# Wing Leader


# Scenario Creation

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version 1.8

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# SCENARIO CREATION

If you want to create scenarios for *Wing Leader*, here are some notes to get you started.

## FUN

The ultimate goal of a scenario is fun, whether you measure that by meaningful decisions to be made, interesting narrative, or close-run fights.

## HISTORICITY

Though it's good if a scenario enlightens, it's best if it entertains. Don't feel confined by fidelity to history.

In our experience trying to cleave too closely to history can result in stilted scenarios, or scripted experiences that play out the same way every time. Feel free to adjust orders of battle or set-ups. *Wing Leader* is an impressionistic game that requires an artful approach to scenarios. First and foremost a scenario should be enjoyable to play.

## VARIETY

What differentiates your scenario from others and makes it unique? It's easy to take a cookie-cutter approach to scenario design by taking an existing scenario as a template and swapping out aircraft. Instead, you should sse the full palette of tricks in this document to mix things up.

## GAME MODES

The default mode for the game is the raider/defender match up and the asymmetry that creates. However, it doesn't have to be that way. Though one player will always be 'raider' and the other 'defender', we can accommodate raider-on-raider games simply by adding bombers to the defender's side.

## SCENARIO SIZE

As the title implies, *Wing Leader* is about battles at wing strength or greater. This differentiates it from games focussed on dogfights with individual aircraft. There are plenty of historical skirmishes involving handfuls of aircraft, particularly in the peripheral theatres of war, but *Wing Leader* is about the battles that are too large for dogfight games to handle.

Small scenarios with just a few counters on each side may lack tactical options, or can turn on the results of one or two critical die rolls. The greater the number of units in play, the less likely the game will be swung by lucky die rolls.

## ORDERS OF BATTLE

One of the few hard rules for scenario design is that units of 7 aircraft or more are squadrons and those with 6 or fewer aircraft are flights. Historical sources often refer to numbers of aircraft rather than squadrons. These numbers may require interpreting to determine the number of game units (see sidebar).

Craft orders of battle as you feel fit, making allowance for the counter mix. Some aircraft types have several flight counters while others have few. Don't forget marker counters in the counter mix limits; it's surprising how that might catch you out, particularly with regards to gun pods or rocket markers. Even common markers might be in short supply. You might find yourself short if you start all your forces with low ammo or lots of Experten.

**Using These Notes.** There are few hard-and-fast rules in these notes. Treat them as guidelines.

We hope these notes encourage you to make scenario content to publish online or in a fanzine. If a good scenario comes to our attention we may ask you if we can publish it officially.

**Remaking Scenarios with Different Aircraft.** A key *Wing Leader* design concept is that WW2 aircraft advanced by generations. Aircraft of the same generation performed similarly, which means that remaking a scenario by simply swapping out aircraft is unlikely to result in much variation.

**Raider-on-Raider Scenarios.** Pay close attention when building a raider-on-raider scenario. Conventions such as the defenders being alerted while the raiders are not, or raiders setting up first, may need to work differently in a raider-on-raider game.

**Wing Strength.** What is wing strength? An RAF wing could often be as small as two squadrons, while a German *Gruppe* was around three. However, scenario designers should think in terms of units, the number of squadrons and flights in play. A side should always have at least two units on the board at the start, and scenarios of three or more units on each side are preferred.

**Embiggening Scenarios.** One technique that works to make scenarios of adequate size is to take two smaller skirmishes that took place in the same vicinity and put them both into the same scenario, possibly on different sections of the map.

**Interpreting Numbers.** If you work from historical sources, you can break down numbers of aircraft into squadron or flight-sized units. Be aware that air force organisations varied. For example, in the Battle of Britain the RAF flew in squadrons of 12, while Luftwaffe *Staffeln* often flew in understrength formations 8-9 strong. So a force of 24 aircraft on each side might break down into two RAF squadrons against three German squadrons!

Odd numbers of aircraft might require a more free interpretation. A reference to an MC.200 force of 15 aircraft from two *Squadriglia* can be represented as three flights, or one flight and a squadron, or maybe two squadrons of 8. Don't be afraid to jigger formation sizes to get a fit.

Though the game is based around squadron-sized units, don't ignore flights. Carrier units (particularly the USN) often deployed in flight-sized divisions rather than squadrons. Enemies that have tactical flexibility may deploy as flights to maximise the airspace they control.

Not every wing-sized group of units in the game is a wing. Only designate wings in the scenario where wing tactics have been developed and a formation is operating as a wing entity (see sidebar).

### Aircrew Quality

Aircrew quality is an important way to distinguish between sides. A feature of the game is that performance is uneven–the proportion of good squadrons to bad ones varying with the air force and the era. The mix of Veteran, Trained and Green squadrons should be a snapshot of how an air force performed at that stage of the war.

To start, divide an order of battle into portions, such as halves, thirds, or quarters, and then assign Veteran, Trained, or Green status to each portion. So you might have one-third Veteran squadrons and two-thirds Trained. How you assign those portions is based on your reading of the air force performance of that era. Appendix 1 in this document discusses aircrew quality at length and gives the designer's personal take.

Note that apportioning is always just a starting point for a scenario designer, not a hard rule. Testing often reveals the need to evolve towards more or less quality, and few scenarios stick with the starting portions.

### Matching Forces

The game has something of a 'chess-like' quality to it. Even where overmatched in quality, fighter units cancel out enemies by drawing them into combats that exhaust their ammo or inflict disruptions. So you must consider numerical advantage.

If interceptors lack a numerical advantage over escorts they might not be able to reach the bombers. The amount of hurt inflicted on bombers often depends on whether interceptors outnumber escorts. Tactical flexibility can aid interceptors by doubling the number of units able to slip past the escorts.

Advantages in aircraft performance, aircrew quality and positional factors such as altitude or the Sun location can help where there is numerical disparity. However, these factors don't entirely substitute for numbers.

## SET-UP

The arena for fighting is sufficiently small that you should be able to get opponents into action quickly. However, if you want to give the interceptor the opportunity to make meaningful tactical choices before combat, then you should think about setting forces up far apart.

Setting up enemies close together gets them into action quickly, though this risks removing decision-making from a player. Giving the players the ability to commit to different strategies is important. If there's little space and squadrons are 'fighting in a phone booth', then you'll need to make the first turn an intriguing puzzle to crack, with options as to which targets need to be tallied and attacked first.

Consider the geometry of the fight; are the interceptors in a head-on intercept or a pursuit? Pursuits are lengthy given the movement differential on the map (fighters only gain one square a turn on a bomber force). Don't be tempted to make all intercepts head-on. There's no reason why interceptors can't set up both in front of and behind a raid (some of these representing interceptors coming from the flanks). Mix it up.

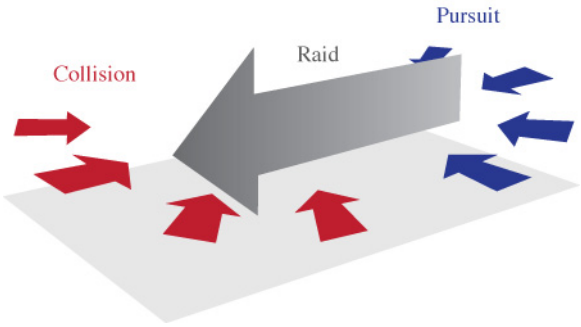
Consider the missions of the squadrons. Are escorts close or distant? Do sweep formations protect the bombers from forward or rear interception?

**Wings.** For sweep operations German *Gruppen* could operate as wings from the earliest stages of the war. The British developed wing tactics for defence in 1940 and offence in 1941. The Soviets developed the 'Kuban escalator' as a wing-like formation in the spring of 1943. American 16-plane fighter squadrons of the late war were the size of small wings and can be deployed in the game as two (game) squadrons in wing formation.

**Countermix: Tactical Flexibility.** A problem that can easily wrongfoot designers is assigning tactical flexibility to aircraft that have insufficient flight counters available. Avoid this if you can.

**Countermix: Substitution.** Miniatures gaming is an influence on the design of *Wing Leader*. Part of the pleasure is in the visual appearance of the game. However, at times you won't have the assets to make a scenario look perfect. The designer will need to substitute counters when the only ones available are in the wrong colour scheme.

Boston squadrons can double-up as American or Russian A-20s, while P-40Fs can pass as P-40Es at a pinch. However, you might be reticent about using RAF P-40B counters for Kittyhawks, as the aircraft look very different. If you need to substitute counters it's worth noting this in the scenario special rules.




**Courses.** Imagine the raid heading towards the target. The 'side view' presentation of *Wing Leader* means that interception, even from the side or a quarter, can be broken down into some form of pursuit or collision course. Interceptors are either chasing raids or confronting them head-on.

