Strategic Bombing in World War II Online

By,
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Proud Member of the 17th Army Air Corps and
The Famed 17th Bombardment Group

Preface

The purpose of this manual is to help players understand the how to strategic bomb in World War II Online. This course is meant to be an educational and training event as well as a review of topics for the pilot of every level who wants to try to fly strategic bombing in the game. The strategic game play in World War II online is a complex one that is ever changing. It is imperative that you have basic knowledge of flying and air combat. In order to gain a more complete understanding of the complexities and challenges of strategic bombing and its effects on the campaign the idiosyncrasies of the simulated combat environment.

The players desiring to participate in the Strategic Bombing Course should review the material covered in these lessons and then put them to the test in the training server. After the lessons, the student should accomplish all assigned practice drills and again review the material covered. Then, log into the game and make a difference in the strategic War.

The goal of the course is to prepare players to be more competitive in the online World War II environment but, as always, the focus remains on fun. World War II online is designed as an entertaining, rewarding experience and that will be the focus throughout training in this course.

Good luck to you and may your bombs find their mark many more time then your enemy's do. Happy bombing.

Acknowledgements

I wanted to begin this with a thanks and a moment of pause for all the pilots, crews, ground crews, and planners who through incredible odds and huge loses fought to free the world. Please remember those crew who paid the ultimate sacrifice, some of whom where found others who have not been found yet. To you the World War II veterans of "The Greatest Generation" I say thank you. We continue in the honor of your memory.

My experiences in strategic bombing in World War II Online have allowed me to be able to meet with some of the greatest players, some who still play and some who have moved on. Players like Davada, Tornic, Dogo, Prangs, Lerkur, CJWilson, McCully, Thomasbn, Vickery, and others in the 17th Bombardment Group who helped to teach me how to bomb in the Blenheim MK IV. when there where no factories even planned. We bombed rear towns (we could not damage them). We practiced and took a lot of opposition from our own side about how we should do more to help the ground war. We continued and when the DB-7 was finally released, after a number of delays, it was quickly followed by the addition of bomb able factory towns. With these towns, we where ready and now had targets to bomb. Players like Airborg, Charlie3, Onchas, Kizmet, Haweye5, and myself all stepped up to help the allied team see the value in strategic bombing. It has been a very long and bumpy road filled with many changes but we have met each one and

persevered. Their influence of this work and the experiences, I have had with many of the players listed above, cannot be overemphasized.

When you talk about strategic bombing you cannot forget the "little friends". Fighter escort is necessary for bomber groups. Pilots like Trukk, Tango, Talon, DocVoodo (Doc357th in game now), Trimcz, Apache25 and many others helped the bomber groups to make it back in one piece.

We cannot forget the developers at CRS; Doc who takes has/will/ and continues to put up with a lot from a minority of the player base.

In addition, the author would like to thank all of the members of 17th Bombardment Group and its trainers, past and present. All have contributed in some fashion.

Any errors, omissions, or other nonsense is completely my fault.

Jcritter

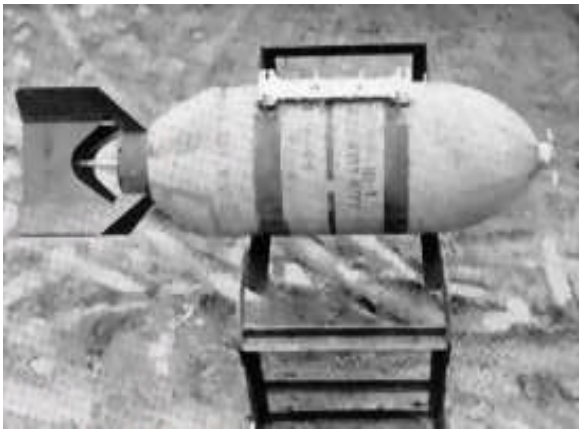
Table of Contents

Chapter 1: Strategic Bombing

A snap shot of Strategic Bombing

What is Strategic Bombing in World War II online? Strategic bombing during the real war was and still to this day is defined as; a military stratagem used in a total war style campaign that attempts to destroy the ability of a nation-state to wage war. Strategic bombing is a systematically organized and executed attack from the air. Strategic bombing is different from tactical bombing because it requires organized attack against pre-determined targets strategic of strategic value. The main distinction between tactical bombing and strategic bombing is Strategic bombing usually attack targets such as factories & bridges in the game (hopefully soon the addition of railroad targets & oil refineries not yet developed but on the developers drawing board). While tactical bombing missions attack targets such as areas of troops, concentrations like firebases and army bases, as well as armor and airfield targets. Strategic bombing during the Second World War was unlike anything the world had seen before or since then. There is still great controversy over the true success of the real strategic bombing campaign.

> ***"The fighters are our salvation, but the bombers alone provide the means of victory"*** Sir Winston Churchill, 3 September, 1940



The campaigns conducted in Europe, and near the end of the war in Japan, involved thousands of aircraft dropping tens of thousands of tons of ammunition over a single city. In these attack the vast majority of German cities where reduced to hollow walls and piles of ruble. In the air attack conducted by the USAAF and RAF 2,700,00 tons (5,400,000,000 pounds or 2,454,545,454

kilograms) of bombs or of bombs were dropped, in more than 1,440,00 bomber sorties and 2,680,000 escort fighter sorties were flown to protect the bombers. The USAAF number of causalities were 79,265 men lost their lives and 18,000 aircraft were destroyed or damaged beyond repair. The RAF number of causalities were 79,281 men lost their lives and 22,000 aircraft were destroyed or damaged beyond repair. *(Reference: The United States Strategic Bombing Survey Summary Report, September 30, 1945)*

Types of Strategic Bombing Strikes

Strategic bombing in World War II online can be accomplished with three main types of attacks. The first type is carpet-bombing also called level bombing by many players. In this type of attack your bomber along with others in the group fly above the anti-aircraft flak guns range (4-6km 13,000- 20,000ft) and all the bombers in the group drop at the same time when the lead bombardiers issues the drop command. This is the hardest type to learn but once mastered it can be very successful with minimal loss of aircraft and crews while maximizing the amount of damage to the target and around the target. This type of Strike is usually done as a drop "On command type of drop" meaning that when the lead bombardier says to drop then all planes drop at that moment. For well-trained groups that are able to keep a very tight formation each plane can use a "drop on your own Strike". Each bombardier has to ensure their line up is correct and then drops when they are in the correct position over target. The benefit of this type of strike is it keeps the group in a tight formation at high altitudes. Egress of the group as a whole is easier to stay in formation and your fighter escort have much easier time protecting you. This is the most important benefit here. The easier it is for your fighter escort to watch the group the more it frees them up to do what they came to do. Keep the enemy fighters off the bombers. The key point and most critical time is the line up of the lead bombardier and maintaining focus on your target until all bombs are away. This is why you have fighter escort let them keep the enemy fighters busy. Once your bombs are away then your tail gunners can make them think twice before approaching the group and pilots can work to tighten up and take the formation home.

The second and third types of strategic strikes are similar to one another. These types of strikes are glide bombing and dive bombing while these two methods are can be very accurate they can be much more costly in numbers of aircraft lost. These two types of strikes require you to take you bomber well with in the kill zone of the enemy anti aircraft flak guns. A glide bombing is descending on a 45-degree angle to your target with bomb release at about 1,000-2,000 feet. This put your plane at a high rate of speed but again it puts you well in the kill range of the enemy flak guns. The dive-bombing attack is a 90 degree dive right on the target (your plane must have a dive break to do this or you will never be able to pull out or drop your bombs). In the dive-bombing attack, you will release your bombs between 2,000 ft and 4,000ft. These altitudes vary on the pilot's choice. The glide and dive bombing use a drop on your own type of drop. This means that each pilot drops when he/she is lined up on target and decided to drop.

Strategic Bombing in the game

This information was provided by "Doc" Geof Rey Evans (from CRS the developers of the game).

A factory will produce resource points towards the completion of an equipment production cycle at a set rate. When that cycle is completed (100%) the equipment is ready and added to your equipment (spawn) lists. The equipment can be a new weapon introduced, raised production levels for current equipment you are already using ... or a combination of both which is normal.

When you bomb a factory, it's output is reduced. It will show it's status as "producing" and will not look visibly damaged in game at this point. The factory continues to reduce output the further damage it takes, until it hits 80% damage, where it stops producing altogether, and in game will now appear destroyed, graphically speaking. It now shows 0% output. It will be listed as "under repairs" now until it recovers back to an 80% health state.

When a factory is damaged enough its production is reduced (it is at 80% damage) and appears destroyed, you can still bomb it and take it all the way to threshold amount of damage, as this will mean it has to recover another 20% more than if you had stopped when it reached 80% damaged and is destroyed looking in game, graphically speaking. This means a longer recovery time to begin producing again.

Only when a factory repairs itself to 80% after being "under repairs" does the process start all over again and it is no longer "under repairs". If it never reaches 100% recovery it is easier to keep "under repairs" and overall output kept low or non-

existant.

Each town has several facories with the exception of Monchen-Gladbach, which has only 1. Factory output for a country expressed as a percentage of capacity is measuring combined damage/output for all factroies, not just a single facility. All "factory towns" have 3 factories except Dusseldorf (4) Koln (4) and Monchen-Gladbach which has only 1.

It sounds more confusing than it is, because a factory that is at 100% health or repairs back to 80% will always produce until you bomb it to 80% damaged to stop it again. If left alone it must repair to 80% health (20% damage) to begin producing again. If it is damaged but not to 80% damage, and repairs but not to 20% before being damaged again, it is going to produce. As long as it is between 80% damage and 20% damage it can produce, provided it was never stopped to 0% at some point. Being at 100% health allows it to "reset" and begin the process all over again.

Once reset (or as they are at campaign start, ie: all are reset) the target for bombers is to achieve 80%->100% damage, then the "repair cycle" starts and is much harder for the factory to recover from, you can keep it down forever if it never recovers it's 80% back and as long as it never reaches 100% it cannot reset, once reset it is harder to stop it producing.

Basically there are two states, "reset" and "destroyed" and each controls what it can do in either state. Once you take a factory from its "reset" state to its "destroyed" state you need to try to prevent it resetting again, as when it does, they become harder to stop producing.

Appearance (graphically) in game is much simpler ... UP = reset and not yet bombed to 80% damage, DESTROYED = has been reduced to 80% damaged and not yet recovered to 80% health. UP can also mean it has recovered to 80% health (or 20% damage) and is or will be fully recovered (ie: resets itself) if not bombed again before it can reach that point.

Thus bombing an already destroyed looking factory is going to help keep it down, but if there is an undestroyed looking one at that town (ie: UP state) obviously you need to hit that one if you need to make a choice.

A factory will begin producing once recovered to 80% health (20% damaged) but won't reset until it regains 100% health back.

Geof Rey Evans
Producer/CRS

Here's the raw data: (or as well as I can put it together in such short time)

Axis = 9 factories Axis He111 sc250 = 564Mj Qty = 8 15 planes / 4.5 hours 4 deployments	Allies = 18 factories French Db7 f100 = 225Mj Qty = 8 15 planes / 4.5 hours 4 deployments	8 French & 8 British British Havoc gp250 = 146Mj Qty = 8 15 planes / 4.5 hours 4 deployments

So the question is how many joules per hour per target can each side deliever

(number of bombs x joules per bombs x planes x deployments) / hours / targets

Allies: ((8 x 225000000 x 15 x 4 / 3) + (8 x 146000000 x 15 x 4 / 3)) / 9 = (36000000000 + 23480000000) / 9 = 6608888888 j/t/h
Axis: 8 x 564250000 x 15 x 4 / 3 / 18 = 5015555555 j/t/h

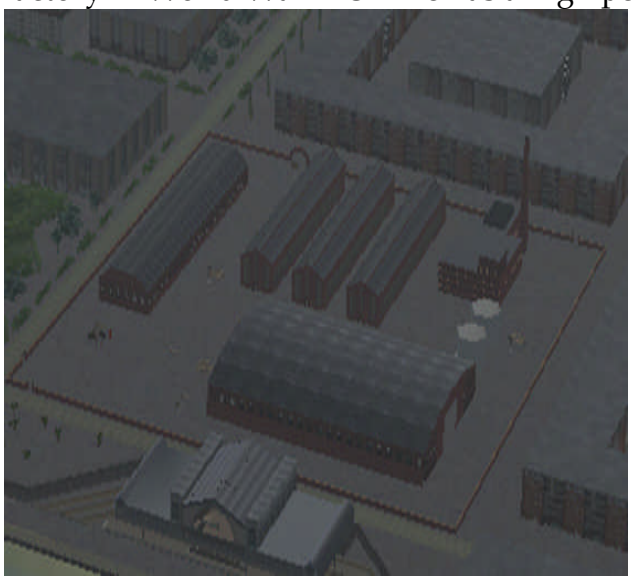
The factory numbers are currently:
Threshold values and damage required to destroy a factory

Threshold: 20000000 Maximum damage level: 10000000000 Rps to repair: 10000000 Rps repaired per 10 minutes: 150000	To destroy a factory it takes: 10000000000/564000000 = 17.7 sc250he = 2.2 he111 10000000000/225000000 = 44.5 f100 = 5.5 db7 10000000000/146000000 = 68.5 gp250 = 8.5 havoc

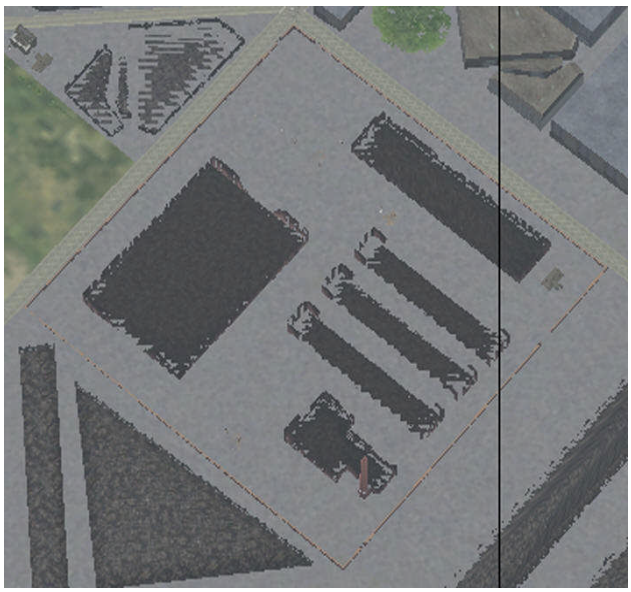
Factories rebuild in about 14 hours from fully destroyed. Factories can not be completely destroyed the will produce at a reduced rate of production no matter how much you bomb.

