRST OVER GERMANY

You should begin by reading through the manual, skimming if you like, to give yourself some familiarity with the game. You'll find this helpful as you proceed. When you want to start playing, the manual takes you through the game in the order of events.

Initially, you start off as a second lieutenant with only a few hours of flight experience. You must choose your crew, and then you'll learn to fly in a series of training missions. You'll learn how to take off and land your B-17 aircraft, and then how to form up in a bomber formation. Finally, you'll go on a practice bombing run. Gunnery practice is available to you before you begin your missions. During the training missions, the instructions in this manual tell you exactly what you need to do to fly the plane and get the best ratings. If you follow the instructions closely, you'll get the highest efficiency ratings and thus the best score.

The first several missions are training missions in the U.S., beginning in Utah and eventually flying to Massachusetts. When you've completed training, you'll

fly to England to take part in the war effort. Then your 25 mission tour of duty will begin, where you'll take part in bombing raids over Germany. You'll have to battle your way through enemy fighters to reach your targets, drop your bombs with precision, and then make your way home (sometimes with a damaged aircraft).

STARTING THE GAME

Copying your game: Make a copy of your game disk before beginning to play. Apple owners will have to use a bit copy program since SSI uses a non-standard DOS. If you are playing on an IBM or compatible, you may copy the game to a hard disk and play from there.

Commodore 64/128: Turn on your system (C128 owners should hold down the Commodore key when booting so as to go into C64 mode). Make sure you have a joystick plugged in to Port 2.

Place side 1 of your copy of the game disk into the disk drive. Enter LOAD "*",8 on your keyboard and press Return. When the message "READY" appears on your screen, enter RUN on your keyboard and press Return.

Apple II family: Insert side 1 of your copy of the game disk into the disk drive. If you have a caps lock key, make sure it is depressed. Turn on your system and the game will start automatically.

IBM and compatible computers: If you are playing from a floppy, insert your copy of the game into drive A. If you are playing from a hard disk, change to the directory to which you copied the game. Enter START and press return. During the play of the game, the F7 key toggles the sound on and off.

Joystick versus Keyboard: Commodore users must have a standard joystick in



The 306th Bomb Group comes into formation.



Safe but not sound; the end of a tough mission.

order to play the game. Apple and IBM users may play using either a joystick or the keyboard. If you are using the Apple keyboard, press the I key in place of pushing the joystick forward. Likewise, use the M, J, and K keys in place of moving the joystick towards you, to the left, or to the right. On the IBM, use the up arrow key in place of pushing the joystick forward, the down arrow in place of pulling it towards you, and the left and right arrow keys in place of moving the joystick in those directions. On the Apple and IBM versions, the return key functions in place of the fire button.

FIRST OVER GERMANY loads in and gives you some options:

- To start a new game, press the space bar.
- To continue a Side 2 game in progress, remove the disk and boot Side 2 of the disk using the same loading instructions you just used.
- To continue a Side 1 game in progress, press the "G" key.
- To start a new game with an old crew, press the "G" key.

The options differ slightly on the IBM version. Please follow the screen prompts to choose the desired option.

Copilot

Name	Aptitude	Experience	Stamina
Adams	6	12	5
Biggs	7	21	3
Dixon	8	55	2
Fisher	4	28	8
Stein	4	36	7
Wood	7	68	3



If you select either option 3 or 4, you are shown your current crew roster and their status. Press the space bar to move between screens. You are prompted to save the game for later; press "Y" to save the game, press "N" to continue without saving. Option 4 will take a crew which has finished side one and move it to side two.

Start a new game by pressing the space bar. First a title screen appears, followed by a cockpit screen. After a moment, you are welcomed to Wendover Field and asked to type in your name. After you type in your name, press Return.

To save a game, press "Y" when requested. The copy of the game disk should not be write protected, because the current game will be saved directly onto a game disk. If you turn the computer off at any other time it will disrupt the play of the game when you try to resume.

REPLAY OPTION

If you choose to play with the Replay option active, you will be able to replay a mission immediately after it is over. You can use this option if you did poorly on a mission, but not if you died.

CREW SELECTION

You are now asked to select your crew from the crew roster (see crew lists on the bottom of the pages). **FIRST OVER GERMANY** prompts you for the name of each crew member. Select the name you want from the roster and type in that name, then press Return.

Each crew member is described by three characteristics: Aptitude, Experience, and Stamina. Each characteristic is described below.

APTITUDE

The higher the Aptitude, the better the crewman will be at his job. This is a

constant, and does not change during the course of the game.

EXPERIENCE

This is the number of hours each man has in a related job since initial training. Experience increases as the hours increase in the simulation. This number complements Aptitude in the ability to do the job.

STAMINA

This is the amount of abuse each man can take before he has to be replaced. (All pilots start with 9.) If a man gets hurt in a crash, bails out, or is wounded, this number is reduced and will not be increased. When this number is 0, the crewman is dead or too wounded to continue, and a new man is assigned to the crew. The new man will have aptitude and stamina (assigned randomly), but his experience will start at 0.

It's important to select a crew that matches your strategy. If you are new to the game, then Stamina is the most important characteristic of the crew. If you are skilled and feel lucky, then Stamina is the least important.

Each crewman affects the mission in different ways. The different positions are described below.

COPILOT

The copilot's ability is important if you get wounded. If you are wounded, your joystick response is reduced in inverse relationship to the aptitude and experience of the copilot. This can affect the survival of the aircraft when you try to fly home and land.

BOMBARDIER

The bombardier's ability affects your score when bombing, thus affecting your efficiency ratings (and your chance to be promoted).

NAVIGATOR (GUN 1)

The navigator's ability affects the reliability of position reports when in bad weather, as well as the nose gun movement and its effectiveness.

ENGINEER (GUN 2)

The engineer's ability affects the top turret guns.

RADIO OPERATOR (GUN 5)

The radio operator's ability affects his gun.

BALL GUNNER (GUN 3)

The ball gunner's ability affects the ball turret guns.

LEFT & RIGHT WAIST GUNNER AND TAIL GUNNER (GUNS 4, 6, & 7)

Their ability affects their gunnery.

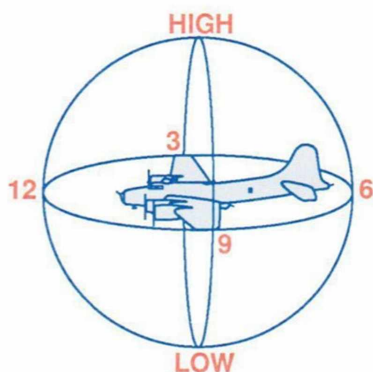
GUNNERY PRACTICE

After you select a crew, you are given the option to enter gunnery practice. Press "Y" to enter gunnery practice, or press "N" to skip gunnery practice and proceed to the first mission.