**Combat and History.** The core of the combat system is the Air Combat Table. As it is based on two six-sided dice it can generate extreme results, but in practice it will tend toward a mean, which means that some scenarios might not generate historical levels of casualties. Scenario V05: *Haway the Lads* is likely to be more generous to the Germans than the historical action, because of this trend towards the mean. So the victory conditions may need to be based on the mean result rather than history.

What's the Air Combat Table based on? Truthfully, there's no combat data on individual engagements that we could draw on. Instead, the Combat Table generates exchange rates. Exchange rate data is the strongest we have access to and the Table approximates historical exchange rates.

Still, the Air Combat Table is open to challenge. It's a model that turns out results that are ballpark in many (maybe most) historical situations. And it will generate wrong results in some others.

Of course, if a battle was a blowout but the game rarely generates this result, it's tempting to place a finger on the scale and handicap the losing side with Green markers, Rigid doctrine or scenario special rules. Be cautious about forcing the game to produce the exact result, as it's another way of putting the scenario 'on rails' with no chance to alter history.

Differences of altitude have profound effects on the set-up geometry. Are interceptors climbing into the fight, slowing their movement? Or can they convert a height advantage into extra MP?

The +1 cohesion modifier for attacking gives attackers a big advantage in air combat, so a set-up that gives a side a good attacking position can make up for an imbalance of numbers or quality.

Variable set-ups are worth experimenting with, though they will increase the number of test iterations you need to run.

A final thing to think about is the set-up order: who sets up first? It might not always be the raider. If players have the freedom to set up where they want (for example, choosing their column and altitude) then the player who sets up last gets a significant advantage.

### Altitude

Altitude is the critical dimension in terms of position and performance. Height gives a side the ability to convert altitude into extra squares of movement, or enter combat with a speed bonus.

For reference, battles that start at 10,000 feet will begin around altitude 5 or 6. 15-16,000 feet (a common altitude for Battle of Britain bombers) is altitude 8 or 9. 20,000 feet is around altitude 11. The operating height of B-17 boxes are around altitude 12-13, which you'll notice is just in the negative modifier zone for direct fire flak and also the top of the optimum performance bracket for many German aircraft types.

In the early war, aircraft on both sides operated within similar altitude bands. By the late war Allied fighters were effective at far higher altitudes than their opponents. This is something that the scenario designer can play with, for example forcing squadrons with poor high-altitude performance to high altitudes.

## WEAPONS AND EQUIPMENT

Squadrons can carry various pieces of equipment.

### Drop Tanks

Drop Tanks are best employed in scenarios where a squadron might be surprised and attacked before it can jettison the tanks. Otherwise, they add little to play.

### Air-to-Air Rockets

The Luftwaffe was the sole user of air-to-air rockets. The first deployments were in the spring of 1943 and should only appear in scenarios featuring heavy bombers.

### Gun Pods

**Gun Pods.** Some research may be needed on whether gun pods were available in a particular theatre. For example, there's no evidence that pods were used over Sicily or the Italian mainland, but there may be exceptions.

From 1943 the Germans used gun pods aboard fighters tasked with attacking American bombers and Russian IL-2s. The pods come with a combat penalty, which makes for a trade-off in air combat. Note that the rule permits the player to choose whether or not to use gun pods, so the designer's role is limited to whether or not to forbid them.

Axis air forces that flew German-made fighters had few or no gun pods available, so you may need to forbid Finns, Romanians, Hungarians, Bulgarians, etc. from carrying them.

### Gyro Gunsights

**German Gyro Sights.** No German aircraft in the game have the Gyro ability. However, a prototype gyro sight was alleged to have been operationally tested by the Luftwaffe, so there may be scope for a scenario that features a flight equipped with the Gyro ability by special rule.

The RAF used gyro sights aboard Spitfires from February 1944, but they weren't in widespread use in the Spitfire fleet until May 44. The USAAF in Europe had some squadrons of P-51s equipped for operational trials in July and August 1944, but widespread adoption did not occur until September 44 onwards. The USN rarely used gyro sights, and then only in a few units in 1945.

## ENVIRONMENT

The environment is a vital art of building scenarios. It's one of the easiest ways to inject variety and tactical puzzles into the game.

Research real-world cloud formations and let that inform your cloud placement. Cloud can appear at all altitudes, but dense cloud will tend to crowd low, around altitude 1 to 3. Cloud can be quite tall: potentially 2, 4 or 6 levels high. Don't just confine it to thin layers or 'blobs'.

Cloud is hard to use offensively. Rather, it is a form of defensive terrain. It obscures enemies and is a means of escape from pursuit. However, cloud is a double-edged sword. Bomber squadrons that hide in cloud are more vulnerable to disruption from cohesion checks.

Include haze and contrails only where it was significant in the historical battle. Think carefully about the placement of the Sun. Consider which side it benefits and how squadrons would need to move to exploit it.

Though we don't differentiate between land and sea, if ships are protected from attack by torpedoes by the presence of land, you may need a special rule defining the direction torpedo bombers can attack from.

**Cloud Layers.** Scenario V20, *Here Come the Last Fifty Spitfires* gives an example of overcast across the entire map, forming a dense floor into which squadrons can easily escape.

**Cloud Advice.** Be adventurous with cloud. It's tempting to arrange cloud around a fight, to frame it, rather than making it an integral part of the fight.

Identify the portions of the map where action are likely to take place and deploy layers of cloud to create channels to divide movement, or to create havens for fighters or bombers. Don't forget that a square of wispy cloud adds one to tally rolls, and broken cloud adds two, which can really shake up situations where forces come close.

## RADIOS AND GCI

In most scenarios we assume that fighters have radios and that interceptors are under GCI. However, you should consider what effects a lack of radios or GCI has on a fight. Some early war scenarios lack ground control altogether, such as the Soviets prior to Stalingrad. Interceptor squadrons without GCI are locked into their starting vectors.

GCI values are a measure of the command and control situation and represent factors such as competency of ground controllers and the types of radio used. The sidebars give examples of how you might apply this in scenarios. You should set a GCI rating appropriate to your situation. High values encourage careful vectoring. Low values encourage players to whizz about as they wish.

**Radio Effects on GCI.** In the Battle of Britain, the RAF had a mature ground control system, but their HF radio set was short-ranged and suffered poor reception. So GCI is rated 4 in many BoB scenarios. The long-ranged VHF sets used after the battle were superior, and improve GCI to a rating of 3.

**Soviet GCI.** Soviet scenarios set around the time of Stalingrad should reflect the lack of radio sets in frontal air units and inexperience with ground control. A GCI rating of 5 or 6 may be appropriate. From Kursk onwards, radios were commonly available and procedures had matured. GCI ratings of 4 and even 3 are appropriate after this watershed.

**GCI Without Radio.** As written, the rules prevent radioless aircraft from benefitting from GCI. However, sometimes control was possible by use of ground signals. This can be represented by creating a special rule that grants GCI with a rating of 5 or 6. Though it might only be used when above or near a particular point on the ground.

**No Radios.** Pre-war scenarios, particularly those set in China and Spain, may lack radio altogether. Fighter formations in these fights will be far more fragile and prone to disruption.

## SURFACE UNITS

The game comes into its own when you start laying surface targets down on the map. However, don't saturate the map with targets and flak. Only include what you need and no more.

In Pacific scenarios we deploy a fraction of ships that were present at any battle. In part this is to keep flak envelopes and the counter mix manageable, but it also reflects the way in which vessels in task forces were positioned in concentric rings around key assets such as carriers. A raid threading its way to the heart of a taskforce would be engaged only by a fraction of the ships along the flight path.

Ask yourself what targets are needed. Do you require more than one target? Most bombing raids were briefed to hit only single targets, such as a bridge or factory. Only in the case of close air support might you offer more options. You should also consider whether flak units are eligible targets or whether you wish to forbid the player from bombing flak.

## FLAK

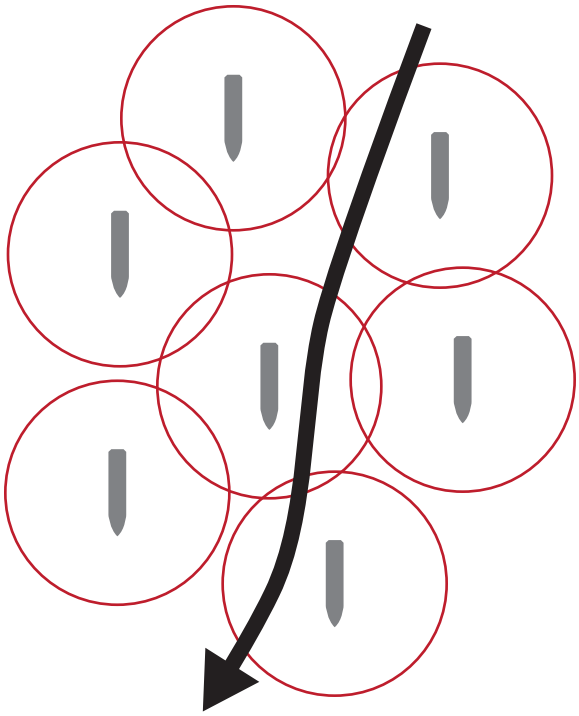
The flak ratings reflect the era, training and equipment of the flak arm.