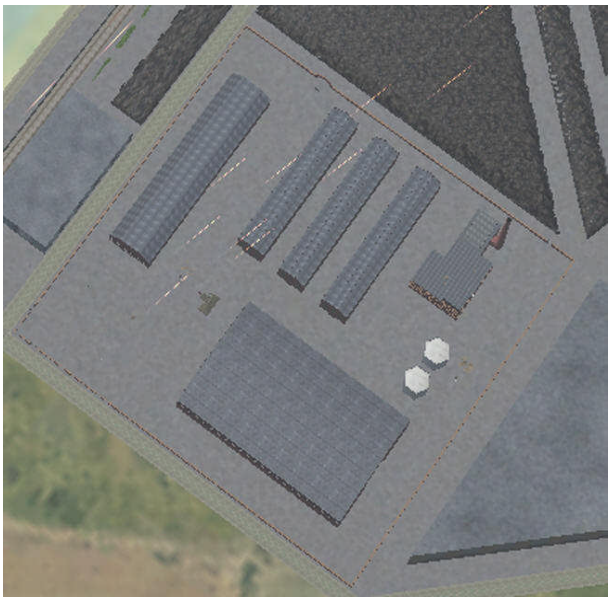
Understanding Factories

W e have been talking about factories for some time so now let's take a more in-depth look into the factories them selves in game. The factories in game all look the same no matter what city they are in or which side you are flying for at the time. A factory in World War II Online has a high perimeter wall around the complex with



seven building and two oil tanks in side of it side by side. Other buildings inside the complex are a large machine factory, a long narrow looking machine shop, three-storage building (all lined up), the factory checkpoint, and the factory smoke stack. **Any bombs hitting with in the high perimeter walls will cause damage to the factory.** Currently in game, once a factory is destroyed (it still will produce a small amount so RDP cannot be stopped entirely) it takes 14 hours to rebuild. This rebuild time can be greatly increased if bombing maintain on each of the complexes even after it was destroyed. Below are pictures of what a factory complex looks like from 3km when it is producing and then what it looks like once it has been destroyed. This does not always render correctly in game. Because there is no debriefing and the web site for damages is not so dependable you need to be able to tell when a factory is destroyed so you can report it on the bombing channels and coordinate the bombing of factories so that time and bomb loads will not be wasted.





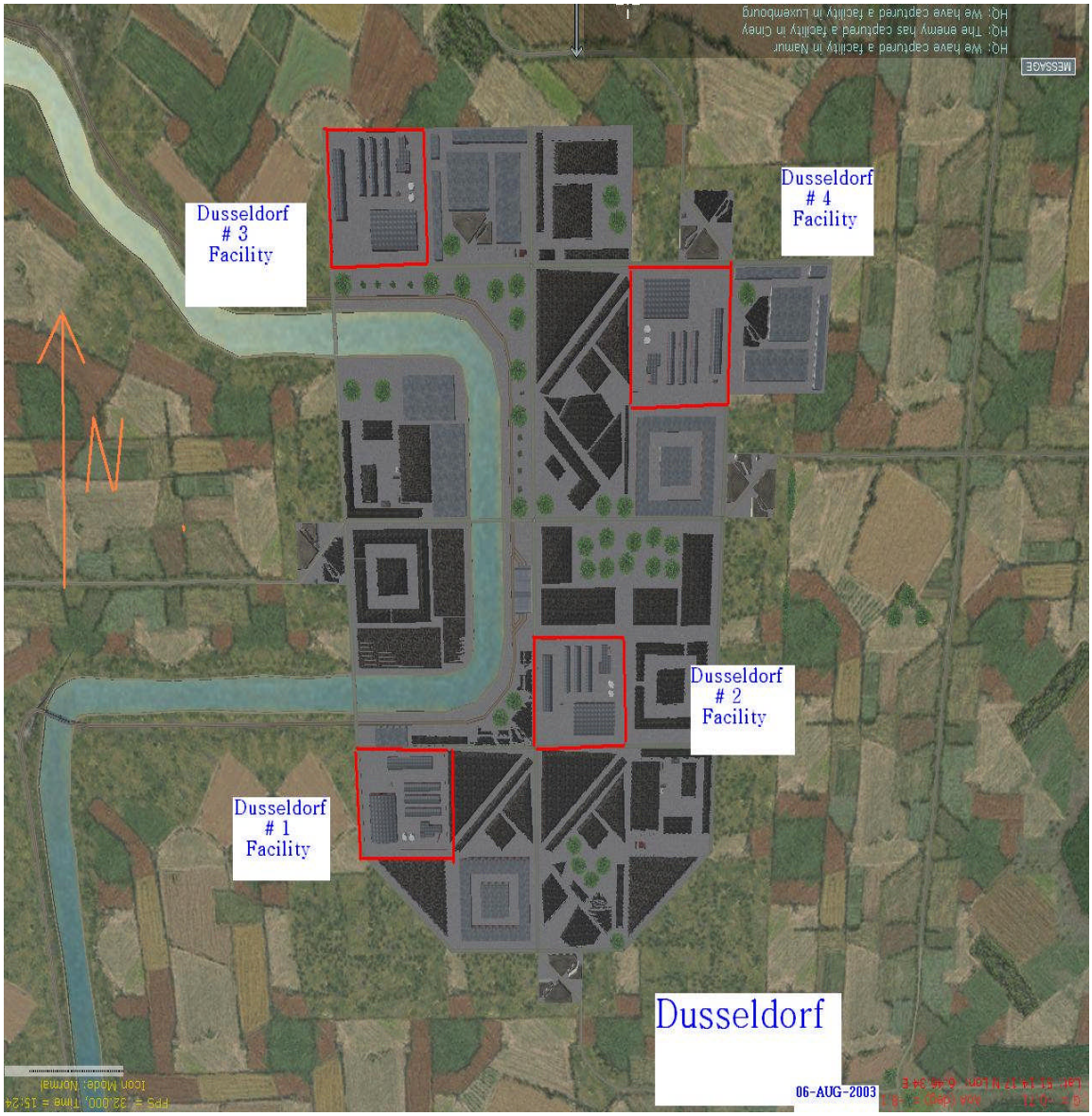
Düsseldorf

Factory Buildings: 4 **Facilities #** 1-4 **City Altitude:** 125 feet / 38 meters

Lat/Long: *(Credit: Zheriz)* **Facility 1:** 51.13.33 N / 6.45.55 E **Facility 2:** 51.13.34 N / 6.46.30 E

Facility 3: 51.15.09 N / 6.45.30 E **Facility 4:** 51.14.30 N / 6.47.29 E

AF attached Düsseldorf Airdrome



Recon photo taken by Hawkeye5

Monchen-Gladbach

Factory Buildings: 1 **Facility #** 9 **City Altitude:** 230 feet / 70 meters

Lat/Long: *(Credit: Zheriz)* **Facility 9:** 51.10.50 N / 6.26.00 E

AF Attached: Gladbach Airdrome

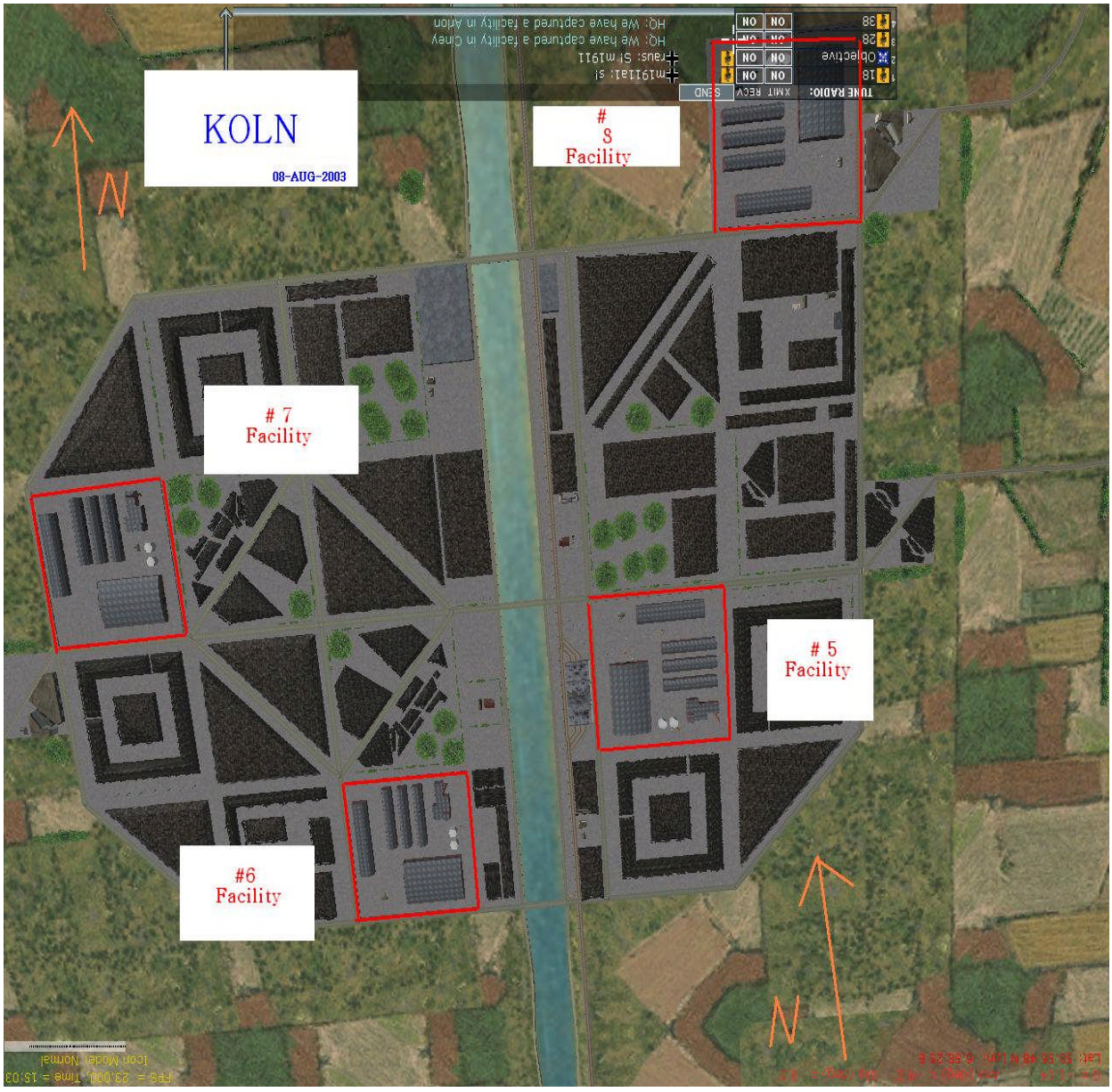
Recon photo taken by Hawkeye5

Köln

Factory Buildings: 4 **Facilities #** 5-8 **City Altitude:** 164 feet / 50 meters

Lat/Long: *(Credit: Zheriz)* **Facility 5:** 50.56.25 N / 6.58.55 E **Facility 6:** 50.55.57 N / 6.57.30 E **Facility 7:** 50.56.45 N / 6.56.30 E **Facility 8:** 50.57.14 N / 6.59.04 E

AF Attached: Ostheim Airdrome



Recon photo taken by Hawkeye5

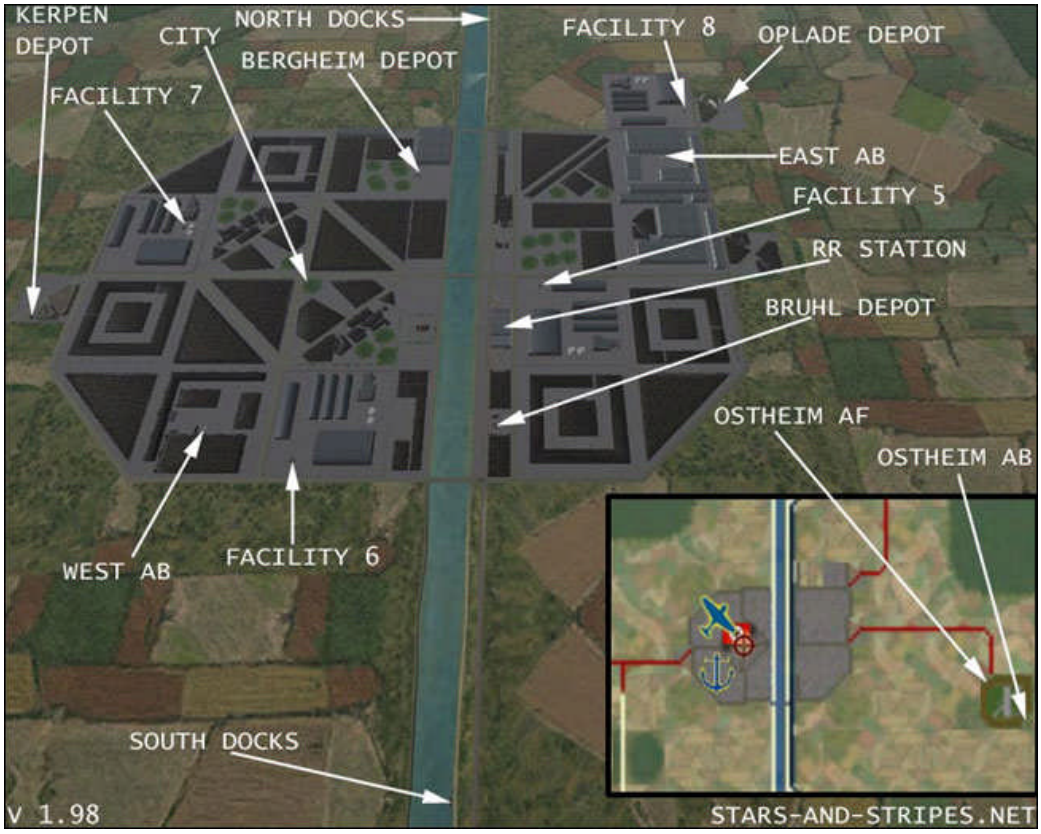
Chapter 2: The Bombers

Level bombing in a DB-7

DB-7 plane is now crucial level bomber for FAF in WWII Online and although it seems to be difficult to do level bombing, it's actually very accurate and you will miss target only sporadically. I will try to share my experience with level bombing in this brief article with you. There is only slight difference in bombing in Havoc or Blen IV. The bomb sights in RAF bombers both look different but work exactly same way, so it will not be a problem to adapt all information to it also.