Gunnery practice gives you some familiarity with all of the different guns of the aircraft. When you enter gunnery practice, you see a cockpit view. At the bottom of the screen the various gun positions are listed, along with the corresponding number key that takes you

to that gun. Each incoming enemy aircraft (a "bogey") will be given a clock position. Refer to the following table to see which guns can fire on a bogey:

BOGEY	GUNS	BOGEY	GUNS
12	1-2-3	3	6-2-3
12 high	1-2	3 high	6-2
12 low	1-3	3 low	6-3
9	4-2-3	6	7-3
9 high	4-2	6 high	7-5
9 low	4-3	6 low	7-3



Enter the number of the gunner you want to use. The bogey will come in and attempt to fire a shot, unless you can

Bombardier

Name	Aptitude	Experience	Stamina
Buttler	6	13	6
Gibson	4	42	9
Kelsey	6	0	7
Morris	7	23	4
Owens	7	5	5
Thorup	6	14	8





Bogey at 9 o'clock!

drive it away or kill it. If you succeed in killing the bogey, it explodes in midair.

Some hints for gunnery practice: The gunner's ability to hit the target will affect your shooting, though positioning the joystick is very important. Watch your ammo consumption; shooting at a bogey with empty guns is a good way to get a low score.

Gunnery practice consists of 25 bogies; when they're all done, your score is displayed. This final score could be either positive or negative, depending on your shooting, the number of bogies shot down, and the number of times you've taken hits.

Press the space bar to continue the game after finishing gunnery practice.

WENDOVER-TRAINING

20 JUNE 1942: TAKE OFF AND LAND

The first briefing map shows the runway next to the salt flats at Wendover. The instructions tell you to take off, climb to the left to 5500 ft., slow to 155 mph, head 180 degrees, turn left to a heading of 0 degrees while setting flaps to 20 degrees and letdown to 5100 ft. Then set flaps to 40 degrees and land. When following these instructions while flying, press the space bar once at

any time to pause the program, and then you can read the instructions in the manual and press the space bar to continue.

Press the space bar and you're ready to start your takeoff.

You are lightly loaded for this flight, so your stalling speed is low, and your climb rate and air speed are fast. This screen displays your fuel, bomb load, and the target altitude (0 in this case). Press the space bar to continue.

When the runway screen appears, press the space bar and the Bombing Altitude is displayed and the game is paused. For right now, leave the game paused and let's take a look at the instrument panel in the manual.

THE INSTRUMENT PANEL

This displays most of the information you'll need to play the game. The information is continuously updated as you fly. Each part of the Instrument Panel is described below. The arrangement of the instrument panel differs slightly on the IBM, but each item is readily identifiable.

270 is pointing left. Currently, the HDG reads 0 degrees (in this simulation, all runways head 0 degrees for simplicity).

IAS: To the right of HDG is the Indicated Air Speed (IAS), which tells us the relative air speed (not how fast the ground is moving by). To know how fast we are traveling over the ground, we would have to know the air density, and how fast the wind is blowing and from what direction.

Artificial Horizon: To the right of the IAS is the Artificial Horizon indicator, which is currently displaying a white bar atop a green bar, flanked by B and P. This instrument tells us when we are turning right or left, or climbing, diving, or in level flight.

B: This tells you the amount of "bank", or turn. The maximum is 2 in either direction. When you are banking, the Horizon Indicator will show this.

P: This indicates the amount of pitch, or the attitude of the aircraft. When P is 0, the aircraft is level. When P is positive, the aircraft is climbing, and when P is negative, the aircraft is diving.

1-4 (Engine Indicators): Next are four engine indicators that indicate the current power level of the engine, from 1 (idle) to 9 (full power). The green indicators just below tell us that the engines are running normally. If this is a "+" sign, then the engine is windmilling. (The engine is not running, just turning freely, thus giving no power but causing drag.) If this occurs in flight, you would try to "feather" the bad engine, streamlining the propeller blades and reducing drag. This would give a "-" indication beneath the engine. Feather the engine by pressing the "Control" key plus the key for the engine number. Thus to feather engine 2 press "Control" and "2". On the IBM version, you need to press the "Alt" key plus the engine number to feather an engine.

X Y: Next we have X and Y. These are used for landing approaches and bombing runs. When the bomb bay doors are open, the X and Y numbers appear. The X indicates how far you are from the target drop point. The Y is used for bombing runs, and ideally should be at 0.0. If it's not, you must correct for drift until you stay on the center of the bombing track.

F: The lower left of the Instrument Display shows the Flap Indicator, now showing flaps up. When your flaps are lowered, your lift is increased and your air speed decreased. Flaps are lowered for takeoff and raised for flight. Note that flaps increase drag. Press the "F" key to lower flaps (each key press lowers the flaps 10 degrees to a maximum of 40 degrees). Flaps may only be lowered when your air speed is below 165 mph. Raise flaps by pressing the "R" key (each key press raises the flaps 10 degrees to a maximum of 40 degrees).

G: Next to it is the Landing Gear Indicator, now showing in the green (gear up is shown by white and red).

Messages: The bottom portion of the Instrument Display is devoted to messages. Normally, your game speed is shown here. Game Speed ranges from "Real Time x1" (the slowest speed, where the game is played in real time) to "Real Time x60" (the fastest speed). The fastest speed possible while banking is Real Time x4. Game speed is increased by pressing the "A" key repeatedly (or press the "Z" key to go to top speed immediately). Return to the slowest speed by pressing the fire button on the joystick. On the IBM version, press the "F1" key to return to the slowest speed.

TAKE OFF

Now let's take off. Before beginning, you should review the instructions for the flight by reading the rest of this section, so you'll know what to expect. Remember, users of the Apple and IBM versions may also use the keyboard in place of the joystick.

Press the space bar to restart the action, then press the "+" key 8 times; the power should go to 9 on all engines and the bomber will begin to roll. When the air speed is above 60 mph, press the flap key ("F") twice to give you 20 degrees of flaps. When the air speed gets above 115 mph, pull back on the joystick just enough to get a 1 on the pitch indicator. The VSI should now show a positive number; if it does, you are now flying (press the "U" key to raise the landing gear). In a few moments you will zoom out to the 10 x 10 mile screen from the 1 mile screen. The flashing black and white dot just off the end of the runway is your airplane.

When your air speed is over 145 mph, press the "R" key twice to raise your flaps to 0 degrees. Now push the joystick to the left until a 2 comes up under B (you are now turning to the left as outlined in your orders). When your altitude gets just above 5500 ft, push the joystick forward just enough to get a 0 under P, indicating that you've leveled off.