**L0/H0** flak represents early flak up to 1942, when batteries were small, less experienced and used rudimentary height-finding.

**L1/H1** flak represents mid- to late-war flak, with improved training, more tubes and radar direction.

**L2/H2** flak represents the best late war flak batteries, organised into 'super-batteries' with large numbers of tubes and good training.

**Flak Description.** The descriptions of flak in this section are not set in stone. For example, the L2 flak (Lt Flak B counter) employed in scenario V11: *The Bridges at Sedan* was added to create an especially dense area of flak.



**Flak Threats.** This is the view above a naval taskforce, sailing in formation. The flak from each ship is shown as an overlapping 'threat ring', in red. A raid, represented by a black line, threads its way through the taskforce. Imagine that line to be the slice of airspace represented by the game map's side view. As you can see, we do not need to represent all the ships in the game–only those the raid is threatened by.

**Victory Conditions and History.** It can be a challenge to marry victory conditions to history. We use victory thresholds to make balanced, exciting scenarios. However, what makes for a balanced scenario might not map to history. It's a tradeoff of history against fun.

It's very easy to 'over-flak' scenarios. Too many flak units can result in the game slowing down through flak die-rolls, or for casualties to mushroom due to flak exposure. Experience has taught us to keep the number of flak units down to two or at most three around a target.

In the late war flak gets various 'extras' as scenario special rules. These modifiers add up quickly and turn direct fire into a murderous weapon, and so they should be used sparingly. The following are guidelines for assigning these special abilities.

#### Improved Fire Direction

Flak fire direction improved as the war progressed, with advances in tachymetric optical systems and gun-laying radars. The Allies had an advantage in both areas, but their radars were superior to those of the opposition. Fire control based on the SCR-584 radar was introduced by the US Army in February 1944 and played a role in protecting the UK from flying bombs in the following summer. Thereafter, it was deployed on the continent of Europe.

Improved directors first appeared on American ships in 1943. But it was the Mk 63 fire director, fitted to USN ships from November 1944, that gave the US Navy its definitive flak fire control through to the end of the war. It played a major part in the defence against the Kamikaze.

Though the Germans worked on the fire direction problem, their L-band radars were nowhere near as precise as the American S-band sets and so their flak doesn't rate as having improved fire direction. That said, improved fire direction could be used as a situational bonus for well-trained and equipped super-batteries in the late war.

#### Proximity Fuses

These fuses (known as the VT fuse) first appear in January 1943 aboard USN ships and were in widespread use by 1944. For land-based flak they play a part protecting the UK from flying bombs in the summer of 1944 before being more widely distributed.

#### Dual-fuse Ammo

The Germans experimented with dual-fuse ammo from April 1945, in the final weeks of the war. So this rule should appear rarely, or could be employed as a counterfactual.

## BALLOONS

Barrage balloons are a scenario option that add an interesting obstacle to targets; particularly those that require precision attacks at low level, such as by dive bombing. The raider may need to employ fighter sweeps as balloon busters.

## SPECIAL RULES

There are many opportunities for creativity in the special rules. Feel free to devise interesting mechanics to reflect any special historical events. Special rules are your opportunity to change the core rules and make them better match history. Appendix 5 further discusses special rules.

## VICTORY CONDITIONS

Most scenarios use a common structure for victory conditions, based on VP with three levels of victory. Don't feel the need to use this structure. Victory conditions can be based on other criteria, such as preventing enemies scoring a certain level of damage on a surface target; or breaking an enemy bomber squadron before it can exit. You can even layer VP-based victory with other criteria, so you could determine victory via VP but it's a sudden-death loss if the enemy bombers make it off the map edge unbroken. Don't be afraid to use alternative victory conditions.

VP-based victory conditions reflect the attrition-based nature of air warfare. Historical air warfare was often fought on percentages, measuring loss rates against bombing results.

In games without bombing, the bombing results are measured by bomber squadrons that exit the map. In which case your benchmark for raider performance is based on the average number of squadrons you believe will exit unbroken.

Similarly, in bombing scenarios you should calibrate the victory levels based on the average damage you expect from bombing. For example, if you believe the bombing force is sufficient to inflict heavy damage on a target worth 10 VP, then that 10 VP is your benchmark around which the victory levels are built.

Things can get complex where it is possible to score more than heavy damage on a surface target. Getting multiple surface target VPs from crippling or fatal damage can put a scenario beyond the reach of the defenders. It can make a scenario particularly luck-dependent, able to 'swing' on a hot run of dice. In such situations it is not unreasonable to cap the number of VPs that can be scored from a target using special rules. This technique can also be used where you want the raider to bomb multiple targets, rather than simply farming all the VP from one target.

### Incentives

One of the most important things to keep in mind with the victory conditions is that they are the incentives to player action. A problem we run into with immature scenarios is that of players who figure out they can win by running away without engaging the enemy. This is a sign of poor scenario design and is a particular problem associated with scenarios that feature no bombers at all.

Bombers are a key incentive and keep players honest by focusing the action around the bomber formation. In most scenarios the defender must attack bombers to prevent them racking up exit VP, or to stop them bombing effectively. If the scenario weakens these incentives (for example, by allowing bombers to bomb before defending fighters can get to them) wily players will look to win by avoiding the enemy. In which case you may need to look to strengthen the incentives to fight by other means, such as special rules.

Scenarios that are based entirely around fighter-on-fighter actions are particularly vulnerable to winning by running away, and so special rules or victory conditions based on other criteria, such as exchange ratios, might be necessary.

## PAGE SPACE

The majority of published scenarios fit on a single page. Some take up two pages, but we tend to reserve those for special situations, often with large orders of battle. Page space may seem like a mundane production issue, but we have found that confining scenarios to a single page is good discipline that focuses the designer on what is absolutely necessary to go in, or which can be kept out.

A common 'newbie' trope is to include reams of space-hogging special rules in a scenario when it would benefit on focussing on a handful of well-curated ones. If nothing else, experience shows us that if there are too many special rules in a scenario, some might be forgotten during play.

**Aircraft VP Values.** *Wing Leader* scores VP for individual aircraft losses: 1 VP for single-engined types, 2 VP for twin-engined types and 3 VP for four-engined heavy bombers. Coincidentally, this matches the scoring system the Luftwaffe developed for measuring pilot successes for decorations.

In the second edition of *Wing Leader*, twin-engined fighters are rated as 1.5 VP, so ensure the victory conditions allow for halved VP.

# APPENDIX 1: AIRCREW QUALITY

## GENERAL

Assessments of aircrew quality are made up of the following factors:

**Training.** Flying hours is the key measure of training, particularly hours spent on preparing pilots for combat. Training had to produce qualified flyers and then polish them into effective fighters.

**Doctrine.** The tactics, philosophies and formations of the participants.

Experten are treated separately from aircrew quality. They represent something like 4% of a fighter force's pilots, but they earned maybe 40% of the victories. If we take these figures as broadly representative, this works out at one Experte for every 25 fighters. Scenario designers are free to vary this, but be cautious of jigging the numbers according to the quality of the force. The Luftwaffe ended the war with a strong cadre of Experte flyers leading a corps of green pilots. In the same period, the western Allies had ranks of highly trained pilots but tended to rotate their aces out of the line into other valuable roles, such as staff or training.

In the following sections we examine aircrew quality for each of the major air forces.

**Doctrine.** Treat the 'Rigid' and 'Loose' doctrine rating in the game as an additional modifier to aircrew quality, reflecting pre-war doctrine and formations that persisted into the World War.

## LUFTWAFFE

The Luftwaffe was designed for a short war and was unprepared for a long one. In the end it was overwhelmed by enemy numbers, by technical inferiority, and by the decline in the quality of German pilots.

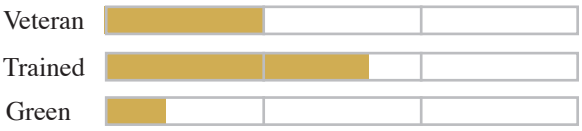
At the height of their success in 1940-41, the Germans underestimated their enemies and failed to increase aircraft production or the pilot reserve. By the time they woke to the growing crisis of strength against the Allies, it was too late. For the rest of the war the Luftwaffe pedalled furiously to maintain its strength against the rate of attrition, and it did this by increasing production of aircraft and pilots.

In the case of the pilots this meant a truncated training syllabus, fewer training hours and less preparation for front line combat. As attrition bit there was a gradual decline in aircrew quality, and we can track some key dates where we see the decline.

**Doctrine for the Luftwaffe.** In 1938 the Luftwaffe developed the *Rotte* and *Schwarm*, flexible two-ship and four-ship formations that were the bedrock of their tactics.