Pre-flight briefing and preparing for take off

First of all make sure, you know where your target is located in the city. Find map of the city and look at it. In our case we are going to bomb Facility #7 in Koln. It's important to know location; because you don't want to expose your plane to AAA for longer time than is necessary and also you need to have an idea what direction you will need to correct your plane heading in order to be lined up well.



Köln city

Next you need to check what the target altitude above sea level is. It's important to know it, because you need to set your altitude in your bombsights right. In our case, Köln ALT above sea level is 40m. We want to bomb from 2,000 meters and bombardier must set IAS (indicated Air Speed) to 2,000 – 40 = 1,960 meters, while a pilot needs to keep his ALT at 2,000 m sharp.

OK here is what you need to do to successfully take off from AF.

- roll to one side of the runway. Don't take off directly from hanger, if you are not sure, that the plane will make it safely.
- Start your engine, brakes on, WEP on, MAX speed and MAX boost.
- Release brakes, roll and pull gently as soon as the plane gets to the other side of the runway.
- WEP off, speed and boost at your will.

Ingress to target, communication with bombardier

Ingress to the target is not a leisure time for you. Make sure you keep your speed and altitude where you need to be. In our example we want to hit from 2.000 meters and speed 360km/h. Ingress at 2k is quite dangerous, so it's better to climb higher. It's alright, if bombardier will set his settings now, but it can change a little as the plane changes altitude, so he MUST make sure again, that all setting are set correctly few minutes before pilot starts his bombing run.

Also both should know what their roles will be :

Pilot – makes sure he flies level at 2,000 meters and keeps speed 360. Plane must be leveled both – vertically and horizontally.

Bombardier – makes sure his sights are centered, bombs doors opened and he is watching target coming up, first through window in his position and than through sights.
After drop, pilot is NOT circling back; he continues to fly on his heading.
Bombardier closes bomb doors and moves into gunner position.

I suggest to fly at about 3k altitude and start to drop about 10- 5 minutes before you will go for bombing run.

Lining up on target; bombing run

It's the most important thing during whole bombing run. Pilot needs to check his red arrow (for target) with his heading and he is trying to observe, if they are both in one line. He must do it almost continuously during bombing run, until bombardier

will be able to spot target visually.

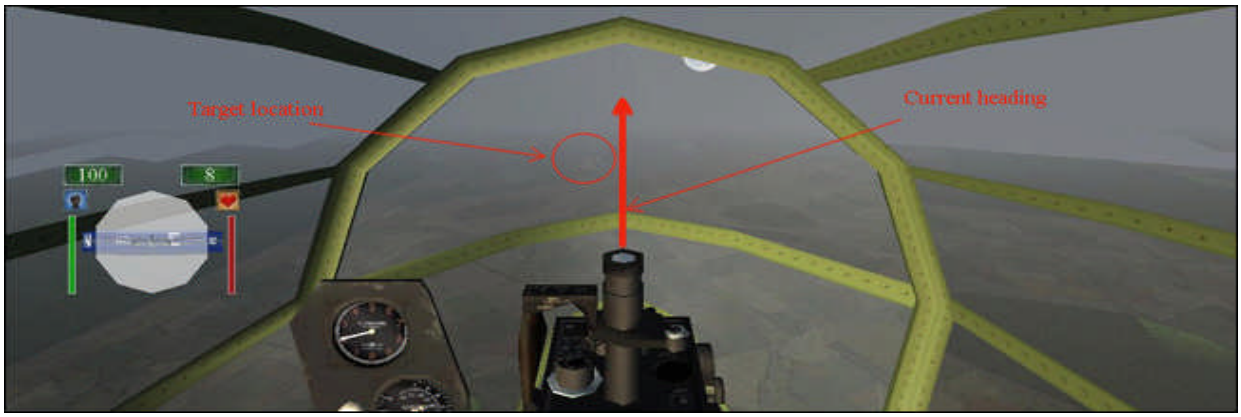
Next he must keep speed at 360km/h and altitude at 2,000 meters.
(Hint: if you will fly on continuous rpm, 70% boost at 2k altitude, you should have speed exactly 360 km/h.)


Lining up on target


Bomber gauges

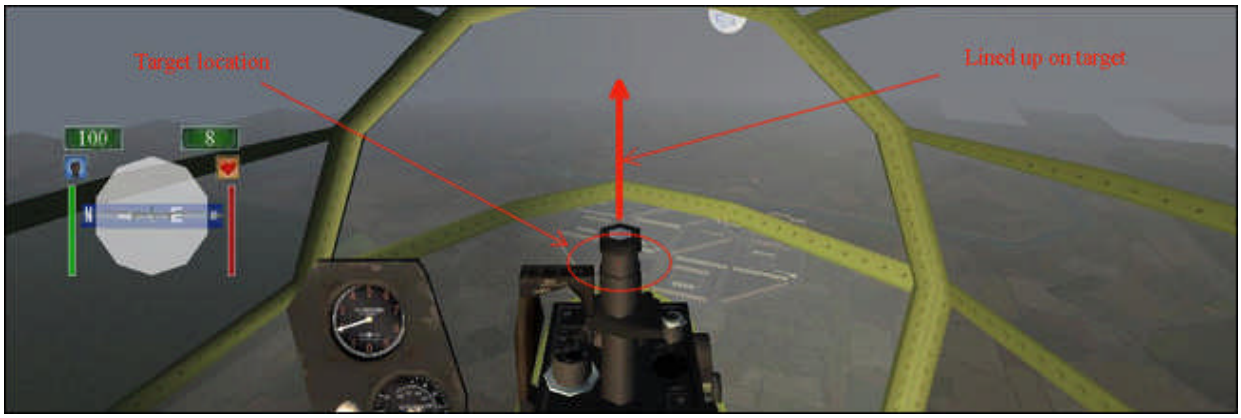
Pilot calls beginning of the bombing run approximately 5 minutes before drop.
At this time bombardier needs to make last check of bomb doors and sights settings.
Also he must make sure his sights are centered by lining up two little notches on sights against center lines.

Now it's time for bombardier to watch for target. It's best to look directly ahead and wait till the city will render in front of you low.



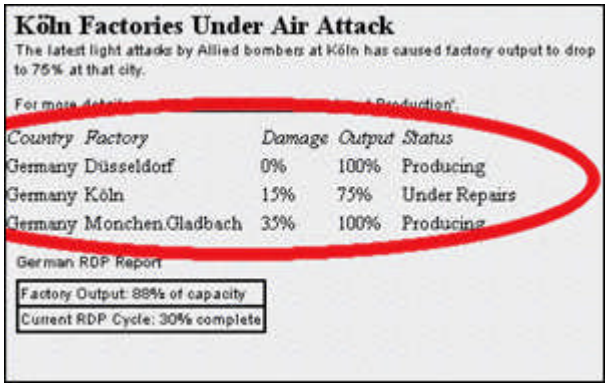
You can actually see the target well before drop and this gives you chance to tell pilot what correction he must do to line
up.

It's easier to tell pilot which way to go, than using "twisting" feature of bombsight, because you don't have too much time to spare.
As soon as you see, that plane is heading right way; you can switch into sights view.
Now you can wait for target. Last check of settings; and prepare for drop. Try to drop all bombs without spacing them too much



You can switch to a belly gunner position and wait for bomb's explosions
At the same time, pilot should go MAX speed, MAX boost and WEP on. KEEP heading away from target, don't turn for next 2-3 minutes and you should never have problems with planes, that are just taking off from airfield desperately trying to find you. Make a wide turn after that and climb up to 5k.

After landing you can check how much damage you did on target, by visiting WWII Online web page, clicking on "Play Axis" and scrolling down to the bottom of the page. If you will do same before take off, you will have a good picture how successful was your (or the group) bombing run.



Learning bombers in WWIIOL

The next step in getting your bombs on strategic target is learning a little about the planes you have to work with. Currently in game the Douglas DB-7, Douglas HAVOC, and Blenheim IV bombers are used for strategic bombing. The bomb loads Vary on these planes so currently the Douglas DB-7 is the preferred aircraft to conduct strategic bombing. This is due to the bomb load out and the effectiveness of the bombs in its load. Some other close air support (CAS) planes can be Researched and Developed (RDP) and those are the Bell 14 (P-39), Hurricane IIC (fighter/Bomber). These can be used in Strategic bombing of Factories and Bridges. Therefore, the Allied High Command (AHC) must decide to develop them first before you can use them. The aircraft that need to be researched and developed (reset at the beginning of each map) may not always be there for you to pick from till they are researched. You will need to pick the best plane available for your mission's type. Figures 2.1 list general information about the bombers currently available in World War II Online.

Bomber Aircraft in World War 2 Online

Plane Name	Plane Type	Country	Bomb Load & armament	Joules	HQ only	RDP
Douglas DB-7	Light Bomber	French	.303's , 944 kg		Yes	No
Blenheim IV	Light Bomber	Both	.303's 4x 250lbs, 8 x 40		No	No

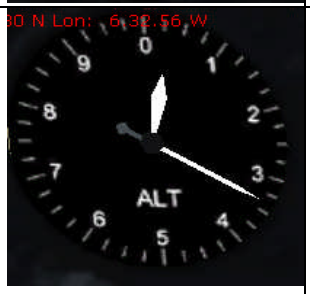
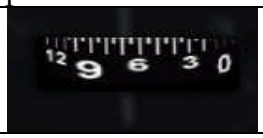
			lbs			
HAVOC	Light Bomber	British	.303's 945 kg		Yes	No
Bell 14's	Fighter / Bomber	French	20mm & 50 cals 200 kg		No	Yes
Hurricane II C	Fighter Bomber	British	20 mm 2 x 250lbs		No	Yes
Blenheim I	Fighter	British	.303s 8 x 40lbs		No	No

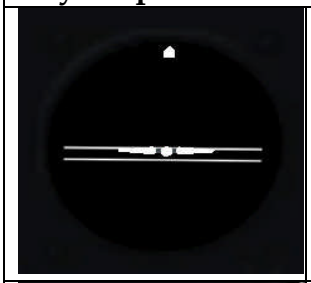
Figure 2.1

Once you have a good understanding of the benefits and limitations of each of the planes you have an easier time selecting the correct plane for the mission that you have to accomplish. Not only must you have a good understanding of the plane and its abilities but you as well must have an understanding of how the factories are damaged and how damage affect them and the over all side which is being bombed. When you conduct strategic bombing in World War II Online you currently do not show in your damage to the factories or even if you hit them in your debriefings. This is currently on the developers list to get done. Then how do you know that you damaged them? You must go to the Axis factory production page to see what percentage of damage your mission did.

Gauges

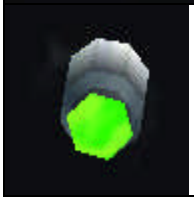
The most important tools you have in your bomber are your gauges so you have to have a very good understanding as to how to use them correctly. As you look over each of there, look in your cockpit and see where they are. All the gauges below can be found in position number one unless noted other wise.