You need to see which way the clouds are moving across the screen. Let's assume that the clouds are moving from left to right. When your heading gets to 190 degrees, pull the joystick to the right to get a 0 under B to stop your turn. Why 190 degrees and not 180 degrees? Well, look at the clouds. Since they are moving left to right, this indicates that the wind is from the northwest giving us a drift to the east (to the right of the screen). To fly 180 degrees, you have to adjust for the drift by heading slightly west. If the wind is coming from the other direction you need to veer that way. Now slow the aircraft down by pressing the "-" key 4 times to bring the power down to 5 on all engines. Watch your air speed. You may have to increase one or two engines to 6 by pressing Shift 1, 2, 3, or 4 to increase power on one or more of those engines, or if you press the 1, 2, 3, or 4 key without the Shift key, it will decrease power to that engine. This will let you get exactly 155 mph as planned.

If your screen jumps to a view from the cockpit, don't be alarmed. You just flew into a cloud. Pay attention to the instruments. Soon you will break out of the cloud, since the weather is not bad this time of year in Utah.

As soon as you head south, the screen changes to the next 10 x 10 mile screen south of where the field is. Press the "V" key to zoom out to 200 x 300 miles. Your aircraft is the blinking dot in the

Engineer

Name	Aptitude	Experience	Stamina
Cooper	6	28	4
Engel	2	65	7
Hadley	4	41	5
Odom	5	31	6
Roche	3	17	9
Turner	5	14	8





Target dead ahead!

square just below the square that has the plus sign in it. (The plus indicates the Wendover Field 10 mile square.) Look 150 miles to the right and you will see Salt Lake City just on the edge of the Rocky Mountains. Press the "P" key. You will now zoom back to the 10 x 10 mile screen.

Now press the "E" key. Your current fuel reading appears. Press the "T" key and your current flying time is displayed. Press the "N" key and the navigator gives you your current position in X-Y coordinates.

Continue flying south. When you are about one-third of the way down the screen, adjust all engines to 6 power, and press the "D" key to lower the landing gear. You now see some numbers next to the X-Y on the right of the screen. The Y number indicates how many miles south you are from the field, and the X number indicates how many miles you are east or west of the approach (+ = west, - = east).

Now drop 20 degrees of flaps (if your air speed is over 165 mph, your flaps will not go down until you slow down). Now start your turn to the left. (Right

on the screen. Don't forget that when the aircraft is headed south, things are reversed as you are looking down at your aircraft and not out the windshield.) As you start your turn, push the joystick forward to get a -1 under pitch to start your let down. Do not fly into the ground. Level off at 5100 feet.

Stop the turn at 0 degrees and adjust for drift as you approach the field. (For ease of play, you can approach with $X < .5$ to $X > -.5$. This is a one mile window, but be sure to compensate for wind drift.)

After you level off at 5100 feet and get your approach on the right track, drop your flaps to 40 degrees. This slows you down and also lowers your stall speed.

Try not to go below 50 feet above ground altitude unless you are on a one mile square screen, as there is a random chance that you will hit something on the ground.

As you approach the field, start to change your heading to 0 degrees so that when you enter the one mile approach screen you are heading down



Hit by flak.

the runway and all lined up. Wind drift is less on the approach screen.

As soon as you get to the approach screen, pitch down to land. Adjust your pitch and power to land just after the approach screen changes to the runway screen. As soon as the VSI is 0 and the Altimeter is 5000 ft. bring power back to 1 and pitch back to 0 degrees. You will stop after the speed bleeds off.

After you have landed, your crew status will be displayed after you press the space bar. Your efficiency rating is displayed; 100 is the best you can get at this time.

28 JUNE 1942: TAKE OFF, FORM UP, AND LAND

Now that you're familiar with the basics of flying, the next mission trains you in the technique of forming up with a battle group.

The briefing map gives you instructions to take off and climb to the left (to an altitude of 7000 ft.), join the formation, then return and land. Once again, you should read through this section before you begin the mission.

Your efficiency rating will be judged by how fast you join the formation. As in all missions you have only a limited amount of time to join up. With this in mind, you should make a maximum climbing turn, with a decreasing rate of turn during the final stage of the turn, that will line you up with the open slot that you will enter in the formation box. The formation will be heading 90 degrees at 155 mph. To join up you must fill the vacant position at 7000 feet plus or minus 10 feet, with an air speed of not less than 145 mph and not greater than 170 mph.

(Note: You can accelerate the passage of time to 4 x real time when you are

using the 10 x 10 mile map screen by pressing the "A" key twice, and return to real time by pressing the firing button on the joystick, or the Return key on the IBM or apple. If you are on the 200 x 300 map screen you can accelerate time with the A key by 2x all the way to 60x or go immediately to 60x real time by pressing the "Z" key.)

After you are joined, you must maintain your air speed between 145 and 170 mph, or you will drop out of formation and will not be able to rejoin. If you drop out of formation by not controlling your airspeed you will lose efficiency points.

If you want to leave formation, drop your landing gear and you are automatically by yourself. You will not lose any efficiency points.

Now take off as before, but as soon as you get your landing gear up, start a maximum turn to the left. Then bring your flaps up. Stay at power 9 until you get to the desired altitude and are close to your formation. Climb at 135 mph by adjusting your pitch. After you get to a heading of 180 degrees, start reducing your pitch to increase your air speed, but keep climbing until you reach the proper altitude.

As you approach the formation, make small adjustments to your heading to line up to the open slot. It is wise to stay a few feet above 7010 ft. until you are sure that you will enter the formation at the proper speed.

After you join you can start your let down to landing approach altitude, as you guide the group back to the landing approach location of 10 miles south of the field. When you are in formation, don't forget to control your air speed to stay joined. When you want to leave the formation, just drop your landing gear.

Land as you did before. You will then see how well you did and be given your next assignment.

9 JULY 1942: BOMB PRACTICE

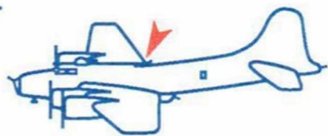
The next assignment is bombing practice. Review the instructions in this section before beginning your mission.

You will take off and join a formation as in the last mission. Then climb in formation to bombing altitude, align the formation to the target at a point 20 miles east of the target circle in the salt flats. Drop your bombs on the target, and return to land.

Now take off and join the formation as you did on the last flight. The aircraft is now loaded and will not climb as it did before. It will be slower and have a higher stalling speed. (A note on stalling: if you should get into a stall, first stop rotation by stopping the turn and flying straight. Then as airspeed comes up, pitch the nose back to P 0 to stop losing altitude.)

Radio Op

Name	Aptitude	Experience	Stamina
Alder	6	2	4
Caldwell	5	11	3
Horton	3	52	7
Martin	1	44	6
Sampson	2	37	7
Smith	4	21	8



As soon as you have joined, press the "V" key to go to the big map. Now start your climb to 20,000 ft.; when you are not banking, accelerate time to 60x to speed things up.

A perfect bomb run is 20,000 ft., air-speed at 155 mph, X = 0.0, Y = 0.0. This is not easy, but the closer you get, the better your efficiency rating.