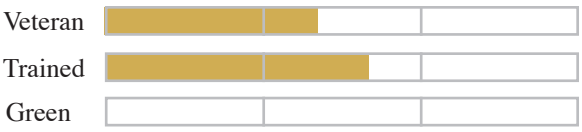
The success of the German doctrine led to copying by the Allies. In the game, German units should benefit from Loose doctrine until the late war when Green aircrew began to dominate and a lack of experienced flight leaders began to affect tactical flexibility. To reflect the poor training of the late war you can consider assigning Rigid doctrine to some German squadrons.

**Quality Guides.** The bar charts below are rough guidelines for the balance of Veteran, Trained and Green aircrews in each era. As discussed earlier, these are starting points for a scenario designer, not hard rules. There is plenty of room for deviation from these guides.




### 1936-1939

The pre-war Luftwaffe was well-trained. In Spain it built cadres of battle-tested flyers. In the Spring of 1938 it began to adopt 'loose' doctrine in its Spanish Bf 109 units, and this was written into the Luftwaffe's doctrine manuals in the autumn of that year. However, the pre-war Luftwaffe was also an expanding service, which brought growing pains, ensuring that the cadre of Spanish veterans was accompanied by large numbers of trained but unbloodied rank-and-file. The Poles in 1939 remarked that there was a world of difference between the regular German pilots, who they thought lacked skill, and the 'Spanish' veterans who they regarded as dangerous.

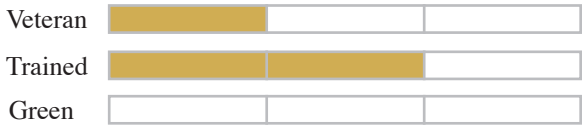



### 1940-Summer 1942

The Luftwaffe began their invasions of the West with combat-experienced flyers and the most advanced fighter doctrine of any air force. However, the Battles of France and Britain stalled the Luftwaffe's growth as it took enormous casualties and had to absorb replacements. Though quality and morale could fluctuate, dipping towards the end of the Battle of Britain, it was in a fine state for the start of the invasion of Russia.

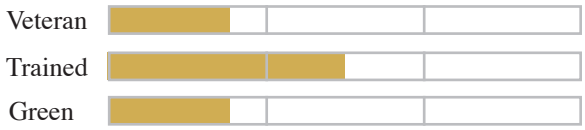
### Summer 1942-Summer 1943

The attack on Russia and continuing action in the Mediterranean resulted in attrition that began to grind up the air force. As yet, the drop in quality was barely noticeable, but the demand for replacements was so desperate that flying hours spent in training fighter pilots were cut in the summer of 1942, a decision in part forced by a lack of fuel for the training establishment. Further cuts would halve the number of flying hours per pilot over the next two years. Cuts to the syllabus, in key areas such as instrument flying, were gradually phased in. Of the 107 German Experten who scored 100+ kills, just 8 joined their squadrons after mid-1942.



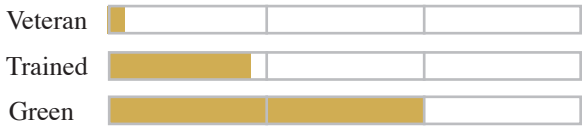

### Summer 1943-Spring 1944

Towards the end of 1943, the losses in the East and Mediterranean had begun to bite. The dearth of well-trained pilot replacements became evident. The lack of instrument flying training, poor formation-keeping and shooting skills severely affected performance, particularly in the Reich defence units. Unit quality varied considerably, with fighter units in the East demonstrating higher levels of skill and aggression (see East and West sidebar).




### Spring 1944-1945

As American Mustangs began to escort raids deep into the Reich, and the Soviets launched their Bagration offensive, a reeling Luftwaffe was pushed over the edge into collapse. It found itself in a death spiral in which novice pilots' inexperience contributed to high losses, which in turn put stress on the training establishment to make good those losses with more novices. The lack of trained leaders compounded the problem. Bomber pilots converted to fighters to make up the numbers, but fuel shortages hit the flying schools hardest, pushing the quality of replacements to rock bottom. Towards the end the Luftwaffe was only able to mount a token resistance.




### The Experten

The story of the German aces ran a different course to that of the rest of the Luftwaffe. Numbers of Experten fell only gradually through the late war, even where the squadrons were in decline. Statistically, the Experten were near-invulnerable—helped by the fact they fought over home soil. Their skills meant the high command kept them flying to the limits of their endurance. The late war has been described as a period in which there were two air forces: one of the Hartmanns and Nowotnys, and the other of the great mass of inexperienced pilots.

**East and West.** The Germans concentrated their experienced pilots on the Eastern Front at the expense of the West. As an example of this, III./JG 53 in the West in August 1944 had four Experten, with two Knights Cross holders boasting 28 and 15 victories each. The rest were youngsters with less than 10 hours on fighters in their log books. By comparison, JG 52 on the Eastern Front could field no less than 13 pilots with more than 100 victories each.

In the East the difference between German quality and Soviet quantity was pronounced up to the spring of 1944. Scenario creators might consider having no Green Luftwaffe squadrons in the East through to the summer of 1944.

## WESTERN ALLIES (US, UK, COMMONWEALTH)

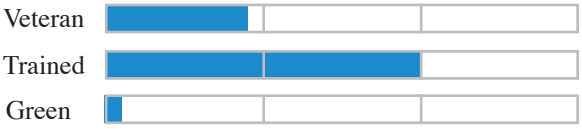
The Western Allies took a different path to the Germans. They overestimated their enemy and then expanded their air forces to address this phantom menace. This put the British two years and the Americans one year ahead of the Luftwaffe by the time the Germans responded.

British and American training was lavish in scale. Flying schools were sited safely away from the fighting in North America and Africa, with plenty of fair weather to fly in. (By comparison, Luftwaffe pupils in Germany were frequently grounded by bad weather.) By 1943, training hours were double those of the German, with far more time spent in operational types of aircraft.

The Allied practice of rotating successful aces out of the front line paid dividends (in contrast to the Germans, who kept theirs in harness). Those experts became trainers or were promoted to roles where they could influence doctrine and air policy. Toward the end of the war the products of the Allied training establishment had almost two years in uniform before they ever flew a combat sortie, and were honed to a fine edge.

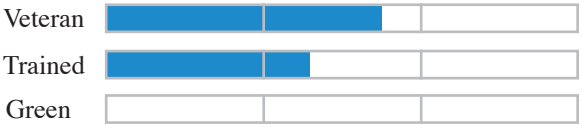
**Luftwaffe Experten.** As a general rule, in scenarios German Experten will equal or outnumber those assigned to the opposition. In the late war you can reflect the 'two air forces' approach by giving the Germans large numbers of Experten to command predominantly green squadrons.

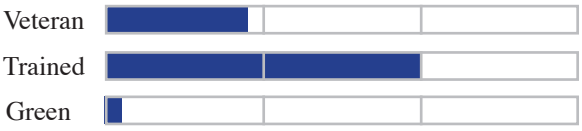
**The Commonwealth and Others.** This article uses 'British' as shorthand for the British and Commonwealth forces, and other national forces incorporated into the RAF, such as the Poles and Free French. The RAF was a multinational force from the start, and some squadrons, such as those of the Poles, were noted for their *esprit*. As the war progressed, Commonwealth nations, notably the Canadians, Australians and New Zealanders, deployed in their own formations.



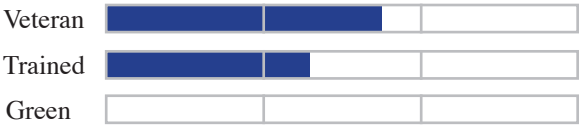

**The Middle and Far East.** RAF and Commonwealth forces in the middle and far east were of indifferent quality in 1941, and were often sent green pilots as replacements. They also lacked veterans, who were held back for home defence. This should be reflected by a greater incidence of Green squadrons in the desert battles of 1941 and the far eastern battles of 1942.

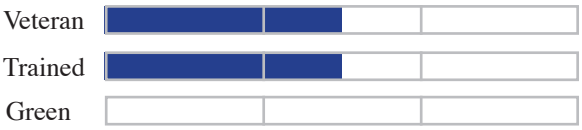
**Doctrine for the RAF.** From the start of the war through the Battle of Britain the RAF flew squadrons in inflexible 'vics', or rigid doctrine. A few units, such as 74 Squadron, practised flexible formations, but German-style Loose doctrine, built around pairs and four-ship flights, was not adopted widely until March 1941, and even then, only by home defence squadrons. The new doctrine disseminated eastward slowly, with the middle-eastern squadrons not recieving instruction in the new doctrine until October/November of 1941.

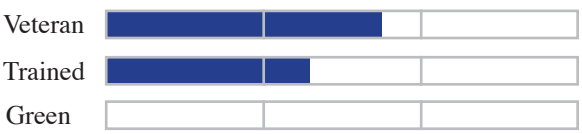



**Doctrine for the USAAF and USN.** By the time America entered the war the air services had learned a lot from the British and so should have Loose doctrine for the duration of the war.