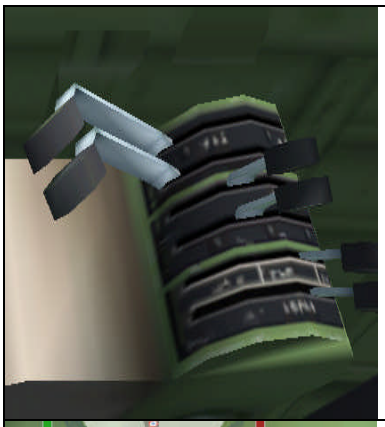
French Planes	British Planes	Uses
		Throttle setting along with the propeller pitch will keep you at the correct speed to maintain formation flight. Example: Lead Pilot Call Max 80 it means that you propeller pitch must be set to max and your throttle arrow in line with 80. On British it is your prop pitch setting and + or - number. Max +4 is and example.* **you will have one gauge per engine usually set side by side**
Keys to presses Move throttle forward or back (")increase prop pitch (;)decrease prop pitch		
		Tachymeter or RPM gauge tell you how hard you engine or engines are working.
		Altimeter indicates the altitude of your aircraft above sea level. The French gauge uses 1 hand and is measured in meters and kilometers. The British gauge uses 3 hands indicating (largest to smallest size hand) hundred, thousand, ten thousand feet. ***French gauge measure in meters.** **** British gauge measure in feet***
Keys to press Move Up and down to change		
		Heading Indicator This will give you the numeric heading for you aircraft

		Climb Decent indicator tell you how mach your plane is climbing or descending 0is level wings with no climb or decent.
Keys to presses Move joystick forward or back to change		
		Horizon indicator tells you if your wings are level and that, you are climbing or descending. This one shows that you are climbing with level wings.
		Bank indicator Tells you if you are level or not if the arrow is leaning to the right then you, right wing is dipping below centerline.
Move joystick right or left to change		
		Temperature gauge. Yes You can burn up your engine *watch this in fighters once you are up to 2.5 or 3 you need to back your throttle down to cont or econ to cool your engine.
		Fuel Gauge Yes you can run out of fuel mostly important for the fighters. In the bombers you'll see 2 of these right next to one another. In the British aircraft the reserve tank gauge is the only one that works, so ensure your watching this on. In the Blenheim MK IV, you must look to the Right using the num pad 6 key.
	None on British	Bombsite indicator This tells you if your bombsite is centered and well as is a tool that a Multi crewed plan can use to direct the pilot over to target

		either left or right.
Move joystick right or left in position 2		
		Clock for In Game time.
		In the **Blenheim series** you'll find this to indicate if your RPM.

Other Gauges & Indicators

	Position 1	This lamp in the Pilots seat indicates you gear is down. When Lit your gear is Up. In the
	Position 2	This lamp in the Bombardiers seat indicates your doors are closed. When lit your doors are open
	Position 1	This lap can be seen in the pilot's seat only if you pull the yoke back out of the way. It indicates that you gear are down when lit and up when out.

	Position 1	The top set is you throttle all the way back like that is full throttle The second set of handles is your pitch, which is set at cont in the picture. Note the 3 little marks next to it the indicate all the way forward=econ mid=cont all the way back=max
	Position 1	This will tell you what position your flaps are in all the way down means your flaps are down or 0% and all the way up is 100%
	Position 1	The Blenheim IV gear indicator

General Bomb Site Operations

Being a bombardier in game is not just simple jumping to position 2 and pressing the B button to drop your bombs. It takes setting up your bombsite properly to ensure that your bombs are going to hit the right spot. Your plane is moving XXX speed, which means when released your bombs are going XXX speed then drag and gravity are variables on your bombs. Operation of the bombsite in game is straightforward but you must have the right information to input into your site to ensure that the bombs will strike the target you want them and not be too long or short of your target.

The bombsites in the game are all little different from one another, so becoming familiar with each of them is a must. The Blenheim IV and Havoc use the XXXXXXXXXXXXX type of site. The DB-7 uses the XXXXXXXXX type of site as it did in the war.

Operations are one of the more difficult tasks in game. To conduct level bombing you must have a stable weapons platform meaning that you must be flying straight and level over the target to get your bombs on target. Along with flying straight and level you have to ensure that you bomb sites are set correctly. There are two important settings that you have to ensure are set correctly, the above sea level altitude and the speed in Indicated Air Speed (IAS).

Setting your Altitude requires a little information before you can begin. You are going to need to know the altitude of the target from sea level. There are a number of sources for this information. (Most of them all use data that McCully complied) You can find that information in the appendix D of this manual. Please make a special note of thanks to McCully for all of his hard work to keep this vital bombing information up to date. Our target for this example is going to be is going to be Düsseldorf, using DB-7 bombers from an altitude of 5 kilometers. Düsseldorf's altitude is 125 feet or 38 meters (remember to use the correct measurement based on the aircraft you are flying) Source Mcully's, "World War II CP Elevations" version 1.18.4. Below is the formula to be used for your bombsite calculations.

Target Altitude meters – your altitude = bombsite altitude setting

38 meters – 5,000 meters = 4,962 meters

Understand that limitations in the bombsite will most likely not allow you to get your site set right for this altitude setting. Therefore, it is ok to be with in plus or minus five. When you use you Page up and page Down

Bomb Site Operation in game

Hitting your target from 3km up to 6 km is not as easy as you may think. You will need to become familiar with the bombsite operations. Once you have mastered the bombsite for each aircraft you will find bombing much easier. The sites in the different bombers are currently quite similar. The Blenheim Mk IV and the Havoc Share the same bombsite in them. The DB-7 has a different bombsite but it works in much the same way. In this section, we are going to cover the different types of bombsite found in the game. The second part of this section we are covering just how to use each of these bombsites.

Look over the training material here, then get into a bomber, and work at it.

Setting your altitude setting correctly for your bombsite requires you to subtract the altitude of the target city from the altitude of your aircraft at the time of the drop. See Appendix: E to find a list of the city altitudes.

Example: of it is if you are dropping on a city that is 30m above sea level from 3,000m, you must set your bombsite settings to 2,970m

The pictures below show what a factory complex looks like from 3km of altitude. These pictures where taken during one of the weekly bombing events made by the 17th Bombardment group called Big Bomber Mondays. This first one is just after a drop on Düsseldorf Factory #1 you can #2 in the upper right. This was done in a French DB-7 Bomber.

The next picture is of a picture from the pilot seat of a glide bombing on Monchen Gladbach factory complex. You can see the Airfield right in the egress path. Generally egressing over an enemy airfield is a bad idea because it puts your aircraft over enemy anti-air guns for a much longer time. Enemy anti-air guns are also effective at pointing intercept fighter to your general heading and even your location by following the tracers. Do not make the interceptors job any easier then it has to be and ensure that you plan your egress rout correctly.

Operations of the DB-7 bombsite

DB-7 Bombsite (as seen in game)

Here is a close up of the DB-7's Bombsite. You can see this in position number 2. One of the unique things that the DB-7 site can do is a look around meaning that with the joystick you can move the site to the right, left, up or down. This is used to help in a multi-crewed plane to help the bombardier direct the pilot to correct left or right when close to the target.

You must have your site centered for your drop the indicators can be found on the bottom of the site itself and to the right lower side of the site. The bottom 5 marks indicate right or left. The site shown is currently centered. The Mark on the lower right side indicates the forward and rear movement of the site. This is centered If any of these line are not lined up your site is not center.

This is gauge is in the pilot position. This gauge is used by the bombardier to direct the pilot to the target. When nearing the target the bombardier tells the pilot to adjust the plane to the left slightly until the marks line up and they are on target. The marks will only line up when the bombardier moves the site back to the center, as he or she will when they are in line with the target.

How do you tell if your bomb bay doors are open in the DB-7?

The DB-7 has an indicator lamp found in the bombardier's seat as well as the bomb bay doors handle doors (silver handle with red top found on the right side when you hold number pad key 5 and 8 down). The bomb bay door handle in position 2 can viewed and you can see the action as the handle moves up or down when you open or close your bomb bay doors. These are two indicators are only found in the bombardier position 2, position number 2. If your bomb bay doors are in the open position then the indicator lamp will be lit up and your bomb bay doors handle will be pointing down. If your doors are closed then your indicator lamp will be off and your bomb bay doors handle will be pointing up. See the pictures below for more information.

Bomb bay doors Closed

Note: the lamp on the gauge panel is off and the handle on the right is up this indicates that the Bomb bay Doors are closed

Bomb bay doors Open

Note: the lamp on the gauge panel is lit and the handle on the right is down this indicates that the Bomb bay Doors are open

While in position 2, you can see the bombardier instrument panel by pressing number pad key 0. When in the bombardier's position (especially in a multi-crewed aircraft) you can use this panel to check on the aircraft's altitude and speed to ensure that your settings are correct or to pass information to the pilot about altitude or speed changes needed to complete the drop. The indicator lamp can be view up closer here.

Operations of the HAVOC bombsite

HAVOC Bombsite (as seen in game)

Here is a close up of the HAVOC Bombsite. You can see this in position number 2. Unlike the DB-7, the Havoc's Bombsite cannot look around.

How to tell if your bomb bay doors are open
The havoc's works the same as the DB-7's doors.

Note: the lamp on the gauge panel is lit and the handle on the right is down this indicates that the Bomb bay Doors are open

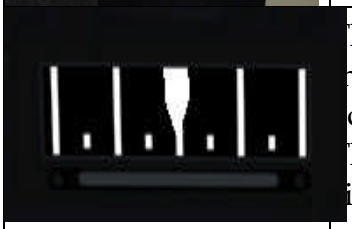
Note: the lamp on the gauge panel is off and the handle on the right is up this indicates that the Bomb bay Doors are closed

Here are the Bombsite gauges where the bombardier (multi-crewed) can check on the alt and speed of the bomber. The red light when lit indicated that the bomb bay doors are open. You can see this view in position 2 when you push num key 0(ins).

Operations of the Blenheim MK IV Bombsite

Blenheim MK IV Bombsite (as seen in game)

Here is a close up of the Blenheim IV's Bombsite. You can see this in position number 2. Unlike the DB-7, the Blenheim IV's Bombsite cannot look around.



This is what the pilot can see. Movement of the site to the left indicates when nearing the target that the pilot needs to adjust the plane to the left slightly until the marks line up. The marks will only line up when the bombardier moves the site back to the center, as he or she will when they are in line with the target.

How to tell if your bomb bay doors are open

Easy there are no doors on the Blenheim Mk IV just find a target and drop.

Here are the Bombsite gauges where the bombardier (multi-crewed) can check on the alt and speed of the bomber. You can see this view in position 2 when you push num key 0(ins).

Understanding Bomber Supply in game

Bomber supply is one of the most important aspects of strategic bombing. Supply is a simple rule to understand, if you don't have enough bomber in supply to conduct strategic bombing strikes then they can not happen. In times past pilots could manual overstock of any airfield with bombers by simple putting the time in and flying them to a non-bomber head quarter's field. This would start the 3-hour resupply ticket at the original field while placing that bomber that was just flown over into the supply list of the field at which the bomber landed. This has all changed drastically now.

Bomber resupply now comes every 4.5 hours in game at this time. Each field no will only have 75 bombers per day to conduct strategic missions. Each bomber produces a resupply ticket at the airfield it leaves from for its mission. So if you are conducting a mission once you spawn in your resupply ticket is generated and 4 hours after that a new one will be there to replace it if you are shot down. Understanding that each bomber head quarters is only allotted 15 bombers (this number can be increased or decreased by the High Commands) in a 4.5-hour period. This means that each country has this is not the case now. This means that bombers are resupplied only five times each day so each country has 75 bombers per bomber field per day to use. What this means is that if all the bombers are used up in the first hour of a 4.5-hour resupply time then you will have to wait 3.5 hours for the next resupply.

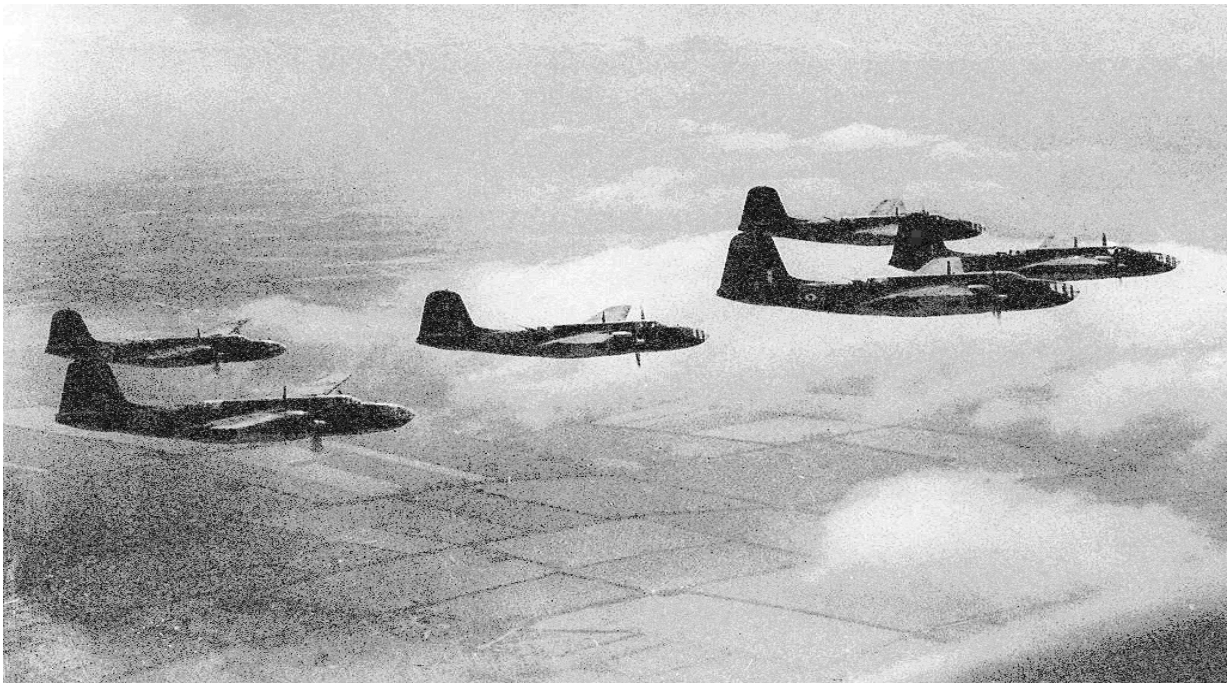
Chapter 3: Bomber Formations and defense tacitics

Bomber Formations

Formations in World War II Online are different all together because of the current limitations in game. These limitations are the issues of lag making close tight formation flying difficult with some players, CTD issues, player aircraft that seem just not to function correctly or able to maintain the correct speed to stay with the group, and lastly issues of players not truly understanding how to properly conduct these missions. As with the real war, formations are the best chance a bomber has to make it to target and back safely. The current defensive armament in the bombers available is lacking in power when use individually. The DB-7, the Havoc, and the Blenheim IV all have a single .303 in a dorsal turret facing rear and only the DB-7 has a single rear facing .303 on the bottom. Each of these planes has a very large single tail structure the impedes you view and limits the range of fire allowing an enemy aircraft to be able to "saddle up" directly behind the bomber's tail and fire without the bomber being able to return fire. This advantage for the enemy fighter is taken away when bombers are flown in tight formations. A formation allows each bomber to cover the blind spot of the bomber next to it on each side. Allow all the other bombers in the group to concentrated their rear defensive guns on the enemy fighter multiplying the defensive capability of all the bombers and increasing the over all survivability of each aircraft. As the numbers of planes in the bomber formation go up numerically, the defensive value of the formation greatly increases the chances for survival. No longer can an enemy fighter line saddle up directly on the six of a bomber without taking fire. When the .303's are grouped up and fired at the enemy interceptors from all different angles the chances of hitting, causing a critical damage, killing the pilot, or causing the enemy aircraft over shoot, are greatly increased. Formations also have an offensive ability of allow all the bombers to concentrate their bomb loads on a single area while limiting the time in the Anti-aircraft gun range or to fly higher then the current AAA reach of 3.5-4km.