When you are 10 or 15 miles east of the target, press the P key to zoom down to the 10 mile screen. Then open the bomb doors by pressing the 0 key. This will slow you down some, so adjust power to compensate. You will notice that you now have X and Y coordinates on your instrument panel. The X designates how far you are from the target drop point. The Y tells you how closely you are tracking the bomb run. The Y value should be on 0.0 for a perfect run. If it is not, then correct for drift until you stay on the center of the bombing track. Don't forget the wind usually comes from the northwest and it changes velocity at times. The wind can be stronger the higher you fly.

The moment you get to the target drop point (X = 0.0.), press the S key to drop your bombs. Close the bomb doors by pressing the C key. You will start to pick up speed, so pitch up to climb until you leave the target area. After you leave the target area, level off and reduce power to give you formation speed. Head for home, and start your let down to

approach altitude. Back power down so you don't run away from the formation.

Now land as you have before.

1 AUGUST 1942: FLY TO CHANUTE FIELD.

You have now finished training, and you must take your aircraft across the country as you head for battle in Europe.

Take off, form up and climb to 13,000 ft. Then fly to Chanutte Field, Illinois. A heading of 90 degrees may be OK but watch the drift. Always take notes when the briefing map is up. Your efficiency is calculated by the amount of fuel you use, so climb slowly and keep the formation speed at 155 mph. After you are past the Rocky Mountains, start a slow let down to 7000 ft. Then as you approach the Chanute runway approach, start a slow let down to landing approach altitude (1100 feet). Land at Chanute field. The field altitude is 1000 feet.

3 AUGUST 1942: FLY TO WESTOVER FIELD

Now take off and join up at 3000 feet and head for Westover Field, Massachusetts. If you have done an outstanding job so far, you may find some silver bars waiting for you at Westover.

Here you will receive a new B-17F. It is a better aircraft, and the difference may

Ball Gun

Name	Aptitude	Experience	Stamina
Barton	5	15	4
Brooks	6	23	3
Gordon	7	0	2
Newhart	1	56	9
Spalding	1	60	8
Webb	2	61	7



be noticeable when you fly it. While you are here, you will be flying sub patrol over the Atlantic Ocean, and therefore you pick up 50 more hours of experience. (The simulation will skip this part, but you'll notice that your crew has 50 more hours of experience.)

2 SEPTEMBER 1942: FLY TO GANDER EN ROUTE TO ENGLAND

Take off and join up at 2500 feet. Climb to 5500 feet and fly to Gander. Do not start your let down until you are sure you are past the mountain. Land at Gander Field (the altitude is 500 feet).

6 SEPTEMBER 1942: FLY TO PRESWICK, ENGLAND

Take off and join up at 2500 feet. Be very conservative on your fuel, as you have 2100 miles to fly. Land at Preswick (field altitude is 500 feet). Welcome to England!

11 SEPTEMBER 1942: FLY TO THURLEIGH

Take off and join up at 2500 feet and fly to Thurleigh (field altitude is 500 feet). This will be your home base for combat.

COMBAT

Now your training is complete and you are ready to begin your tour of duty. Each mission that you undertake will have a briefing screen describing the mission and the objectives, similar to the screens in the training missions.

If you fly at precisely 155 mph, there is a chance that enemy fighters will bypass you. Keep an eye on your ammo consumption. Try to use the ball guns (2 and 3), as they have a greater chance of knocking out the enemy fighters.

Your run should begin 20 miles from the target. Try to pick an approach from downwind; this lessens the chance of flak. Remember that winds tend to

be from the north and west, with a higher velocity the higher you go.

For the combat missions, there are three different map screens that you will fly on. Each one starts at Thurleigh and goes a different direction. On each of the maps there is a secondary airfield that you can land at if you are damaged or don't feel you can make Thurleigh. These airfields are Middle Wallop, Leiston, and Boxted. If you land at these other airfields you will lose efficiency.

One other thing to remember regarding combat missions is not to change altitude when over a flak town. If you do you will fall out of formation.

COMBAT MISSIONS

***Mission number:* 1**

Date:	9 Oct. 1942
Destination:	Lille, France
Altitude:	21000'
Target Type:	Industrial
Aircraft dispatched:	24
Aircraft making target:	19
Aircraft lost:	1
Aircraft damaged:	1 (scrapped after return)
Crewmen lost:	9
Crewmen wounded:	1
Notes:	This was the first mission for the 306th BG.

***Mission number:* 2**

Date:	8 Nov. 1942
Destination:	Lille, France
Altitude:	21000'
Target Type:	Industrial
Aircraft dispatched:	20
Aircraft making target:	14
Aircraft lost:	1
Aircraft damaged:	4
Crewmen lost:	11
Crewmen wounded:	2

Mission number: 3

Date: 9 Nov. 1942
Destination: St. Nazaire, France
Altitude: 7000'
Target Type: U-boat pens
Aircraft dispatched: 19
Aircraft making target: 18
Aircraft lost: 3
Aircraft damaged: 12
Crewmen lost: 33
Crewmen wounded: 0
Notes: This mission was the only time that a low altitude of 7000' feet was used.

Mission number: 4

Date: 17 Nov. 1942
Destination: St. Nazaire, France
Altitude: 21000'
Target Type: U-boat pens
Aircraft dispatched: 13
Aircraft making target: 9
Aircraft lost: 0
Aircraft damaged: 3
Crewmen lost: 1
Crewmen wounded: 3

Mission number: 5

Date: 3 Jan. 1943
Destination: St. Nazaire, France
Altitude: 23000'
Target Type: U-boat pens
Aircraft dispatched: 17
Aircraft making target: 17
Aircraft lost: 2
Aircraft damaged: 9
Crewmen lost: 20
Crewmen wounded: 3

Mission number: 6

Date: 13 Jan. 1943
Destination: Lille, France
Altitude: 23500'
Target Type: Industrial
Aircraft dispatched: 17
Aircraft making target: 14
Aircraft lost: 2
Aircraft damaged: 1
Crewmen lost: 20
Crewmen wounded: 0

Mission number: 7

Date: 27 Jan. 1943
Destination: Wilhelmshaven, Germany
Altitude: 23000'
Target Type: Naval base
Aircraft dispatched: 16
Aircraft making target: 14
Aircraft lost: 0
Aircraft damaged: 11
Crewmen lost: 0
Crewmen wounded: 0
Notes: First Over Germany: This was the first 8th BC raid over Germany.