### Early and Mid War RAF

The British started their war with a well-trained force, though doctrine was based more on theory than practice. The Battle of France gave some squadrons combat experience, while foreign squadrons, such as the Poles, brought seasoned veterans to the fight.

The Battle of Britain saw two crises for the RAF. The first was the realisation that their doctrine did not match the war they were fighting. A small number of squadrons resolved this with home-brewed tactics, but many did not have the time or steady leadership to formulate new tactics and so fought to the end of the battle the way they were trained.

The other crisis was in manpower. Front line squadrons were wrecked by losses, and sending raw replacements to these units reduced effectiveness. This was fixed part-way through the battle by the Stabilisation Scheme, which allowed experienced pilots to be shuffled from second line units to front line squadrons as needed.

After the Battle of Britain quality briefly dropped due to rapid expansion of the air force. Forces in the middle and far east suffered from numbers of ill-prepared pilots, likened to a 'village cricket team'. This recovered somewhat for the big battles of 1942, against the veteran German *Kanal Geschwadern*, and in North Africa, but not for the fight against Japan.

### Late War RAF

The Allied training apparatus gradually kicked in, so that by the late war Training Command was turning out well-prepared RAF pilots. Seasoned unit leaders began to get the upper hand over the *Kanal Geschwadern*. After D-Day, the difference in quality with the Luftwaffe only became more pronounced.

### Mid War USAAF

American fighter pilots started their war in Europe with experience earned from service with the RAF in the 'Eagle' squadrons. These veterans, in particular the unit leaders, formed the nucleus of the Army Air Forces in Europe, with doctrine based on that of the British. In the Pacific the Army Air Forces had kept a close eye on tactical developments in Europe, while veterans from the American Volunteer Group in China were inducted to lead new units. Despite the inevitable growing pains, standards were good.

### Late War USAAF

When the products of the American training programme started to filter through, with doctrine honed by veterans of earlier battles, the Air Forces began to dominate their opponents. If pilot rotation meant there were fewer Experten to face off against the Germans, the quality of rank-and-file pilots was significantly greater (as were numbers), and from late 1943 on the Army pilots were beating their enemies in most encounters.

### Mid War USN and USMC

The US Navy at the start of America's war was well-trained, particularly in deflection shooting, a peculiarity of the Navy that gave aviators an edge in the frantic battles of 1942. Like the Army, the USN had kept an eye on developments in Europe, but they still found themselves disadvantaged against the combat-experienced Japanese.

### Late War USN and USMC

After the 'first team' of Navy fighter pilots moved on to command new squadrons after 1942 there was the inevitable dip in quality as naval air strength underwent a massive expansion. But like the Army Air Force, extensive training and the retention of a cadre of experienced pilots meant that by the summer of 1944 large numbers of well-trained and prepared aviators figured in the USN orders of battle.

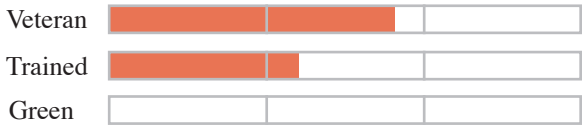
## IMPERIAL JAPANESE NAVY AND ARMY

Like the Luftwaffe, though for different reasons, the Japanese air forces did not expand during the war and found it difficult to maintain their starting strength.

**Doctrine for the IJN and JAAF.** The Japanese flew their flights in three-ship formations. However, these weren't the rigid vics of 1940 RAF practice but something more flexible, so I rate the Japanese as having Loose rather than Rigid doctrine.

### Early and Mid War IJN and JAAF

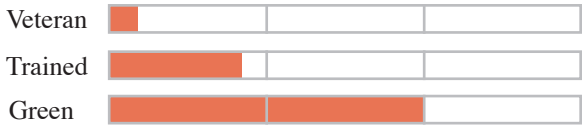
The Imperial Japanese Navy (IJN) was well-trained at the start of the war, with experience of fighting over China. The IJN was highly selective and its training rigorous, with the polish added in operational units. This was adequate for peacetime but standards had to be relaxed to achieve the throughput needed to replace wartime losses, so we see a rapid decline in quality after 1942.




The Japanese Army Air Force (JAAF) were not as rigorous as the Navy in their pilot selection, but like the Navy, they had experience from the China War and their early-war cadres were of good quality until attrition began to bite.

### Late War IJN and JAAF

Pilot attrition in the Pacific was greater than that in Europe due to fighting over oceans and hostile jungle, and the paucity of Japanese air-sea rescue services. Though basic training hours didn't dip significantly until late in the war, instructors were compelled to push students more quickly through their courses to make up for losses. By the late war new Japanese pilots had something like half the flying hours of their opponents and far less preparation for combat.




Numbers of Experten declined in the late war. Like the Germans the Japanese kept their top pilots in the fight, but the harsh environment and the insidious influence of *Bushido* and its emphasis on sacrifice contributed to a greater attrition rate in the ranks of the aces.

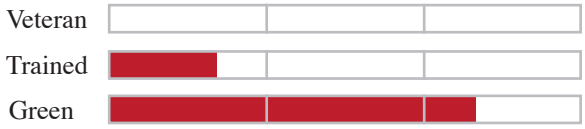
## SOVIET UNION

The Soviet frontal air force, or VVS, and the Air Defence Force, or PVO, were both dysfunctional in the early stages of the war, thanks to pre-war purges, massive casualties in the early stages of the fighting and inadequate doctrine enforced by Commissars. Training in the early war was hampered by a paranoid 'no fault' culture that viewed any flying accident as 'sabotage'.

**Doctrine for the Soviet Union.** The Soviets flew Rigid three-ship 'vics' or *zveno* up to the end of 1942. It wasn't until after Stalingrad that the Soviets overcame their ideological revulsion for fascist tactics and adopted German Loose doctrine, in the form of the *para* (pair) and a new four-ship *sveno*.

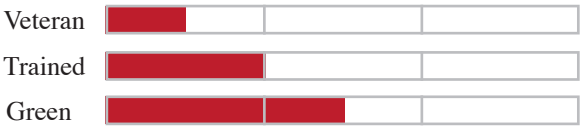
### Early War Soviets

In the very first dogfights of the German invasion, the Soviets surprised the Luftwaffe with their tenacity. However, as casualties amongst the pre-war cadres mounted and they found themselves out-matched, the Soviet pilots soon became demoralised. The Germans noted that they were unaggressive and prone to form Lufberys at the first sight of enemies.

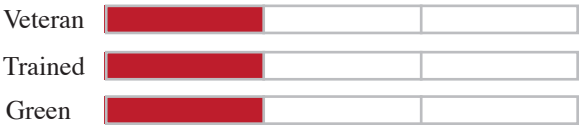



### Mid War Soviets

It wasn't until Stalingrad that Soviet fortunes began to turnaround. Numbers of fighters grew and innovations such as GCI helped put squadrons at less of a disadvantage against the Germans. After Stalingrad, the doctrine that had so hampered the Soviets was put aside.




A key demonstration of the maturing skills of the VVS came in the Kuban battles of April-May 1943. It's in this period that figures such as Alexander Pokryshkin began to lay down simple, battle-tested principles for fighting and had them disseminated through articles and air tactics conferences. The Kuban front was where the VVS perfected its skills and many future aces emerged. From the battle of Kursk onwards doctrine began to be rewritten at the front and then passed back to training units, narrowing the gulf between training and operational reality.

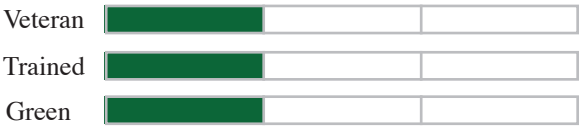



**Radios.** At the start of hostilities it was common for modern fighters in many air forces to be equipped with radio-telephones. This was not always true of older models of fighter, and in the early stages of the war some aircraft operated without radio.

The quality of the sets could vary. HF radio sets in 1940 had limited channels and range, but VHF radio sets, such as those that entered RAF service in the autumn of 1940, set the standard for the rest of the war.

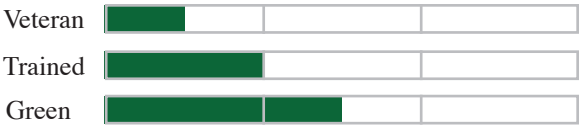
Some nations adopted radios gradually. For much of 1941-42 the Soviets operated radioless squadrons or ones in which only the squadron leader carried a radio for ground direction. Radio usage increased, but it wasn't until the summer of 1944 that reliable radios were installed in Soviet fighters as standard.

The Japanese navy carried radios but effectively operated in conditions of radio silence in the early war. In the Guadalcanal campaign they even removed sets from Zero fighters to save weight. These practices were to change as the war progressed.