Flying formations take time and practice to become good at but is a vital part to the successful missions and returning to base safely. Allied bombers as they did in the real war have proven their importance in the strategic bombing aspect of the game and value of demoralizing the enemy players. With what we explored earlier,

lone bomber. The formation flying currently used in game is taken from the real we can easily see the value of bomber in a formation flying in groups rather then a



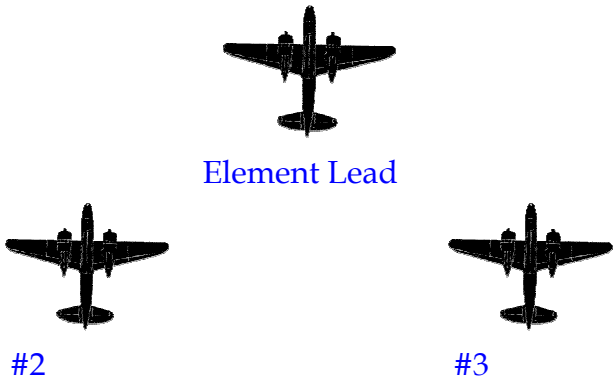
lessons learned in World War II by the bomber crews who gave it all they had for victory.

History lessons about bomber formations

The typical bomber formation during the war was made up of 3 plane elements set into positions with in a squadron (wing) that are positioned with in an imaginary box that each bomber fly's in. During the war formations changed and progressed as needed to, for defense and survivability, but one thing remained constant this was the use of the box formation. The use of the areas in an imaginary box shape, each bomber was positioned inside the box, is why These formations are often referred to as boxes. Each bomber knowing their aircraft's individual assigned position with in the box and maintaining its position was the responsibility of the pilot and the co-pilot. Typical box formation for a B-17 group was 500ft high by 480ft in width by 2340ft wide. This is a big box. The elements would be positioned at different elevations with in the squadrons as well as squadrons placed at different altitudes with in the box. This was done to maximize the defensive firepower and minimize the chances of fighters or AAA taking down great numbers with in the groups. During World War II the typical bomber formations was made up of 18-36 bombers at varying altitudes and intervals.

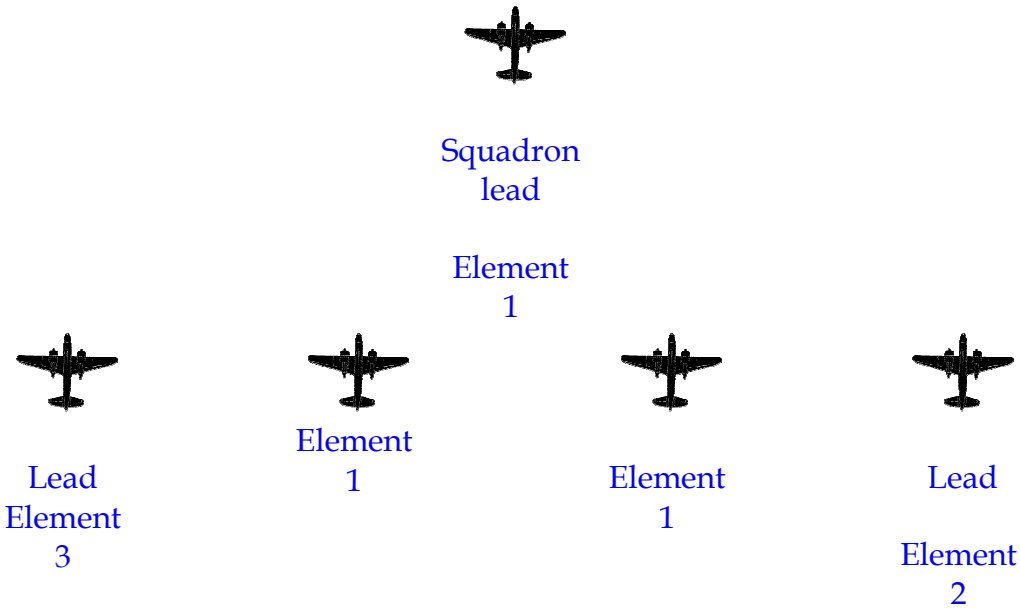
The Basic Element- is the core building block of the formation and is made up of three bombers each. Element lead is responsible for their element position with in

the Squadron. *Reference: The Mighty Eighth War manual by Roger A. Freeman, ISBN 0-304-35846-0*



The basic element of a bomber formation

Squadron- is made up of three elements with in a formation. The squadron lead is responsible for their squadron's position with in the group (Formation) *Reference: The Mighty Eighth War manual by Roger A. Freeman, ISBN 0-304-35846-0*



Element 3

Element 3

Element 2

Element 2

Large Formations

Large Formation: Below is a basic description of the 8th AF's breakdown in formation. These types of formations where used by the real 8th Air force in Europe. Formations of this size in game are currently rare due to the lack of a heavy bomber and numbers of pilots.

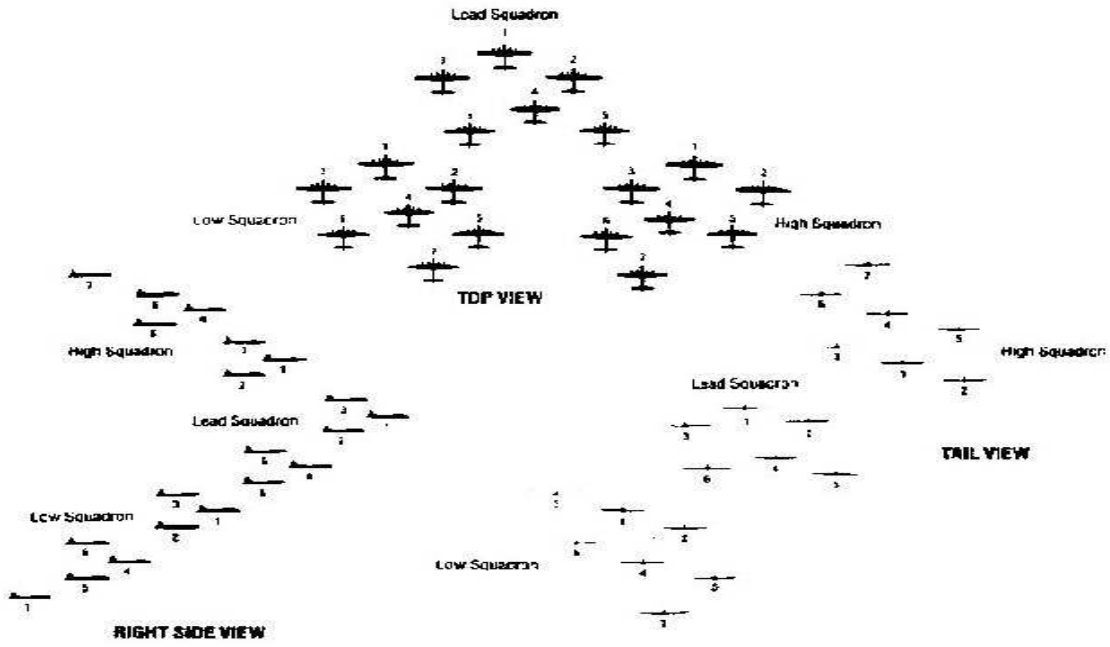
The side view of the basic box formation used during the large formations during World War II. Formation flying in with this many numbers of aircraft is extremely difficult and very taxing on lead pilots.

Squadron #1

The height separating the high Group from the low group would be 480ft

Squadron #2

Reference: The Mighty Eighth War manual by Roger A. Freeman, ISBN 0-304-35846-0



Formations in Game

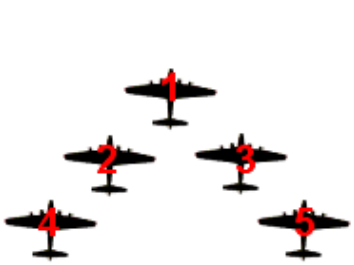
Formation in game are mostly modeled after the light and medium bombers formations of World War II. The large formations could be done in this same way but in game getting this many bomber pilots together in a formation is very difficult as stated before. The most commonly seen formations in game are the element or Diamond, standard Vee, and the Triangle formations are shown below. Why these they are the most effective in game and allow each bomber the maximum amount of protection.

Lead #1

#2

#3

#4



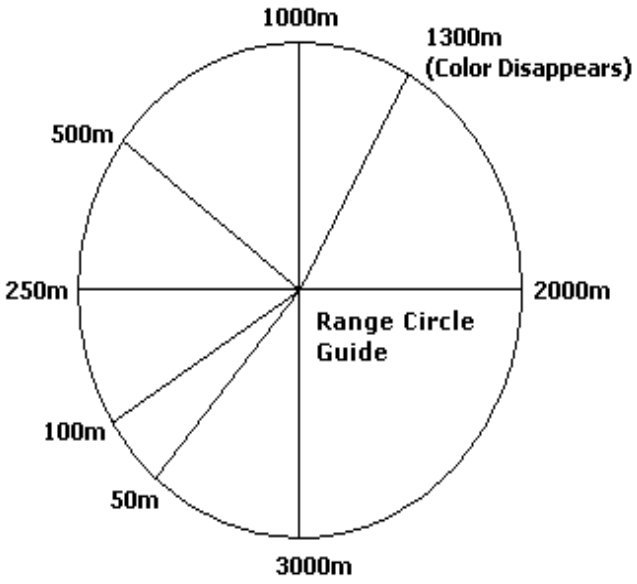
Early Warning System (EWS)

Understanding the EWS (Early Warning System) currently used by World War II online is easy. The EWS is triggered when a bomber (only the DB-7, Havoc, and the He-111) travels over the enemy town. It activates when your bomber is with in 2.5km of the city and stays active for about 2-4 minutes after you have 2.5km out of range of the city. Each enemy city works this way so as you trigger one and pass out of range and it deactivates you travel into the range of another city's EWS range triggering its EWS. Some pilots currently employ a type of flying in which they fly around or out of range of EWS until they reach their target. This is commonly referred in game as "Skirting EWS". Benefits of this are that you do not set off warnings that allow the fighter interceptors to track the bomber group. However, using this method as an allied pilot you lose the main advantage of the DB-7 and Havoc. That advantage is the aircraft's speed the DB-7 and Havoc have a reduced flight time to target which allow for an increased number of sorties per hour. This speed advantage is off set by a reduced bomb load that requires more sorties to damage and maintain the damage level to the factories. The Blenheim IV is

considerably slow and carries only half the bomb load, but it does not trigger EWS and is an excellent strategic bombing platform.

Rear Defenses and Gunnery

Understanding how to estimate your range in World War II Online is your first step in learning how to formation fly. Don't worry if you get to close currently in WWIIOL you can not collide with friendly aircraft and there is no friendly fire. Below is a figure (thanks to Trukk of the 78th FG) that explains how to use the range circles currently is in the game. (By default enemy aircraft circles are red in color, you can change this in your settings if you'd like to) From 0-1300m you have color anything above that and the circle appear grey this will be explained more in depth later in this section.



Duties as a tail gunner

1.) Maintain a vigilant watch for Bandits

2.) Call out all incoming bandit using the clock system

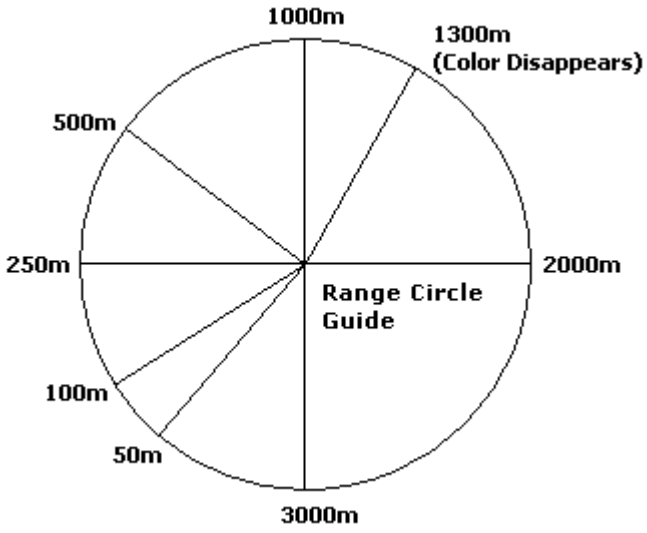
3.) Fire on any Bandit that comes with in range and dissuade them from lining up for a kill shot.