Mission number: 8

Date: 16 Feb. 1943
Destination: St. Nazaire, France
Altitude: 22300'
Target Type: Port area
Aircraft dispatched: 20
Aircraft making target: 18
Aircraft lost: 2
Aircraft damaged: 6
Crewmen lost: 20
Crewmen wounded: 5

Mission number: 9

Date: 6 Mar. 1943
Destination: Lorient, France
Altitude: 22000'
Target Type: U-boat base
Aircraft dispatched: 21
Aircraft making target: 21
Aircraft lost: 2
Aircraft damaged: 6
Crewmen lost: 20
Crewmen wounded: 0

Mission number: 10

Date: 8 Mar. 1943
Destination: Rennes, France
Altitude: 22000'
Target Type: Marshalling yard
Aircraft dispatched: 18
Aircraft making target: 15
Aircraft lost: 1
Aircraft damaged: 4
Crewmen lost: 10
Crewmen wounded: 1

Mission number: 11

Date: 22 Mar. 1943
Destination: Wilhelmshaven, Germany
Altitude: 22000'
Target Type: U-boat yard
Aircraft dispatched: 19
Aircraft making target: 19
Aircraft lost: ?
Aircraft damaged: ?
Crewmen lost: ?
Crewmen wounded: ?
Notes: Aircraft and crew losses were not found for this mission.

Mission number: 12

Date: 5 Apr. 1943
Destination: Antwerp, Belgium
Altitude: 22900'
Target Type: Industrial area
Aircraft dispatched: 20
Aircraft making target: 16
Aircraft lost: 4
Aircraft damaged: 6
Crewmen lost: 40
Crewmen wounded: 2
Notes: A navigation error caused the wrong target to be bombed, resulting in many civilian casualties.

Mission number: 13

Date: 16 Apr. 1943
Destination: Lorient, France
Altitude: 22500'
Target Type: U-boat pens
Aircraft dispatched: 20
Aircraft making target: 12
Aircraft lost: 0
Aircraft damaged: 2
Crewmen lost: 0
Crewmen wounded: 3

Mission number: 14

Date: 17 Apr. 1943
Destination: Bremen, Germany
Altitude: 24500'
Target Type: Aviation industry
Aircraft dispatched: 26
Aircraft making target: 22
Aircraft lost: 10
Aircraft damaged: 0
Crewmen lost: 100
Crewmen wounded: 1
Notes: Crews reported that this was the heaviest opposition to date.

Mission number: 15

Date: 1 May 1943
Destination: St. Nazaire, France
Altitude: 25200'
Target Type: U-boat base
Aircraft dispatched: 18
Aircraft making target: 12
Aircraft lost: 3
Aircraft damaged: 8 (2 beyond repair)
Crewmen lost: 34
Crewmen wounded: 12

Mission number: 16

Date: 19 May, 1943
Destination: Kiel, Germany
Altitude: 23000'
Target Type: U-boat yard
Aircraft dispatched: 24
Aircraft making target: 21
Aircraft lost: 0
Aircraft damaged: 0
Crewmen lost: 0
Crewmen wounded: 1

Mission number: 17

Date: 21 May 1943
Destination: Wilhelmshaven, Germany
Altitude: 22000'
Target Type: U-boat yards
Aircraft dispatched: 21
Aircraft making target: 14
Aircraft lost: 3
Aircraft damaged: 0
Crewmen lost: 10
Crewmen wounded: 3
Notes: One plane ditched in the sea, but the crew was saved.

Mission number: 18

Date: 13 Jun. 1943
Destination: Bremen, Germany
Altitude: 25200'
Target Type: U-boat yards
Aircraft dispatched: 28
Aircraft making target: 28
Aircraft lost: 1
Aircraft damaged: 0
Crewmen lost: 10
Crewmen wounded: 3

Mission number: 19

Date: 4 Jul. 1943
Destination: Nantes, France
Altitude: 23000'
Target Type: Aviation industry
Aircraft dispatched: 27
Aircraft making target: 22
Aircraft lost: 0
Aircraft damaged: 12
Crewmen lost: 0
Crewmen wounded: 0

Mission number: 20

Date: 28 Jul. 1943
Destination: Kassel, Germany
Altitude: 26000'
Target Type: Aviation Industry
Aircraft dispatched: 24
Aircraft making target: 16
Aircraft lost: 2
Aircraft damaged: 14 (3 beyond repair)
Crewmen lost: 20
Crewmen wounded: 6

Mission number: 21

Date: 29 Jul. 1943
Destination: Kiel, Germany
Altitude: 27000'
Target Type: Ship yards
Aircraft dispatched: 18
Aircraft making target: 13
Aircraft lost: 4
Aircraft damaged: 0
Crewmen lost: 40
Crewmen wounded: 0

Mission number: 22

Date: 17 Aug. 1943
Destination: Schweinfurt, Germany
Altitude: 21000'
Target Type: Bearings Industry
Aircraft dispatched: 30
Aircraft making target: 30
Aircraft lost: 0
Aircraft damaged: 14
Crewmen lost: 0
Crewmen wounded: 0
Notes: Other groups lost 36 aircraft on this mission. The 306 BG was lucky.

Mission number: 23

Date: 23 Sep. 1943
Destination: Rennes, France
Altitude: 22000'
Target Type: Airfield
Aircraft dispatched: 18
Aircraft making target: 14
Aircraft lost: 0
Aircraft damaged: 8 (1 beyond repair)
Crewmen lost: 10
Crewmen wounded: 0

Mission number: 24

Date: 8 Oct. 1943
Destination: Bremen, Germany
Altitude: 24000'
Target Type: Industrial area
Aircraft dispatched: 20
Aircraft making target: 20
Aircraft lost: 3
Aircraft damaged: 17
Crewmen lost: 32
Crewmen wounded: 6

Mission number: 25

Date: 14 Oct. 1943
Destination: Schweinfurt, Germany
Altitude: 24000'
Target Type: Industrial area
Aircraft dispatched: 18
Aircraft making target: 5
Aircraft lost: 10
Aircraft damaged: 6
Crewmen lost: 100
Crewmen wounded: 2

EFFICIENCY POINTS

Your promotions are based on the Efficiency Points you earn during your missions. A large part of this is your bombing accuracy; the closer you are to $X = 0$, $Y = 0$, at the mission altitude with an airspeed of 155 mph, the better your rating will be. If you are not very accurate in bombing the target, you will lose EPs. If you don't think you can do at least 50% damage to the target, you will have better efficiency if you abort.

You also gain Efficiency Points for every enemy aircraft shot down, and for successfully forming up. In some of the training missions you gain EPs if you properly fulfill your mission.

You lose EPs for crashing, ditching, or bailing out, and if you fall out of formation (other than by dropping your landing gear). You also lose EPs if you use a secondary airfield.

The bombing percentage is just yours, not the groups'. So if you fall out of formation, try to complete your bombing run anyway.

Completing 25 missions with a high rank can only be done by not aborting your mission.

DAMAGE

There are 13 possible types of damage that your aircraft can sustain. They are listed below with their effects and what you can do about them.

Engine Damage: This causes an engine to stop completely. You must feather the propeller to reduce drag. Press the Control key and the number key corresponding to the engine number simultaneously to feather the engine (for instance, Control-4 to feather engine number four). On the IBM version, press the Alt key instead plus the engine number.