**Doctrine for Italian squadrons.** The pre-war Italian predilection for individual fighting, founded on aerobatics, meant that formation tactical skills varied widely. A lot rested on what individual experts and leaders implemented in their units.

Early Italian fighters operated in tight 'vics', suggesting Rigid doctrine. This changed as the war progressed and the service gained experience. Italian units in North Africa absorbed tactical knowledge from their experienced German allies. It's likely that by 1941 the Regia Aeronautica were flying Loose doctrine, though indications are that after the Armistice there was no standardisation of combat tactics in the ANR.




Kursk demonstrated that overall aircrew skills had improved from the early war, but tactics remained crude, and high attrition rates continued to result in undertrained pilots being thrown into the line.

#### Late War Soviets

It wasn't until the end of the Soviet offensives of late 1943/early 1944 that loss levels stabilised sufficiently and allowed the flying schools time to polish new pilots. Soviet performance transformed for the better in the Crimean battles of March/April 1944. In the summer of 1944 16th Air Army began to prepare novice pilots for battle by flying combat training flights, intended to pass along the experience of veteran pilots. Many such flights were flown in preparation for Operation Bagration.

By the summer of 1944, elite 'Guards' units and a generation of Experten had emerged. The Soviet doctrine also encouraged the formation of small 'free hunt' flights made of more experienced pilots.

## REGIA AERONAUTICA

*(This section also describes the Aviazione Cobelligerante Italiana and Aeronautica Nazionale Repubblicana)*

Pre-war Italy was one of the world's most air-minded nations; a trendsetter and record-breaker. Like the Luftwaffe it had gained combat experience in Spain. However, by 1940 it had fallen behind, having suffered growing pains from rapid expansion and lost its technical lead.

The Italians misread the lessons from Spain. The Regia Aeronautica remained wedded to aerobatic dogfighters, which could not compete with the new fast monoplanes. Neither their air force and industry were cut out for the grinding war of attrition they were about to face.

#### Early and Mid War Italians

The aerobatic skill of Italian pilots was remarked upon by their enemies, as was the poor quality of their gunnery. This was the product of a training regime that favoured aerobatics, but confined gunnery practice to fixed targets. Instrument flying was scanty, so the Italian expeditionary force that intervened late in the Battle of Britain was hampered by a lack of experience of bad weather, as well as a lack of radios. The length of fighter pilot training was slightly less than the Allies, a gap that grew as the war progressed. In spite of this, the Italians proved formidable in North Africa, and it was here that they scored the bulk of their victories.

There were plenty of distinguished pilots amongst the Italians and despite an incomplete record over a hundred aces have been identified. However, leadership above squadron level appears to have been weak due to a glacial rate of promotion, which meant that combat pilots were slow to reach positions from where they could impart their knowledge to other pilots. This impaired improvements in doctrine.

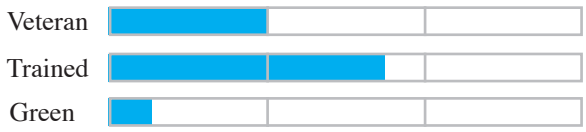
#### After the Armistice

The shortness of the Italian war means there is no discernible arc of improvement or decline in the period up to September 43. When the armistice came the complexities of Italian politics forced pilots to choose between the ACI and ANR. Many good pilots, including prominent aces, served the Social Republic out of disgust for the 'dishonourable' politics of the new Italian government. In early 1944 the ANR put up a solid fight against the Allies. However, a poor showing in April 1945 suggests that the Republican air force was suffering from a declining level of skills. Whatever the truth, the Italian air forces that emerged after the armistice were treated as lesser partners by both their Allied and German co-belligerents. Whether this was out of prejudice, mistrust or a lack of faith in their ability is hard to say.

## OTHER COMBATANTS

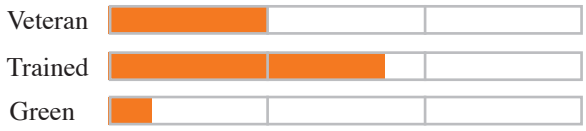
### France

In the Battle of France, hamstrung by poor command, an under-manned support system and inadequate aircraft, the *Armée de l'Air* was mishandled by the generals. However, most of the aviators were well-trained, with high morale. French *chasseurs* (fighter pilots) gave a good account of themselves whenever they came into contact with the Luftwaffe. The main criticism of the French was that some of the younger pilots lacked polish while the older ones lacked stamina. In spite of this the French, with assistance from the RAF, shot down more German aircraft in the Battle of France than were lost in the whole of the Battle of Britain, with a higher number of those losses being precious bombers.



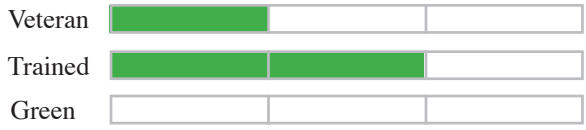

### Holland

The Dutch metropolitan air force, the *Luchtvaartafdeling*, had a cadre of well-trained pilots. When they could get fighters in the air the Dutch had a favourable exchange rate against the Germans. However, the colonial air force in the far east, the *Militaire Luchtvaart van het Koninklijk Nederlands-Indisch Leger* (ML-KNIL), suffered from inexperience and the pains of transitioning to modern aircraft. Some Green squadrons should be present for the battles for the East Indes and Singapore.



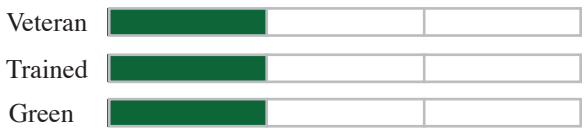

### Romania

The Romanian *Forţele Aeriene Regale ale României* (Royal Romanian Air Force, or FARR) began the war with well-trained cadres of pilots, though their aircraft were lacking. As the war went on they fell increasingly into the sphere of the Luftwaffe, which trained them and equipped them with German aircraft. Though never large–perhaps *because* they never grew too large–the Romanian air force displayed *élan* and skill against the Russians. Later, they would face the Americans and on occasion could punish USAAF raids.




### Bulgaria

Banned from operating military aircraft following the First World War, the Bulgarians rebuilt their air force clandestinely. In 1938 the ban lifted and the *Vazhdushnite na Negovo Velichestvo Voyski* (Royal Bulgarian Air Force, or VNVV) came into being and experienced rapid expansion. Military pilots could train openly, with most receiving instruction in Germany, though some were schooled in Italy, Hungary, or France. As an organisation, the VNVV was severely lacking, particularly with regards to air defence. It had an adequate cadre of pilots, but no modern aircraft or combat experience. Bulgaria's lack of commitment to the war caused the Germans to hold back modern fighters until 1943. Bulgarian pilots eventually proved themselves to be able and aggressive in the defence of Sofia in 1943/44, though some pilots had to fly outdated aircraft against the American 15th Air Force.

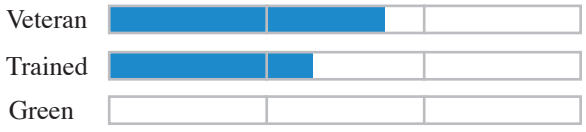



### Finland

Finnish pilots are popularly viewed as an elite. However, the mystique does not hold up to scrutiny. Pre-war training hours were similar to those flown by RAF cadets, and pilots were often thrown into the front line with little preparation for operations.

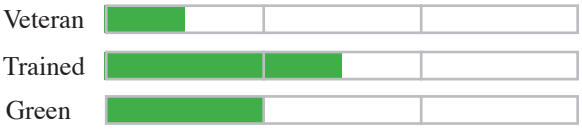
That said, Finnish doctrine appears to have been advanced by European standards, with a heavy emphasis on gunnery skills (see sidebar). The resulting pilots achieved wonders with an air force made up of cast-off aircraft and a bloody-minded attitude.

Soviet incompetence complemented Finnish skill. The post-purge Soviet VVS was in a parlous state in the Winter War, and through the Continuation War the northern front was a relative backwater manned by second-




**Doctrine for Finnish squadrons.** Finnish training in combat techniques was unusually intensive. Their doctrine was founded on loose formations, allied to systematic gunnery training and an edict emphasising aggressive action (the pilot that first spotted an enemy led the attack, regardless of their status). Against the hapless Soviets this made for a highly successful doctrine.

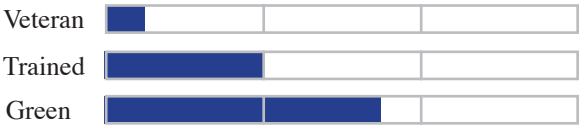
rate Soviet air units. For all the Finnish successes the Soviets always held air superiority. This should not take away from the exchange rates the Finns racked up in their 'aerial guerrilla war' against an enemy that outnumbered them. It was a remarkable feat of arms.