Understanding the Range Circles

The Range Circles (RC) is used to provide the player with "depth perception". In real life, you can tell if an object is moving away or towards you. You can do this in WWIIOL too, but not very well compared to what you could do in the real world. For ground units this is not a big deal but for aircraft and air combat, it is critical.

Visually the RC is that blue (for friendly), red (for enemy), or orange (for squad mates) circle or arc that appears around an aircraft. These colors are the default colors and can be changed in your World War II online settings. As you get closer to the aircraft, the circle shrinks (moves counter-clockwise). As you get farther apart, the circle gets bigger (moves clockwise).

The RC uses a logarithmic scale, which means that if you double the length of the circle the distance quadruples. So if the circle goes from the 6oc position (the starting point at the bottom of the circle to the 9oc position the distance to the aircraft is 250 meters or about 820 feet away. If the circle is at the 12oc position (i.e. half a circle), the aircraft is 1000m or about 3,280 feet away, a big difference.



Trukk of the 78th FG made this figure.

When to Shoot - Tail Gunners

For tail gunners it is not as clear-cut. The key thing to avoid is shooting at the bandit at long range, only to have him shooting at you at close range while you are reloading the gun.

Just like the bandit, your gun is most effective at close range, but while he is using his guns to shoot you down, you are using yours to prevent being shot down. What this means is that if you can shake his concentration and make him miss his shot by whizzing tracers by his cockpit, you have done well. This being the case the smart tail gunner will often shoot early to try to throw the bandit off, even though he knows his chances of hurting the bandit are very slim.

The key is the closure rate that is how quickly the bandit is closing the distance between him and you.

> If the bandit is closing quickly, wait until the RC is at the 9oc (i.e. quarter circle) away as you are only going to have enough time for one clip and you don't want to be reloading when he is 300 feet away hammering away at you.
>
> If the bandit is closing slowly, use one clip on him at long range (RC at 11oc). You may get lucky and at a minimum, you will alert any escorting fighters to the presence and location of the bandit. If you time it right, you will have a second clip loaded as he enters the "sweet spot" (i.e. 300').

The sign of a good tail gunner is one who can judge the closure correctly, so that he is never caught reloading at the wrong time.

Note that this particularly an issue the drum fed guns in the early bombers as you could empty a clip rather quickly. When the Americans come in with belt fed .50cal, it is much less of an issue

Chapter 4: Leading and planning strategic bombing missions.

Leading a bomber formation

Leading a bomber formation is much more difficult task then many think it is. It is not just jump into a bomber and yelling follow me men we are going to bomb a factory. We know from the information that we just read that tight formations are

the key to survival. Even though the in game issues makes, a tight formation difficult to achieve and along with a lack of training or general knowledge of strategic bombing the player base that is willing to fly in these formations. On more then one occasion we as formations leaders have the be able to help that guy who only sees grey circles and can not seem to catch up to the group. We know the benefits of keep the formation together. Now how do we do just that? Make sure as a leader you have a back up leader. The enemy fighter will engage and try to shoot the lead down first. If you are damaged or shot down, you have to make sure the group still can get to target.

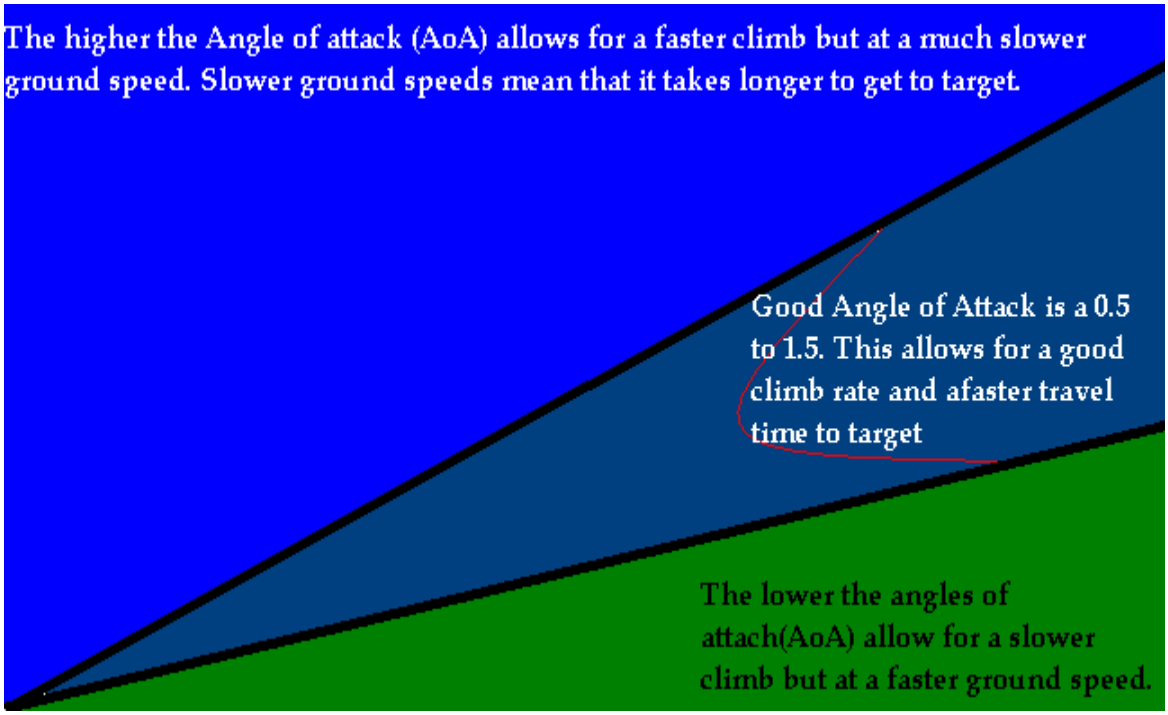
Four things that can help you lead your formation successfully to the target and back again are a lead pilot, lead bombardier, communications officer, and a lead escort. You are the flight lead so you will fill the lead pilot position. Your duties are to coordinate the flight in air in formation and keeping the escort fighter up to date on the group and to get the formation to target and home again safely. The lead bombardier is responsible for helping with navigation and for calling the drop on target and ensuring bombs are on target. The Communications officer duties are to listen to the Team speak channel and then text what is said by the lead pilot to the pilots not on team speak. The Escort leader is responsible for the escorts and for keeping the enemy fighters out of the group. These four officers must be on team speak channels. The bombers and the fighters will have their own Team speak channel but the officer will have either command channel set or key map so they can change channels as needed quickly. Teamwork is the key to success here so do not take it all on yourself use the officers around you to help.

In your planning, you are going to set parameters of the formation flight. These should include Altitude, climb rate or angle of attack (AoA), and engine settings for each part of the mission. Typically, the mission has 7phases and those are:

1. Phase I Preflight checks & take off
2. Phase II Climb & form up
3. Phase III Cruise & straggler catch up
4. Phase IV Approach and Drop
5. Phase V Egress
6. Phase VI Decent
7. Phase VII Landing & Debrief

Phase I Preflight checks & take off: is where you do preflight and take off. Your preflight checks are ensuring that all the doors and canopies are closed, that you have taxied to the correct side of the field, you have your engines set to Max Max (maximum throttle maximum prop pitch. This can be done with; & ‘keys on the keyboard), your WEP (toggled on or off with the F8 key) is on (depending on the aircraft you are in you may need to lock you tail wheel or steering wheel). Pilots can set their flaps as they like for take off.

Phase II Climb & form up: Climbing is slow in a bomber formation; the key is to use a lower Angle of Attack to allow for a higher ground speed. This means that if you climb to sharp your speed drops and it takes longer to get to altitude and to target. If your climb is at a lower rate then your speed increases allowing you to actually climb at a better rate, allowing your aircraft to reach altitude as well as the target quicker. Bombers are different then fighters in this area because a bomber needs to be slow and steady to be most effective. Fighters have to be fast and maneuverable. See the figure below to gain a better understanding of AoA



While climbing to your cruise altitude you try to balance the speed, AoA and forming up of the group. Your climb power setting should never be set to max max with War emergency Power (WEP) on because this will not allow the extra power needed for a straggler to catch up. This is probably one of the hardest times for you as a leader because you have to talk to stragglers and help them to get into the formation while maintaining you climb. This is where your communications officer of lead bombardier. You will have any number of new pilots who cannot seem to keep up with the group. Here is a little trouble-shooting checklist for when you or anyone else in your flight needs to help a straggler.

- Check to make sure that all doors and canopies are closed
- Have straggler check to see settings are Max Max with WEP on.
- Check flap[s are not lowered and gear have been raised.

- Lead double check your aircraft setting to ensure you have your WEP turned off.
- Have the straggler check their AoA to ensure it is not to high

Multi-crewed aircraft for some reason will make a plane slow down. Remind your crews that if the have the same setting as you they may need to play around with their settings till they find the right one. For example due to lag and multi-crewing, a plane with in the group may actually need to set his engine settings to Max 85 boost when the lead has their settings at Max 80. This is just a game issue so your pilots need to be aware of this. Anyone who cannot catch up to the group and get into formation may need to do so when they get to cruise altitude.

Phase III Cruise & straggler form up: You cruise altitude was already predetermined in your planning stages. The altitude in which you travel to your IP (Initial Point) is known as your cruise altitude. Typically, for cruise speed it is Continuous (Cont) max. This is mainly to allow for a better line up on IP and for any stragglers to catch up that have not already been able to. This is the longest part of the mission. This is also a good point to ensure your groups bombsite setting and walk a first time bombardier through setting it. If you set your settings on the ground they will have changed by the time, you reached this altitude so you will need to double check them here anyways. As the lead for a bomber formation, you need to know right where the front is. You will need to make sure you cruise Altitude and speed are high enough when you get there to minimize you chance of early detection and interception. This is also, where your group will start to trigger EWS. Most pilots will ignore EWS for the first three towns around front or will be looking low for the CAS planes. Make sure to use the checklist above for trouble shooting stragglers and getting them back in to the formation. Formations are life in bombing a lone bomber is an easy target.

Phase IV Approach & drop: Your approach is set by your Initial Point (IP). IP is a city that is near the target and has a cone shape heading towards the target you will need for your line up. "IP" (initial point**)** is where the actual bombing run begins and the lead bombardier is in charge of the flight providing small changes in directions to the pilot to line the bombers up on target. First thing to do is to once again check your bombsite settings as per mission orders and call out the egress route and Rally Point (RP) (if used). For level bombing at higher altitudes speed is as important and your line up. Your engine setting should never be above Econ max for level bombing above 4km. If your speed is too high, your bombs may miss or be lost in tracking and never hit. Either your drop can be on your own or an on command drop. If it is an on your own type of drop then each plane lines up and drops when that plane bombardier is lined up on target. This is good to use with pilot and bombardiers that can level bomb on their own. On Command type of drop, require tight formations for all the group's bombs to find their mark on the target. When the lead bombardier is lined up, he/she will call Drop! Drop! Drop! In addition, all the

planes drop together. This is a carpet-bombing. This is why we are here and we must keep our focuses on getting our bombs off on target. If you are, being engaged let the fighter escort know and engage the bandit. Do not run to you tail gun and miss your mark there is no time for the group to turn around for you to make a second run. It currently takes the server 10mins to give an update on the damage of the factory. There is currently no credit given in the debriefing screens given for factory strikes or bridge strikes.

Phase V Egress: Egress is you escape route and once you have made a successful drop on your target it is time to get your bomber group home as safely as possible. Once you have reformed at the Rally Point (RP), you can start to head toward home or your return Way Point (WP) (if used).

Phase VI Decent: Ok you have gotten to target, dropped and your group over the front line and into friendly territory and your still at 4-6km. Depending on where you are at and what field your group is planning to land your decent may be different. The key is to get the bombers down and allow enough time to slow the bombers speed to land. This stage really depends on your liking here.

Phase VII Landing & Debrief: You made it back now get that bomber on the ground safely. Landing look great in large groups but they may also be done on your own for each pilot. Once everyone is down safely then gather up you information on who saw what and how much damage your group caused by looking at the axis factory damage page. Good job now do it again.

Check list for leading a bomber group

Target:		Target Alt:	
Bombsite settings	Altitude:	Speed:	
Engine settings	Climb:	Cruise:	Drop:
Type of drop:			
Notes:			

Planning a Strategic bomber mission

First thing to be done once you have decided to conduct on a strategic bombing mission is to start planning. To begin your planning you must decide what type of aircraft you are going to use based on your mission and the resources that are available due to you due to supply and Research and development. Your vital resources are the number of pilots the types of planes and the number of them you can get from supply the same applies to your escorts as well.

Mission Planning:

- Organize the strike and resources needed to do the strike
- route planning
- setting the "IP"
- egress and "RTB"
- radio procedure

Bomber missions require planning. While individual bombers are at serious risk, even a moderately sized formation of bombers can be very survivable. As the numbers of planes in the bomber formation go up numerically, the defensive value of the formation greatly increases the chances for survival. Ideally, the bombers should be "wingtip to wingtip", if possible to do this all the bombers should take off at once. The lead pilot will announce the intended route ahead of time, and fly at less than max throttle settings to insure that others can maintain station on him. Course changes should be gentle and announced in advance.