Fuel Leak: The aircraft is losing fuel. You can see the results of this by pressing the space bar and looking at your fuel consumption figures. Note that fuel leaks are cumulative.

Oxygen System: The aircraft's oxygen system has sustained a hit and is out of action. If this happens, take the aircraft down to under 15,000 feet altitude as quickly as possible. For every minute above 15,000 feet, the crew may lose 1 Stamina point permanently (when Stamina reaches 0, the crewman is dead).

Gun Hit: Any one of the gun positions may be hit, and is then non-functional for the rest of the flight.

Pilot Hit: You've been hit, and you may be dead or wounded. If you're just wounded, the copilot will aid you in flying the plane back to safety. The joystick response is affected in relation to the copilot's Ability and Experience.

Crew Hit: Any one of the crewmen may be wounded or killed. This will affect his function in the aircraft.

Minor Damage: The aircraft has sustained minor structural damage, causing drag. You will have to increase power to compensate for the increased drag on the aircraft. The effects of minor damage on drag are cumulative.

Landing Gear Hit: The aircraft's landing gear is damaged and will not function, which will cause a minor crash when you land. It's better to crash-land on the runway than on the countryside, so do your best to land.

Engine Lost: The engine is non-functional and cannot be feathered, creating drag.

Fire: If a fire breaks out, the crew will try to put it out. You are given a report each minute on the status of the fire. If the fire goes out of control, it might still be put out, but if it isn't, the aircraft will explode. If the aircraft explodes, some crewmen may bail out. However, it's safer to bail out before the aircraft explodes.

Left Waist Gun

Name	Aptitude	Experience	Stamina
Clark	6	0	4
Graves	3	27	6
Johnson	6	8	3
Lee	6	32	2
Piffer	1	72	8
Rand	2	45	9





Narrow escape for a lucky gunner.

Right Wing Hit: Major structural damage. If you fly faster than 170 mph, the aircraft explodes (some crewmen may be able to bail out). If you get another hit in the same place, the aircraft explodes.

Left Wing Hit: Major structural damage. If you fly faster than 170 mph, the aircraft explodes (some crewmen may be able to bail out). If you get another hit in the same place, the aircraft explodes.

Tail Hit: Major structural damage. If you fly faster than 170 mph, the aircraft explodes (some crewmen may be able to bail out). If you get another hit in the same place, the aircraft explodes.

MISCELLANEOUS COMMANDS

Lighten Load: If you wish to throw out your guns and ammo to lighten your load in an emergency, press the Shift and "L" key. Apple users must press the Ctrl key and the "L" key instead.

Bail Out: If you must bail out, then press the F8 key. Apple users must press the Esc key instead. Note that you must be at least 500 feet above ground level in order to bail out.

Abort: If you want to abort your mission, then press F2. Abort if you think you will lose the aircraft if you don't. You should also abort if you don't think you can do at least 50% damage to the target. When you abort, you will automatically drop your bombs.

FIRST OVER GERMANY:

A HISTORY OF THE 306TH BOMBARDMENT GROUP

Molding a team, finding leaders at every level, and becoming a modern bombardment group was the task confronting Lt. Col. Charles Overacker. Overacker first met the men of the newly-formed 306th bombardment group on a raw 1 March 1942 at Salt Lake City, Utah. From that place he was to take "his" men westward to the salt flats at Wendover where they would start on their quest for skill, fame, and glory—and the dreams and failures of aerial combat over Europe.

About fifty men came together for that first meeting. They were issued the very first of more than one thousand special orders that were to mold new groups of men into an effective fighting force. They were to be on the forefront of new ventures in aerial combat that had only been talked about in the classrooms of Maxwell Field. These ideas had never been tried with real men flying entirely new airplanes, and they were to be tried in a hostile sky against an enemy that increasingly found its back against the wall.

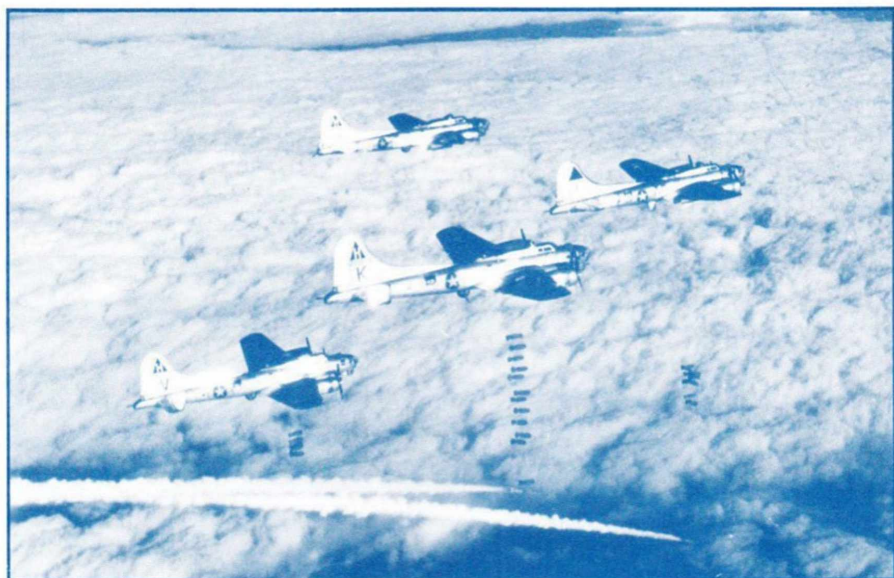
These new men of the 306th were among the first to take their B-17 aircraft to England and to test the Maxwell theories against the Luftwaffe in the skies. Further, they were to face the anti-aircraft fire of thousands of guns surrounding Nazi targets in France, Holland, Belgium, Germany, and even far off Norway and Poland.

This was a task demanding that boys and young men become warriors, that they shed many of their homespun ways, that they become dedicated to the task at hand, and that they face death on a daily basis.

First there was the task of taking pilots just out of flying school, placing them in the biggest airplane they had ever seen and then teaching them to flying it safely and in formation. At the same time, this newly-fledged pilot had to become an airplane commander, responsible not only for himself and the aircraft, but for nine other men as well. It was a task for supermen, something that most men found themselves unable to handle without undue stress. If nothing else, combat flying was stress to an infinite degree. The stress came in moments of high tension, or it arrived like a clap of thunder and remained perched on the instrument panel until the plane exploded. Success was only achieved in returning to the insular safety of the British isles.

Once the new 306th bombardment group had received its quota of men from schools and other units, and a rather minimal level of training had been achieved in the B-17s, the top brass deemed that the moment had arrived. The 306th headed for Europe, and for combat.