### Hungary

The pre-war Royal Hungarian Air Force (*Magyar Királyi Honvéd Légerő*, or MKHL) was under-resourced, in particular its training system. As a result the peacetime Hungarians suffered a horrendous accident rate in which losses of pilots began to exceed recruitment. Contracting training out to Italy was an attempt to resolve this; however, pre-war experience fighting the Slovaks and a deployment to Russia in 1941 confirmed deficiencies in every department of the air force. The exchange rate in the Don River campaign was particularly poor, though in 1942 this gradually improved to a healthy 6 to 1 ratio against the Soviets.

Hitler's view was that the Hungarian flyers lacked offensive spirit and that too many operations had ended in fiasco. However, in 1944 the Hungarian flyers–in particular their plucky 'Puma' fighter group–put up a valiant performance against the US 15th Air Force in defence of the homeland. They achieved a respectable loss ratio against the Americans, though it was too little and too late to save the nation.

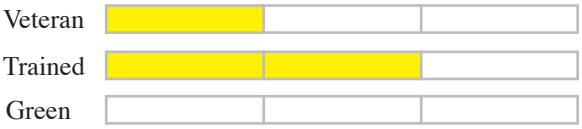



### China

Nationalist Chinese aviators were a mixed bag. Though some able pilots emerged, the rank-and-file suffered from inadequate training and resources, while the service was rife with nepotism and corruption. Worse yet, in the early years of the China War there were persistent accusations that aircrew shirked missions and avoided combat. The Soviets claimed that Chinese aircrews sabotaged their own 'planes to evade duty. Though the Koumintang strenuously denied this, the allegations stuck, and suggest a force that was undertrained and undermotivated.

Up to 1942 the most effective forces were the 'volunteers'– bands of foreign advisers and mercenaries who shouldered the burden of fighting. These forces included the well-trained Soviets, as yet unharmed by Stalin's purges. Later came adventurers of the American Volunteer Group, with a mixed bag of experience, some good and some mediocre.

From the summer of 1943 more than a hundred Chinese pilots were incorporated into the Chinese-American Composite Wing. These pilots trained in the US and fought alongside the Americans. However, in the summer of 1944 the Americans expressed disappointment with their allies. Rumours circulated that Chinese pilots were ordered to avoid combat to conserve their planes. Whatever the truth, these stories suggest that the Chinese were not very impressive.




### Nationalist and Republican Spain

Both Nationalist and Republican pilots were a mixture of native Spaniards and foreign volunteers from Germany, Italy and the Soviet Union. In general, all these pilots came from established and well-trained air forces. Because they were selected for this work, they were of a high standard. There were question marks over some of the mercenaries and adventurers that fought for the Government, who became more unruly as the war continued, but as a whole the cadre of pilots on both sides should be treated as trained and experienced. By the late war, new recruits had all benefitted from training schools in Germany, Italy or Russia. Only towards the very end of the fighting did the morale of the Republicans fail.

# APPENDIX 2: TOOLS

You can download an Excel spreadsheet—titled 'air combat results'—that contains two tools to help in scenario design.

The first is a combat calculator. Input the attacker and defender combat modifiers and firepower and check against the attacker's combat differential. The results below show the number of hits, losses, and the exchange ratio. This sheet is worth playing with to see the effects of even small changes to the inputs on loss numbers and the exchange rate. This might help hint at the kind of losses the scenario might generate and input into your calculation of VP thresholds.

The second sheet is a bombing calculator. Simply input the bomb values and read off the results for the likely die modifiers for the bombing attacks. This will give the mean number of bombing hits. From this you can calculate the total hits that bombers are likely to inflict on surface targets. (They may be smaller than you think!) In turn this will allow you to define VP thresholds for your scenario.

**Exchange Rates.** (See Tools section, opposite) It's hard to find data on outcomes of individual air engagements, but it's easier to find data on exchange rates, which is why the *Wing Leader* combat tables are built around exchange outcomes. You should play with the combat calculator to get a sense of how this works.

Take two fighter squadrons, each with a firepower of 1. At +0 the exchange is, as we would expect, even. However, if the attacker is at +1 the rate goes up to 1.56:1. At +2 it increases to 2.5:1 and at +3 it is 4:1. You begin to see how even a modest increase of 1 in the differential can rapidly shift the odds.

Note that this converts into very small numbers of aircraft destroyed in each individual combat. If the attacker in our example is at +4 they inflict an exchange ratio of 8.57:1, which sounds impressive. However, this equates to 0.97 losses on the enemy to the defender's 0.11. This might not seem like a lot, but imagine how many shot-down aircraft that equates to over the course of many combats. You begin to see how even in a tactical game like *Wing Leader*, the outputs are attritional.

# APPENDIX 3: SCENARIO CHECKLIST

This is a list of all items that can go in a scenario.

### Scenario Number and Title

I will assign scenario numbers appropriate to the venue for the scenario. The prefix varies with the game or expansion the scenario appears in:

Prefix 'V' = 'Victories' (core game)

Prefix 'S' = 'Supremacy' (core game)

Prefix 'B' = 'Blitz'(expansion)

Prefix 'E' = 'Eagles' (expansion)

Prefix 'O' = 'Origins' (expansion)

Prefix C3i = scenarios appearing in C3i magazine

### Background

The historical background describes the date, the location and the battle.

### Order of Battle

Which side are raiders? Which are defenders? Who sets up first? List the squadrons and flights for each side.

List their EXACT model and where they set up (or enter, as appropriate). Variant models are underlined.

Can multiple squadrons set up in the same square or must they set up in separate squares? Do formations enter the map in trail or can they enter any way the player wishes?

List wings separately and note where their wing leader sets up.

### Max Losses

List the maximum losses for squadrons and flights.

### Alert Status

Which fighter squadrons start alerted? Usually, defenders begin alerted and raiders do not.

### Quality

List the number of Veteran, Green and Experte markers

### Map Edges

Which map edge belongs to which side?

**Downloads.** Download *Wing Leader* files such as scenario supplements and tools from:

**www.airbattle.co.uk/w_downloads.html**

I have tried my best to make files safe and virus-free, but open them at your own risk.


**'Plus' Scenarios.** In the early core games and expansions we gave no mind to the question of what games and expansions the player owns. However, we are increasingly mixing aircraft and assets from multiple games. We mark such scenarios with a 'plus' symbol and note what products the player needs to own to play it.

**Models.** Do make sure to list the exact model of aircraft in the scenario. Don't assume that players and testers understand that by writing 'Bf 109E' you mean the E-4 variant. In the second edition we underline the model if it is a variant from the back of the ADC.

**Map Edges.** As scenario V22, *The Day of Jubilee*, demonstrates, it's possible to have scenarios in which sides can use both edges of the map.

**GCI.** Ground Control Intercept was used to direct defensive operations. Rarely was GCI used for offensive missions, as these might take place beyond radar coverage.

The British, Germans and Americans all had fairly mature GCI procedures when they entered the war. The Italians had no radar at the start of the war. However, in North Africa they occasionally co-operated with the Germans in employing radar direction.

The Soviets were slow to assemble the infrastructure needed for GCI. Their first experiments with ground control began in October 1942 during the Stalingrad campaign. However, Soviet GCI was perfected in the Kuban campaigns of Spring 1943.

In 1942 in the Pacific, American skills at fighter control were shaky, but rapidly improved. It's clear that some carriers had superior control to others and this was often down to the skills of individual controllers.

The Japanese Navy lacked radar in 1942. Their situation was complicated by doctrine that emphasised radio silence, so Japanese CAP was dependant on visual signals from the fleet. See scenario V23, *Shimatta*, for an example on how to model this.

**Barrage Balloons.** You are welcome to fix the heights of barrage balloons in the scenario, or offer the choice of height as an option to the defender.

**Submissions.** There's no formal submission policy for *Wing Leader* scenarios. We'd love to look at your scenarios to see if they have publication potential. Feel free to post your work to sites such as **Consimworld** or **Boardgamegeek**. However, please don't post a scenario up until you have tested it a few times. Develop your ideas and work out any major kinks before going public with it.

#### Doctrine
Only list the Loose or Rigid doctrine if Rigid doctrine affects the scenario. Otherwise leave this off.

#### GCI Control
Note whether there is any GCI control and what the GCI rating is.

#### Radio
Only list radio if some squadrons have no radio. Otherwise leave this off.

#### Radio Nets
List the radio nets for fighters. Also whether those nets are affiliated with GCI.

#### Sun Position
List the Sun arc.

#### Clouds
List the locations of any cloud markers. Also whether rain effects apply.

#### Haze
Only list Haze altitude if Haze applies to this scenario.

#### Contrails
Only list the Contrails altitude if Contrails apply to this scenario.

#### Surface Units
List surface units and their square, but only if they are present in the scenario. Also list barrage balloons in this section.

#### Split Limit
The split limit is sometimes used to set the number of squadrons that can be split where the counter mix might vary because of the addition of expansions, or to avoid counters with the wrong colour schemes from being used (for example, stopping players using Commonwealth P-40 counters instead of American ones).

The split limit is also a tool to simply restrict the amount of splitting allowed, for reasons of balance.