- **Route planning**

Bombing missions are defined by several separate stages. The **Climb out** phase is where the bombers generally avoid the well-traveled air lanes to climb to operational altitude. **Operational altitudes** for bombers are a matter of taste. Generally the higher the bombers operational altitude the less the chance of a successful enemy intercept. Bomber missions should usually be over 10,000ft, but the higher the better. When the ordnance serves is on line we will be able to hit targets from this altitude.

Setting the "IP"

Once the bombers have climbed to their intended operational altitude, they must establish the **"IP" (initial point)** where they will begin their actual bombing run on the target. The IP will have a cone shape heading towards the target in order to lined-up the target properly. Make sure that you have planned this using the intelligence available to find land marks with in the IP cone. Once the pilot accesses the bombardier position (if not multi-crewed) the target is lined up the pilot should go to bombsite (if alone), access the bombsight prior to beginning the run and prepare the bombsite using the Lead Bombardier's Altitude and speed settings.

Egress and "RTB"

Planning an effective egress helps survivability. Since bombers tend to separate when the pilot is busy in the bombardier position, the bomber box is usually more vulnerable during the bomb drop. Setting a course for egress and reassembling for an orderly "RTB" (Return to Base) is very hard, but essential for maximum survivability.

3.) Ensure that you have the right aircraft for the mission. Know you aircraft inside and out.

4.) Review your plan with your teams.

5.) If you are using fighter(s) for scouting be sure you have enough escorts before you send scouts out. (The 78th & 357th FGs are the best escorts out there). It is better to have more escort then you think you need. We have found that usually a 2:1 ratio works best, 2escort fighters to every 1 bomber.

6.) Communicate your planned routes and egress to the teams and the escorts

7.) Make sure your Bombsite are set correctly.

8.) Listen to the lead pilot, navigator and bombardier and you will hit your target and return home safely.

Sample Mission Orders

Office of Mission Planning –17th Army Air Corps
Mission posted by JCritter
email:Jcritter@17thaac.com Mission is subject to change due to map changes.

MISSION NAME: Big Bomber Mondays
DATE: Monday, January 5th, 2004
FORM UP: 1830 CST (1930 EST)
TAKE OFF: 1900 CST (2000 EST)
COMMS: (Text) ch93, Mission Channel (Voice) TS2 GBIII and/or GBIII/1

MISSION OBJECTIVES: are to Conduct Level bombing strikes on Düsseldorf # 4 Factory and Düsseldorf #1 Factory. A single bomber formation will be used consisting of two flights made up of six bombers per flight. Alpha and Bravo.

Primary Target: Alpha Flight 51.14.30 N / 6.47.29 E (Fac # 4)
Bravo Flight 51.13.33 N / 6.45.55 E (Fac # 1)
Operational Requirements: 12 bombers 12 fighter escorts

Launch From: Maubeuge
AIRCRAFT TYPE: DB-7
ENGINE Settings:
MAX 70 for climb to 6km
CONT max for cruse to IP
Econ Max for Drop
Egress Max Max, War emergency Power (WEP)
APPRAOCH: From the WEST along latitude 50.55.57(directly at Factory center)
Egress: North then West
Recover: Maubeuge
TARGET IP: Grevenbroich
Target Alt: 125 ft
Bombsite: Air Speed: 240 kph
Bomb Drop Type: Level
Type of drop: Drop all on your lead Bombardiers' Command!

CRUISE ALT: 8500 ft
FORMATION: diamond
LEADS: TBA ALPHA Flight – JCritter BRAVO Flight ----TBA--- CHARLIE Flight

TBA

Route
Maubeuge to Target:
Take off and climb on north east along the river
1. WP Charleoi
2. WP Huy Deploy Tail Gunners # 3 & 4
3. WP Masstricht *** Deploy TG ***
3. IP Grevenbroich *** OPEN Bomb Bay doors****
4. <<Target>>Düsseldorf Factory #4 (50.55.57N 6.47.45E)
5. Continue north east until lead turns RTB on Blue Arrow
7. WP Venlo
8. WP Maastricht
9. WP Huy
10. WP Charleoi
11. Recovery MAUBEUGE

Appendix A: Keyboard Commands

Important Key commands for bomber pilots and crew.

A	Autopilot your plane must be in level flight with your trim set right for this to engage this function.
B	Bombs release for the selected bomb in position 2
D	Opens your bomb bay only in your position 2
E	Toggles your engines on or off
F	Fires your gun(s)
G	Toggles your Gear
M	Brings up your Map
O	Opens your canopies in that position only
X	Right Wheel break
Y	Will toggle you Hud
Z	Left Wheel break
1	Pilot's position
2	Bombardier's position
3	Dorsal Tail Gunner's position
4	Bottom Tail Gunner's position (DB-7 only)
~	Brings up your flight information in the top upper left
;	Toggles your prop pitch to Economy or Continuous
'	Toggles your prop pitch to Maximum
/	Toggles your steering wheel or your tail wheel as locked
TAB	Toggles your Icons for the range circles
Back Space	Toggles your bombs in Blenheim MK IV from 250-40's
Ctrl C	Toggles your mouse cursor on and off for mouse look
Left Ctrl J	Jettisons all your bomb load
Enter	Brings up chat window and allow you to send message
F1	Toggles chat to be sent on 1st selected text channel
F2	Toggles chat to be sent on 2nd selected text channel
F3	Toggles chat to be sent on 3rd selected text channel
F4	Toggles chat to be sent on 4th selected text channel
F8	Toggles War Emergency Power on and off
F9	Take screen shot
Page Up	Bomb site setting for
Page Down	Bomb site setting for
Home	Bomb site setting for

End	Bomb site setting for
Num pad del	Zoom in for all positions
Num pad 0	Instrument views for positions that have that ability.
Num pad 1-9	View around the cockpit. You can also look around in the mouse look mode or by using the Track IR3.

Appendix B: Conversion Chart

Planes Altitude – City's Altitude = Bomb site Altitude settings.

Feet	meter	km
10,000 ft	3048 m	3.0 km
10,500 ft	3200 m	3.2 km
11,000 ft	3325 m	3.3 km
11,500 ft	3505 m	3.5 km
12,000 ft	3657 m	3.6 km
12,500 ft	3810 m	3.8 km
13,000 ft	3962 m	3.9 km
13,500 ft	4114 m	4.1 km
14,000 ft	4267 m	4.2 km
14,500 ft	4419 m	4.4 km
15,000 ft	4572 m	4.5 km
15,500 ft	4724 m	4.7 km
16,000 ft	4876 m	4.8 km
16,500 ft	5092 m	5.0 km
17,000 ft	5181 m	5.1 km
17,500 ft	5334 m	5.3 km
18,000 ft	5486 m	5.4 km
18,500 ft	5638 m	5.6 km
19,000 ft	5791 m	5.7 km
19,500 ft	5943 m	5.9 km
20,000 ft	6096 m	6.0 km

Remember to set your site by the subtracting the City Altitude from your drop Altitude. Example Düsseldorf's city altitude is 125ft / 38m you will be dropping from 10,000ft. 10,000 – 125= 9,875 so your bombsite needs to be set at 9,875 (+/- 5)

Appendix C: Bomb Strike Checklist

Preflight

_____ Formation set
_____ Give information on Mission & Operation settings
_____ Preflight **Check off list**
- _____ lock Tail wheels or Steering wheel
- _____ Check all doors & canopies are closed
- _____ Set engines to Max Max with Wep ON
- _____ Flaps (If you like up to Pilot)

Take off

_____Start up Engines
_____ Power up throttle holding breaks
_____ Start Rolling
_____ Rotate to lift off
_____ Gear & Flaps stowed
_____ Give Direction & power settings for climb to Cruise Altitude

_Flight

____ Call Heading for Way Point (WP) or Lat Long lines to be traveled
____ Call WP # made and gives the heading to next WP (repeat as needed)
____ Call IP Arrival **IP Check List** confirm settings
- _____ Open doors
- _____ Bombsite Altitude setting
- _____ Bombsite Speed (IAS) setting
- _____ Egress route
- _____ Rally point (If needed)

Bomb Drop

____ (Glide only) Give order to begin decent
____ Call Target on map and Visual
____ (Level) Lead bombardier calls drop or drop on your own
____ Egress as planned reconfirming routes and close doors

Egress & RTB

____ Close doors and give RTB AF as well as secondary AF (if needed)
____ Call heading to next WP (repeat as needed) Start decent to AF as needed

Landing

____ Call **Landing Check List**
- _____ Approach direction
- _____ Gear & Flap deployment
- _____ Throttle settings

____ Call final approach
____ Touch down, taxi, and shut down report mission info on text CH 3

Appendix D: City Altitudes

1.18.4 by McCully

City & Alt
A
Aachen City 535 ft /163 m AF 855 ft / 261 m
Aalst 30 ft / 9 m
Aalter 50 ft / 15 m
Aarschot 180 ft / 55 m
Abbeville City 25 ft / 8 m AF 65 ft / 20 m
Achel 125 ft / 38 m
Albert 250 ft / 76 m
Amiens 90 ft / 20 m
Andenne 280 ft / 85 m
Anhee City 400 ft / 122 m AB 305 / 93 m
Antheny 805 ft / 245 m
Antwerp 5 ft / 2 m
Ardres 90 ft / 27 m
Arendonk 90 ft / 27 m
Arlon 1275 ft / 389 m
Armetieres 60 ft / 18 m
Arras 220 ft / 67 m
Ashford 530 ft / 162 m
Ath 135 ft / 41 m
Attigny 285 ft / 87 m
Aubenton 715 ft / 218 m
Aubigny 420 ft / 128 m
Avelgem 45 ft / 14 m
Avesnes 515 ft / 157 m
B
Baarle-Hertog 85 ft / 26 m
Bailleul 70 ft / 21 m
Bapaume 425 ft / 130 m
Bastogne 1675 ft / 511 m
Bavay 490 ft / 149 m
Beaumont 610 ft / 186 m
Beauraing 750 ft / 229 m
Beauvais City – not built AF 295 ft / 90 m
Berck Plage 5 ft / 2 m
Bergheim 330 ft / 101 m
Bergues 10 ft / 3 m
Berlaimont 475 ft / 145 m
Bernay 125 ft / 38 m
Berry-Au-Bac 210 ft / 64 m
Bertincourt 410 ft / 125 m
Bertrix City 1405 ft / 428 m AF 1425 / 434 m
Bethenville 370 ft / 113 m
Bethune 85 ft / 26 m
Bievre 285 ft / 87 m
Biggin Hill 500 ft / 152 m
Bilzen 190 ft / 58 m
Binche 405 ft / 123 m
Bitburg City 1000 ft / 305 m AF 1165 ft / 365 m
Bohain 445 ft / 136 m
Boom 10 ft / 3 m
Bouchain 125 ft / 38 m
Bouillet 635 ft / 194 m
Bouillon 1010 ft / 308 m
Boulay 900 ft / 274 m
Boulogne 15 ft / 5 m
Bouzonville 730 ft / 223 m
Boxtel 30 ft / 9 m
Brakel 135 ft / 41 m
Breda 20 ft / 6 m
Breskens 5 ft / 2 m

Brest 5 ft / 2 m (not built)

Brighton 5 ft / 2 m

British Training 5 ft / 2 m

Brouwershaven 5 ft / 2 m

Bruay 545 ft / 166 m

Brugge 15 ft / 5 m

Bruhl 210 ft / 64 m

Brussels City 180 ft / 55 m
AF 150 ft / 46 m

Buzancy 705 ft / 215 m

City & Alt

C

Calais 15 ft / 5 m

Cambrai City 260 ft / 98 m
AF 320 ft / 79 m

Canterbury 155 ft / 47 m

Carignan 575 ft / 175 m

Cassel 375 ft / 114 m

Catillon 455 ft / 139 m

Caudry 400 ft / 122 m

Cerfontaine N City 825 ft / 252 m
S City 810 ft / 247 m

Champlon 1345 ft / 410 m

Charleroi 350 ft / 107 m

Chareville 435 ft / 133 m

Chaumont 400 ft / 122 m

Chevron 975 ft / 297 m

Chichester City 75 ft / 23 m
AF 35 ft / 11m

Chilly 675 ft / 206 m

Chimay City 845 ft / 258 m
N AB 770 ft / N AB 235 m

Chuignolles 280 ft / 85 m

Ciney 835 ft / 255 m

Clermont AF 300 ft / 91 m City – not built yet

Clervaux 1625 ft / 495 m

Cobreville 1450 ft / 442 m

Coltishall City not built yet
AF 15 ft / 5 m

Conde 65 ft / 20 m

Consenvoye 445 ft / 136 m

Corbie 320 ft / 98 m

Couvin 675 ft / 206 m

Cromstrijen 5 ft / 2 m

D

Damvillers 725 ft / 221 m

Daun 1625 ft / 495 m

Deal 5 ft / 2 m

Deinze 40 ft / 12 m

Den Haag 5 ft /2 m

Dendermonde 5 ft / 2 m

Densborn 1730 ft 528 m

Derringstone 425 ft / 130 m

Diksmuide 45 ft / 14 m

Diest 100 ft / 30 m

Diksmuide 45 ft / 14 m

Dinant 325 ft / 99 m

Dizy 405 ft / 123 m

Dordrecht 5 ft / 2 m

Dormagen 150 ft / 46 m

Douai 140 ft / 123 m

Doullens 345 ft / 105 m

Dover 5 ft / 2 m

Dun 445 ft / 136 m

Dunkerque 15 ft / 5 m

Duren 420 ft / 128 m

Düsseldorf City 125 ft / 38 m
AF 165 ft / 50 m

E

Eastchurch 5 ft / 2 m

Echternach 610 ft / 185 m

Eeklo 25 ft / 8 m

Eersel 105 ft / 32 m

Eghezee 530 ft / 162 m

Eind 90 ft / 28 m
Eindhoven 60 ft / 18 m
Elsloo 290 ft / 88 m
Enghien 245 ft / 75 m
Erkelenz 320 ft / 98 m
Esch 1195 ft / 364 m
Escoeuilles 445 ft / 136 m
Etain 705 ft / 215 m
Ettelbruck 670 ft / 204 m
Etten-Leur 40 ft / 12 m
Eupen 950 ft / 290 m
Euskirchen 540 ft / 165 m
Evrange 745 ft / 227 m
City & Alt