Increasingly, the men at Wendover had sensed that their time to move towards combat was near. By late July it



Bombs away!

was "go," whether ready or not. The commitment to the beleaguered British was that American bombardment units were to carry the battle alongside the RAF over the skies of the continent. The first B-17 units arrived in England in August, and by the end of the first week of that month it was the 306th's turn.

The 306th began its journey by flying to Westover Field, Massachusetts. There, flying training was continued and the crews were shortly given their own new F model B-17s, fresh from the assembly lines at Boeing. The pace was high speed and by the end of the month the 306th was ready for its overseas movement. Ground personnel had gone by train from Wendover to Richmond, Virginia, to New York to meet the great passenger liner, the Queen Elizabeth. Ground crews who had serviced the planes at Westover also went to New York.

By September 4, the 306th was in the air on its way to Gander, Newfoundland, from which point the jumpoff was to be made to England. On the night of September 6, 35 planes of the 306th began to take off for Prestwick, Scotland, a long way across the icy North Atlantic. En route, the plane of Lt. Robert Leahy exploded and disappeared off the coast of Greenland, the cause for the disaster never determined. Another plane had engine problems and ditched off the coast of Ireland with the crew walking ashore to safety.

The teamwork which had been practiced at first over the salt flats around Wendover became a way of life on the over-water flights as pilots and navigators, especially, began to meld their individual skills into a team approach to reach land on the "other side."

They arrived without further incident at Prestwick on the southwestern tip of Scotland, and the next day were en route south. To be exact, their destination was Thurleigh, in the Midlands, where their new base had been appropriated from the British. It was to become a part of the original first wing of the Eighth Air Force. Work had been going on feverishly, but the runways still had not been fully upgraded for the heavyweight aircraft of the USAAF fleet. Once the B-17s arrived at Thurleigh and the ground crews came in, training began all over again. Pilots had to learn the ways of British radio operation. Navigators had to learn the vagaries of navigational aids. Everyone had to learn how to behave in a new environment, and sometimes it was not easy.

Weather became an ever-present problem, something that had not been so variable in the continental air mass of the U.S. Here in Britain, however, it was an ever-changing panorama

that took pilots out in fine weather, only to have bases obscured by clouds on return. There were numerous other configurations that discouraged the fliers, confounded their commanders, and caused a near apoplexy in command centers in Washington.

Training in England had its problems, and before the first mission

could be launched, a 367th squadron plane left a formation training flight and crashed into the ground, killing everyone aboard and reducing the aircraft total to thirty-two. This incident, plus the inadequacy of base housing and numerous other frustrations, were often the cause of bitter words around the base.



It could've been worse...

Colonel Overacker and his commanders persevered with the flying training, with the discipline problems, with the lack of adequate housing and with the boredom that came from general inactivity.

All of that ended October 9, 1942, when the first formation of the 306th aircraft took to the skies en route to Lille in northeastern France. The great Cie de Fives-Lille steel plant was the first target for the group. The 306th itself was also a new target for the Luftwaffe fighter planes, which was just beginning to figure out how to attack the new, heavily armed, four-engine aircraft with the big tails.

One 306th plane did not come home, that of Capt. John Olson which went down near the target in a hall of gunfire that claimed the lives of seven of the ten fliers while still in the plane. Only the navigator, bombardier, and engineer survived, and of that threesome, the bombardier was captured. The other two men evaded capture in that area, made their way to Spain and in early 1943 returned to England. Another 306th plane was extensively damaged by flak and fighters, and although ditching in the English Channel was imminent, the crew worked together to bring it back to the great British emergency airfield at Manston on the Kent Coast. That crew survived to fly another day.

It was a blow to every man of the 306th to lose one crew and to almost lose a second. All fliers immediately took stock of what combat meant to each of them. Death was a greater

concern than it may have been earlier. As the missions wore on, the combat crewmen saw more of their friends lost over the skies of Europe or saw planes smash into English soil. It made for emotional problems for some, with chaplains and physicians as well as squadron commanders seeking to restore the luster of youth in the jaded eyes of the fliers. Because the 306th in its short term of life had become a close-knit team, losses affected the ground personnel as well. There was no escaping the impact of empty beds in the barracks, of hardstands without the graceful aircraft crouching there, of mail to be returned, effects collected and prepared for shipment to the U.S.

The late night bull sessions at the officers' and enlisted men's clubs, the quiet and desperate conversations around the barracks' stoves, now turned to thoughts of survival. From the first mission in October there was a month's hiatus until November. From that point on, planes were flying often into the jaws of death and men were being lost—dying, imprisoned, or wounded in action. Some were emotionally unable to continue flying. All of these things emptied barracks, while filling the minds of the fliers with the deadly impact of assurance that death awaited for each at the next mission. Calculations were frequent as to the staying power of the individual, as to

Right Waist Gun

Name	Aptitude	Experience	Stamina
Brown	3	63	4
Forrest	3	45	5
Healy	4	18	6
May	8	2	2
Phillips	4	11	3
Willy	3	24	7



the aircraft, and as to the missions of the Eighth Air Force. Many knew it would all come to an end within a matter of weeks or months.

Time wore on. The missions became more frequent. The losses inevitably mounted. The 367th squadron lost so many in the early days that it was dubbed the "Clay Pigeon Squadron," a name that sticks with it even today. The never-ending tales of woe were widespread. Despite the aspects of doom and gloom that hung over the group in the wintry days of 1942-43, the 306th bomb group prevailed.

Survival as a combat organization was often dependent on air discipline, the willingness of each unit to subvert itself to the good of the whole. Planes had to stay in formation in order to reach the target, to endure the onslaughts of the enemy and to return to base. The group prevailed, even though out of the initial 350 airmen of the 306th, about a quarter were killed in action, and another quarter of the original flying contingent found themselves in German prison camps for the duration. Many were surprised that 25 percent actually completed their 25 mission combat tours.

By April of 1943, the 306th was approaching a time of revival and renewal. New crews, sent to replace

combat losses, were beginning to have a significant impact in strengthening the combat organization. But much of this came to a halt on April 20, 1943 when the 24 planes that left Thurleigh were decimated by ferocious fighter attacks before reaching Bremen and ten planes were shot out of the air. This instantly produced a hundred empty beds at the base, which then had to be filled by a further commitment of replacement crews.

Fortunately, this was not a monthly occurrence, and the group was increasingly flying combat missions in which there were no losses. This always buoyed up their spirits. Great stress was continually placed on pilots and co-pilots to fly in better formation, to allow the gunners a better environment for attacking German aircraft. Little could be done to stem the heavenward blast of anti-aircraft fire, and as the war progressed, the flak increased. Eventually, with the use of long range drop tanks which followed the advent of the P-47 and P-51 in the Eighth Air Force battle groups, the impact of the Luftwaffe became less significant. It was an ever-present danger that had to be constantly addressed, but fewer and fewer planes were being lost to that adversary.