#### Special Rules
Any special rules unique to the scenario are listed here. Only number the special rules if there is more than one.

Note that if bombing attacks and tactical flexibility rules are in effect these are listed as special rules.

#### Victory Conditions
List the victory conditions and any special scenario ending conditions.

#### Aftermath
Describe the historical aftermath of the battle.

#### Gameplay Advice
If gameplay advice is necessary, such as to point out a particular rule, then list it here.

## COUNTERFACTUALS

In *Wing Leader: Eagles* we have introduced the first counterfactual scenarios. Counterfactuals are fine, but the fundamental rule with any kind of alt-hist is to:

(a) Clearly indicate it is counterfactual, and

(b) To indicate what premises have changed

So the following changes and additions need to be made:

### Background
The Background section clearly labels the scenario as counterfactual.

### Counterfactual Details
In place of the Aftermath section, this section details the changes to the historical premise that made the scenario possible.

> *EXAMPLE: The details for an Operation Tungsten scenario might say "This scenario assumes that a navigation error led to the raid's detection and German fighters were able to scramble and intercept."*

## APPENDIX 4: NARRATIVES

*Wing Leader* scenarios are vehicles for communicating historical narratives. It's worth familiarising yourself with these narratives to understand where your scenario fits within the body of work.

### Aircrew
An important narrative is the rise and decline in the quality of aircrew. Allied aircrews rose in quality through the war, while the Germans and Japanese squandered their early advantage.

### Powerplants
Another narrative is of the technical development of powerplants. German and Allied fighters began the war on an even footing. As the war continued Allied engines allowed them to take the fight to higher altitudes, where the Germans could not compete.

Germany's Allies were even worse off, as they lacked high-powered engines. Both the Italians and Japanese eventually adopted German-designed motors.

Finally, jet engines arrived too late to make an impact. In particular, German jets lacked the reliability and fuel economy needed for success.

### Firepower
The problems of protecting aircraft with armour and self-sealing fuel tanks were solved early in the war. After that, the major developments in the struggle between damage output and protection were in firepower.

The Americans settled early on heavy machine guns, as they were primarily concerned with shooting down fighters rather than bombers. The British adopted versatile 20mm cannon, while the Soviets employed a mix of weapons for their fighters.

The Germans needed weapons capable of bringing down heavy bombers and tried a number of solutions involving cannons, large-calibre guns and rockets. However, only some aircraft were capable of handling these weapons–the Fw 190 became a powerful gun platform while the lightweight Bf 109 needed gun pods to enhance its firepower.

Overall, the Soviets had some of the best weapons of the war, balancing lightness with astonishing rates of fire. However, their fighter engines were so large and inefficient that airframes were built to be small–often too small to mount large gun batteries.

### Wings
Wings were unwieldy formations and hard to use at the start of the war. But as radio communications improved and it became possible to mass fighters against deep penetrating raids, the wing–or even masses of wings, known as *Gefeschtsverbande*–came into increasing use as a tactic.

# APPENDIX 5: SCENARIO SPECIAL RULES

This section lists some scenario special rules and suggests where you might deploy them.

### Bombing Rules

If the 15.0 bombing rules are in effect this must be noted.

### Drop Tanks

Drop tanks confer no specific advantages in the game, but can be used to penalise fighters that are likely to be bounced early in a scenario. However, scenario designers might consider sparing squadrons with drop tanks from fuel limit penalties [13.1].

### Medium Bombers

**Medium Bomber Glide Bombing.** The thinking behind the restrictions on glide bombing was that it seems to have been a specialist precision bombing tactic, and because of the difficulties of maintaining formation during glide bombing, it was confined to small formations or specially-trained units.

Medium bombers are restricted from certain behaviours in scenarios that feature bombing. The second edition rules restrict them from glide bombing except in flight-sized formations, and in the special rules we should only give permission to glide bomb in circumstances where a unit was trained for that task. We should also, in general, restrict medium bombers from changing altitude before commencing their bombing profile.

### Heavy Bomber Boxes

The bombing mission rules are written around the behaviours of medium bombers. Heavy bombers–in particular the USAAF use of large self-defending formations in 'boxes'–need additional restrictions. It's advisable to add special rules disallowing bomber squadrons from circling, or from changing altitude unless broken.

### Bomber VP

A peculiarity of bombing scenarios that feature a mix of single-engined and twin-engined bombers (each loss worth 1 VP and 2 VPs, respectively) is that the twin-engined bombers can become 'VP farms' for enemy fighters and encourage your opponent to throw all his effort into racking up scores against them. Adding a rule that makes the 2 VP bombers worth 1 VP for each loss can discourage this.

### Strategic Bombing

Bombing scenarios with medium and heavy bombers attacking from high level can be something of a crapshoot. The chances of doing any damage might require high die rolls, and the victory conditions would rely on one of those rolls coming good.

A way around this is to use a variant of the non-bombing victory conditions, which is to say that instead of rolling a bombing attack on the target, the bomber scores a set number of VPs based on its status. For example: 3 VPs if undisrupted, 1 VP if disrupted, 0 VP if broken. This places the emphasis in the scenarios on hurting the bombers before they bomb. However, it does reduce the effects that flak might have on bombing.

### VP Caps

Low altitude and precision attacks on high VP surface targets can rack up high scores from lucky hits. To make scenarios less liable to VP swings from bombing you can use a special rule to limit the maximum VP from any target to its printed VP value.

### Broken Bombers

Historically, bomber formations occasionally proved fragile enough that they would turn back when confronted by serious opposition. To represent this, have the bombers, like fighters, return to base when broken.

### Return to Base Sleaze

Where sweep squadrons fail to make contact with the enemy, raider players might use the return to base rules [9.2.6] to have them double back and try to intercept enemies. This is not illegal *per se*, and even encouraged. However, if you want to avoid this happening in your scenario, you can use a special rule to force squadrons to return to base via the far map edge rather than the friendly one. Or simply define the friendly map edge as being the far edge!

### Sweep Squadron Strafing

The bombing rules give sweep squadrons considerable latitude to drop down to low level to strafe. In battles where 'high' and 'low' forces are separated and might not come into contact with each other, that could be leveraged by the raider to bring high squadrons into a low-level fight. In other scenarios it might be unhistorical for sweeping fighters to strafe.

In either situation you can write a special rule that forbids sweep squadrons from strafing.

### Six Foot Supermen

It's tempting, particularly when recreating battles that involve an elite unit, to hand out benefits that turn particular units into *übermensch*. Examples I've seen in submitted scenarios include:

- Permitting multiple Experten in a squadron
- Increasing the combat modifier of an Experte
- Providing Cohesion roll bonuses

In general, I am cautious of these. I understand the temptation to convert national myths into reality by turning aircrew into six-foot supermen, but think carefully before doing this.

I have allowed it in particular circumstances. For example, to capture the fanaticism of the Soviets in the first days of Barbarossa, I gave them a +1 cohesion roll bonus in the *Drive on Kiev* campaign in *Wing Leader: Blitz*. However, this was largely to balance out a raft of negative factors such as lack of radios and a high proportion of Green markers, rather than to make the Soviets supermen.

An interesting variation on the theme is to give forces a one-off modifier to help survive their first combat and confer a little more longevity. A special rule giving units a positive cohesion roll bonus *if not marked with an Ammo marker* can do this.

### Bomber Experten

Though Experte markers indicate air combat aces, there were some notable bombing aces in the war. However, they were rare enough that they are excluded from the main rules. There's no reason why a special rule cannot permit Experten to be assigned to bombers. However, these should have no effect on air combat and allow only a +1 modifier to the bombing roll.

### Tactical Flexibility

The tactical flexibility special rule has a profound effect on the game, almost doubling the effectiveness of a force. Use it where one or both sides demonstrated the versatility to break into sub-formations. Eras where it would be common include:

The early-war Luftwaffe up to the beginning of 1943

The early-war Japanese up to the end of 1942

The RAF from 1942 onwards

The USAAF from the middle of 1943

A lack of flight counters will restrict the ability to use tactical flexibility. Large scenarios featuring lots of squadrons could be overwhelmed by the production of flights, so consider not using the rule in such scenarios, or applying split limits to particular aircraft.

### Close Escort

If squadrons performing close escort deserve to be penalised in combat (see sidebar) try applying a –1 to fighters' basic speed when defending in a multi squadron combat with a bomber.

Where close escorts were ordered not to stray far from the bombers, consider restricting the maximum distance they can tally to one square. Note that this restiction would disappear as soon as the escort changes its mission to sweep, and the special rule may need to note this.

**Close Escort.** Players familiar with the Battle of Britain narrative may be surprised that close escorts are not penalised in combat in the game. However, close escort was an evolving art in the war, and only fighters that did not weave to maintain their speed were disadvantaged. When designing the game I thought it better to handle such malpractice as a special rule. A more interesting limitation was where orders prevented the close escort from straying too far from the bombers.