F

Faversham 150 ft / 46 m
Fechain 125 ft / 38 m
Feschaux 775 ft / 236 m
Fixecourt 55 ft / 17 m
Flamierge 1550 ft / 472 m
Flavion 845 ft / 258 m
Florenville 1120 ft / 341 m
Folkestone City 5 ft / 2 m
AF 450 ft / 137 m
Fontoy 1000 ft / 305 m
French Training 5 ft / 2 m
Frevent 365 ft / 111 m
Fruges 395 ft / 120 m

G

Gedinne 1235 ft / 376 m
Geel 65 ft / 20 m
Geilenkirchen 285 FT / 87 M
Gembloux 550 ft / 168 m
Genk 255 ft / 78 m
Gent 20 ft / 6 m
Geraardsbergen 245 ft / 75 m
German Training 5 ft / 2 m
Gerolstein 1630 ft / 497 m
Gilze 55 ft / 17 m
Givet 340 ft / 104 m
Gomont 220 ft / 67 m
Gorisboek 5 ft / 2 m
Gosport 5 ft / 2 m
Gouvy 1580 ft / 482 m
Grandpre 485 ft / 148 m
Gravelines 10 ft / 3 m
Gravenpolder 5 ft / 2 m
Grevenbroich 470 ft / 143 m
Grevenmacher 440 ft / 135 m
Griendtsveen 105 ft / 32 m
Grobbendonk 65 ft / 20 m
Guise 375 ft / 114 m

H

Haamstede 5 ft / 2 m
Habay 1260 ft / 384 m
Hahn City – not yet built
AF 1580 ft / 482 m
Halle 145 ft / 44 m
Hallschlag City 1970 ft / 600 m AF
2050 ft / 625 m
Hamoir 1765 ft / 538 m
Hampteau 705 ft / 215 m
Hannut 460 ft / 140 m
Hasselt City 150 ft / 46 m
N AB 170 ft / 52 m
Hastiere AB 335 ft / 102 m
City (West Hill) 535 ft / 163 m
Havelange 865 ft / 264 m
Haybes 365 ft / 111 m
Hazebrouch 100 ft / 30 m
Heerlen 450 ft / 137 m
Heiderscheid 1500 ft / 457 m
Heinsberg 130 ft / 40 m
Helchteren 240 ft / 73 m
Hellevoetsluis 5 ft / 2 m

Helmond 65 ft / 20 m
Herbeumont 1010 ft / 308 m
Hesdin 155 ft / 47 m
Hillesheim 1485 ft / 452 m
Hirson 625 ft / 191 m
Hoogstraten 65 ft / 20 m
Hornchurch City 110 ft / 34 m
AF 165 ft / 50 m
Houffalize 1250 ft / 381 m
Hulst 5 ft / 2 m
Hürtgenwald 1295 ft / 395 m
Huy 275 ft / 84 m

I

Ieper 105 ft / 32 m
Ijzenduke 10 ft / 3 m
Ipswich 5 ft / 2m
City & Alt
Jabbeke 25 ft / 8 m
Jarny 690 ft / 210 m
Jodoigne 355 ft / 108 m
Julich 290 ft / 88 m
Juniville 320 ft / 98 m
Jurbise 245 ft / 75 m

K

Kaarst 135 ft / 41 m
Kalmthout 75 ft / 23 m
Kamperland 5 ft / 2 m
Kats 5 ft / 2 m
Kempen 120 ft / 37 m
Kerpen City 305 ft / 93 m
AF 330 ft / 100 m
Keil 5 ft / 2 m (not built)
Knokke 10 ft / 3 m
Köln City 160 ft /49 m
AF 165 ft / 50 m
Kortrijk 80 ft / 24 m
Krabbendijke 5 ft / 2 m
Krefeld 115 ft / 35 m
Kreuzberg 1180 ft / 360 m

L

La Bassee 85 ft / 26 m
La Capelle 725 ft / 221 m
La Fere 170 ft / 52 m
La Roche 1180 ft / 360 m
Landrecies 475 ft / 145 m
Langenfeld 170 ft / 52 m
Laon 230 ft / 70 m
Launois 720 ft / 220 m
Le Catelet 330 ft / 101 m
Le Chesne 560 ft / 171 m
Le Crotoy 10 ft / 3 m
Le Quesnoy 440 ft / 134 m
Le Touquet City 20 ft / 6 m
AF 10 ft / 3 m
Lens 145 ft / 44 m
Leopoldsburg 175 ft / 53 m
Leuven 70 ft / 21 m
Leuze 190 ft / 58 m
Liart 780 ft / 238
Libin 1370 ft / 418 m
Libramont 1540 ft / 469 m
Liege 265 ft / 81 m
Lier 10 ft / 3 m
Lille Center Third 130 ft / 40 m
Northern Tip 95 ft / 29 m
Southern Tip 175 ft / 53 m
AF 95 ft / 29 m
Lillers 95 ft / 29 m
Lislet 495 ft / 151 m
Lokeren 10 ft / 3 m
Lommel 165 ft / 50 m
Longuyon 1020 ft / 311 m
Longwy 1035 ft / 316 m
Losheim 1000 ft / 305 m
Louviere 425 ft / 130 m

Lumbres 225 ft / 68 m

Luxembourg 900 ft / 274 m

Lympne 250 ft / 76 m

City & Alt

M

Maaseik 115 ft / 35 m

Maastricht 195 ft / 59 m

Maldegem 30 ft / 9 m

Malmedy 1595 ft / 486 m

Manhay 1580 ft / 482 m

Maninghem 615 ft / 188 m

Marche 1110 ft / 338 m

Margate 5 FT / 2 m

Mariemburg 525 ft / 160 m

Marle 370 ft / 112 m

Marquion 225 ft / 69 m

Marquise 145 ft / 44 m

Martelange 1475 ft / 450 m

Martelsham (City not yet built)
AF 70 ft / 21 m

Maubeuge City-AB 470 ft / 143 m
AF 435 ft / 133 m

Mazagran 510 ft / 155 m

Mean 920 ft / 280 m

Mechelen 10 ft / 3 m

Mechenheim 1590 ft / 485 m

Mendig City – not yet built
AF 245 ft / 175 m

Menen 75 ft / 23 m

Merbes 450 ft / 137 m

Mersch 725 ft / 221 m

Merzig 565 ft / 172 m

Mettet 850 ft / 259 m

Metzervisse 765 ft / 232 m

Metz 545 ft / 166 m

Moerdijk 5 ft / 2 m

Mol 185 ft / 56 m

Monschen-Gladbach 230 ft / 70 m

Mons 140 ft / 43 m

Monschau 1720 ft / 525 m

Montfaucon 960 ft /293 m

Montherme City 430 ft / 131 m
AB 1045 ft / 319 m

Montmedy 650 ft / 198 m

Montreuil 165 ft / 50 m

Mouzon 435 ft / 133 m

Musch 1240 ft / 378 m

N

Namur 295 ft / 90 m

Nandrin 720 ft / 220 m

Neiderkassel 190 ft / 58 m

Neiderkruchten 210 ft / 65 m

Nettersheim 1745 ft / 532 m

Nettetal 170 ft / 52 m

Neufchateau 1475 ft / 450 m

Neufchatel 210 ft / 64 m

Neuss 135 ft / 41 m

Neuvillette 320 ft / 98 m

Ninove 70 ft / 20 m

Nivelles 415 ft / 127 m

Nouvion 645 ft / 197 m

O

Oostende 15 ft / 5 m

Oosterhout 30 ft / 9 m

Oostmalle 65 ft / 20 m

Oplade 195 ft / 59 m

Orchies 120 ft / 37 m

Orval 770 ft / 235 m

Ouddorp 5 ft / 2 m

Oudenaarde 45 ft / 14 m

P

Paal 100 ft / 31 m

Panningen 130 ft / 40 m

Peer 220 ft / 67 m

Peronne 190 ft / 58 m
Philipville 760 ft / 232 m
Piennes 1030 ft / 314 m
Piesport 400 ft / 122 m
Poperinge 100 ft / 30 m
Profondeville 295 ft / 90 m
Prum 1590 ft / 485 m
City & Alt

R

Ramet 275 ft / 84 m
Ramsgate 5 ft 2 m
Ratingen 130 ft / 40 m
Raville 930 ft / 283 m
Reims City 280 ft / 85 m
AF 320 ft / 98 m
Remich 460 ft / 140 m
Rethel 235 ft / 72 m
Revin 565 ft / 172 m
Rochefort 895 ft / 273 m
Rocroi 1130 ft / 344 m
Roermond 100 ft / 30 m
Roermond West 100 ft / 30 m
Roisel 310 ft / 95 m
Ronse 140 ft / 43 m
Roosendaal 25 ft / 8 m
Roubaix 110 ft / 34 m
Roulers 75 ft / 23 m
Rozoy 600 ft / 183 m

S

S-Hertogenbosch City 30 ft / 9 m
AF 50 ft / 15 m
Saarburg 725 ft / 221 m
Sains-Richaumont 475 ft / 145 m
Sambreville 345 ft / 105 m
Samer 270 ft / 82 m
Sandwich 5 ft / 2 m
Saulty 565 ft / 172 m
Schilde 25 ft / 8 m
Schleiden 1700 ft / 518 m
Schweich 405 ft / 123 m
Sechault 450 ft / 137 m
Seclin 95 ft / 29 m
Sedan 440 ft / 134 m
Seick-les-Bains 485 ft / 148 m
Signy City 545 ft / 166 m
East AB 650 ft / 198 m
Sissonne 280 ft / 85 m
Sittard 320 ft 98 m
Soignies 330 ft / 101 m
Solesmes 300 ft / 91 m
Sommepy 730 ft / 155 m
Somzee 730 ft / 223 m
Spa 1015 ft / 309 m
Spijkenisse 5 ft / 2 m
Spincourt 855 ft / 261 m
Spontin 685 ft / 209 m
Sprimont 700 ft / 213 m
Stadtkyll 1985 ft / 605 m
Steenbergen 5 ft / 2 m
Stekene 15 ft / 5 m
St. Hubert 1530 ft / 466 m
St. Niklaas 50 ft / 15 m
St. Omer City 30 ft / 9 m
AF 225 ft / 68 m
St. Pol 415 ft / 127 m
St. Quentin 265 ft / 81 m
St. Ricquier 195 ft / 59 m
St. Truiden 205 ft / 62 m
St. Vith 1515 ft /462 m
Stavelot 1485 ft / 453 m
Staveniss 5 ft / 2 m
Stellandam 5 ft / 2 m
Stenay 565 ft / 172 m
Stromness 5 ft / 2 m (not built)

City & Alt
T
Talmas 435 ft / 133 m
Temse 5 ft / 2 m
Terneuzen 5 ft / 2 m
Thionville 435 ft / 133 m
Thulin 120 ft / 37 m
Tielt 135 ft / 41 m
Tienen 145 ft / 44 m
Tilburg 45 ft / 14 m
Tongeren 300 ft / 91 m
Tornhout 65 ft / 20 m
Tourcoing 110 ft / 34 m
Tournai 50 ft / 15 m
Trelon 785 ft / 239 m
Trier 440 ft / 134 m
Tuntange 1165 ft / 355 m
Turnhout 70 ft / 21 m
V
Valenciennes 70 ft / 21 m
Valkenswaard 85 ft / 26 m
Veere 5 ft / 2 m
Veghel 45 ft / 14 m
Venlo 130 ft / 40 m
Verdun City 435 ft / 133 m Abbe 870 ft / 265 m
Verviers City 880 ft / 268 m AF 1100 ft / 335 m
Vervins 565 ft / 172 m
Veurne 10 ft / 3 m
Vianden 1100 ft / 335 m
Villers - Bretonneux 340 ft / 104 m
Vireaux 580 ft / 177 m
Virton 780 ft / 238 m
Vise 285 ft / 87 m
Vitry-En-Artois 180 ft / 55 m
Vlissingen 5 ft / 2 m
Vouziers 325 ft / 99 m
W
Waalwijk 30 ft / 9 m
Walcourt 750 ft / 229 m
Walsoorden 5 ft / 2 m
Waremme 395 ft / 120 m
Warmeriville 275 ft /84 m
Waterloo 385 ft / 117 m
Watten 35 ft / 11 m
Wavre 275 ft / 84 m
Weert 110 ft / 33 m
Wellin 820 ft / 250 m
Westkapelle 5 ft / 2 m
Westvoorne 5 ft / 2 m
Wetteren 10 ft / 3 m
Whitstable Main City 150 ft / 46 m North Tip 30 ft / 9 m Dock 5 ft / 2 m
Willemstad 5 ft / 2 m
Wiltz 1490 ft / 454 m
Wingham 50 ft / 15 m
Wissant 5 ft / 2 m
Wittlich 545 ft / 166 m
Wollersheim 525 ft / 160 m
Wuustwezel 65 ft / 20 m
Z
Zandvliet 15 ft / 5 m
Zeebrugge 5 ft / 2 m
Zelzate 5 ft / 2 m
Zemmer 1250 ft / 381 m
Zerf 1400 ft / 427 m
Zottengem 210 ft / 64 m
Zundert 50 ft / 15 m