As the Americans and the RAF began to master more of the air over the continent, the military and

Tail Gun

Name	Aptitude	Experience	Stamina
Archer	4	29	5
Campbell	5	13	4
Hunter	3	72	8
Meyers	4	44	4
Reid	6	0	3
Wilker	6	16	2



civilian leadership itched to press further into the Third Reich, to reach more targets with greater tactical and strategic significance. One of the targets worthy of attention was the city of Schweinfurt. Lying 90 miles east of Frankfurt, Schweinfurt was known in the manufacturing world for its specialization in the manufacture of ball bearings. All mechanized military equipment uses ball bearings, hence an all-out attack on Schweinfurt would cripple the manufacturing of planes, tanks, trucks, etc.

In the summer of 1943, Schweinfurt was selected for special attention by the Eighth Air Force. To make it very special and to cause maximum confusion for the defending aircraft, the attack was to be a two-pronged affair. Planes of the third bomb division would take off first for Regensburg, and then fly on to bases in North Africa. The first division was to takeoff later, fly to Schweinfurt, and return back to England. The first mission was set for August 17, but the weather did not cooperate. The third division, located on the east coast, got off, but the inland area was fogged in and the first division, including the 306th, got off several hours late. The disparity of times played into the hands of the German defenders and let them assault two much smaller air groups. The disaster cost the USAAF 60 aircraft, a record for one mission.

This was later matched on the second mission to Schweinfurt on what became known as "Black Thursday," October 14. This was a very dark day for the 306th. Eighteen planes took off, three left the formation over the continent and returned home, ten were shot down before reaching the target. Five planes actually bombed the target and "staggered" on home, with the lead aircraft never to fly again.

The 306th was in combat through April 19, 1945. In its history it lost 171 aircraft to combat in 341 missions, and had 1,500 men lost in action, about half of them being killed.

Of the several thousand men who flew with the 306th and survived their combat tours, air discipline became a way of life. Formation flying was essential to World War II combat bombardment, and remains a unique segment in the history of military aviation even today. No other nation's air service has ever perfected the techniques of high altitude, formation combat aviation as did the United States in WWII. The 306th bombardment group played a significant role in this development.

APPENDIX A: KEYBOARD FUNCTIONS

Commodore Key	Apple Key	IBM Key	Function
+	+	+	Power up all four engines by 1
-	-	-	Power down all four engines by 1
1-4	1-4	1-4	Power down each engine
Shift 1-4	Shift 1-4	Shift 1-4	Power up each engine
Ctrl 1-4	Ctrl 1-4	Alt 1-4	Feather each engine
F	F	F	Flaps down 10 degrees (max 40 degrees; IAS must be less than 165 mph)
R	R	R	Flaps up 10 degrees (max 40 degrees)
U	U	U	Gear up
D	D	D	Gear down
A	A	A	Accelerate time by 2
Z	Z	Z	Accelerate time to x60
Q	Q	Q	Warning Off/On
O	O	O	Open bomb doors

Commodore Key	Apple Key	IBM Key	Function
C	C	C	Close bomb doors
S	S	S	Drop bombs
P	P	P	10 mile screen
V	V	V	200 x 300 mile screen
E	E	E	Fuel quantity
N	N	N	Navigator — gives position if no undercast; if undercast, navigator will guesstimate
Shift L	Ctrl L	Shift L	Lighten load; ejects guns and ammo (1240 lbs.)
T	T	T	Gives current time
W	W	W	Wind speed and direction
F8	Esc	F8	Bail out
B	B	B	Bombsight toggle
F2	Control A	F2	Abort
Space bar	Space bar	Space bar	Status and pause
		F7	Sound toggle

APPENDIX B: MOVEMENT FUNCTIONS

Commodore Joystick	Apple Keyboard	IBM Keyboard	Function
Fire button	Return	Return	Return time to x1
Forward	I	Up arrow	Pitch aircraft down
Backward	M	Down arrow	Pitch aircraft up
Right	K	Right arrow	Bank right
Left	J	Left arrow	Bank left

APPENDIX C: GUN POSITIONS

BOGEY	GUNS	BOGEY	GUNS
12	1-2-3	3	6-2-3
12 high	1-2	3 high	6-2
12 low	1-3	3 low	6-3
9	4-2-3	6	7-3
9 high	4-2	6 high	7-5
9 low	4-3	6 low	7-3

CREDITS

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Photographs

COURTESY OF RUSSELL STRONG

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A&A PRINTERS AND LITHOGRAPHERS

APPENDIX A: KEYBOARD FUNCTIONS

Commodore Key	Apple Key	IBM Key	Function
+	+	+	Power up all four engines by 1
-	-	-	Power down all four engines by 1
1-4	1-4	1-4	Power down each engine
Shift 1-4	Shift 1-4	Shift 1-4	Power up each engine
Ctrl 1-4	Ctrl 1-4	Alt 1-4	Feather each engine
F	F	F	Flaps down 10 degrees (max 40 degrees; IAS must be less than 165 mph)
R	R	R	Flaps up 10 degrees (max 40 degrees)
U	U	U	Gear up
D	D	D	Gear down
A	A	A	Accelerate time by 2
Z	Z	Z	Accelerate time to x60
Q	Q	Q	Warning Off/On
O	O	O	Open bomb doors

Commodore Key	Apple Key	IBM Key	Function
C	C	C	Close bomb doors
S	S	S	Drop bombs
P	P	P	10 mile screen
V	V	V	200 x 300 mile screen
E	E	E	Fuel quantity
N	N	N	Navigator — gives position if no undercast; if undercast, navigator will guesstimate
Shift L	Ctrl L	Shift L	Lighten load; ejects guns and ammo (1240 lbs.)
T	T	T	Gives current time
W	W	W	Wind speed and direction
F8	Esc	F8	Bail out
B	B	B	Bombsight toggle
F2	Control A	F2	Abort
Space bar	Space bar	Space bar	Status and pause
		F7	Sound toggle

APPENDIX B: MOVEMENT FUNCTIONS

Commodore Joystick	Apple Keyboard	IBM Keyboard	Function
Fire button	Return	Return	Return time to x1
Forward	I	Up arrow	Pitch aircraft down
Backward	M	Down arrow	Pitch aircraft up
Right	K	Right arrow	Bank right
Left	J	Left arrow	Bank left

APPENDIX C: GUN POSITIONS

BOGEY	GUNS	BOGEY	GUNS
12	1-2-3	3	6-2-3
12 high	1-2	3 high	6-2
12 low	1-3	3 low	6-3
9	4-2-3	6	7-3
9 high	4-2	6 high	7-5
9 low	4-3	6 low	7-3

Questions or Problems?

Our main business telephone number is (415) 964-1353. We also have a Technical Support Hotline number: (415) 964-1200, which you can call if you have problems with your disk or need a clarification of the game and/or rules. Both numbers can be called every workday, 9 to 5 Pacific Time.



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