

TWO-FISTED PULP DOGFIGHTING ACTION IN A WORLD AT WAR!

# LUFT KRIEG™

THE GEAR KRIEG AIRCRAFT GAME



DREAM POD 9



"NEVER IN THE FIELD OF HUMAN CONFLICT WAS SO MUCH  
OWED BY SO MANY TO SO FEW."

— SIR WINSTON CHURCHILL, 20 AUGUST 1940



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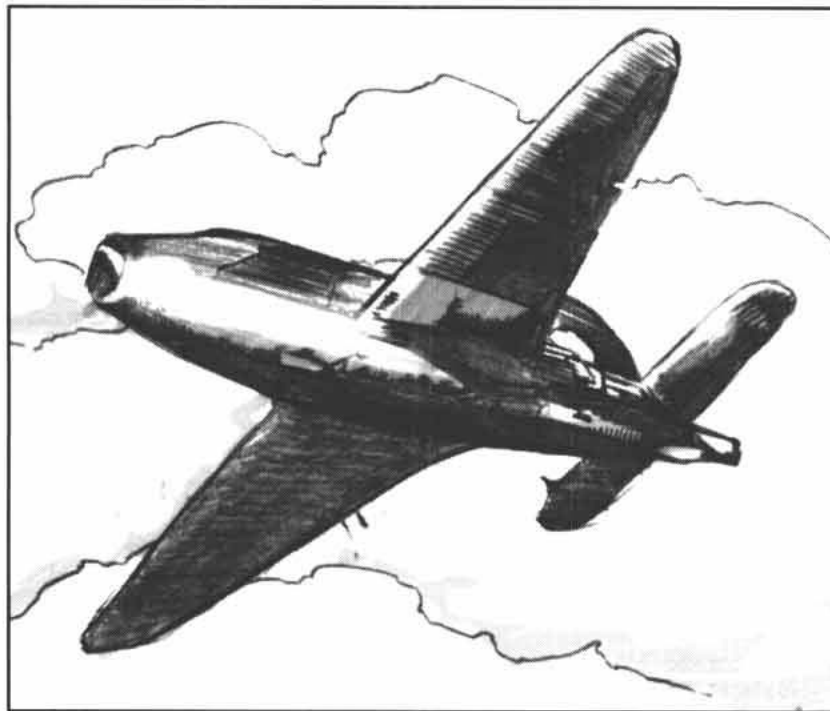
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## KNIGHTS OF THE JET AGE

Bellamy threw the *Lady B* into a roll, then immediately yanked back on the stick with all his strength. The elevators fought him and g-forces pushed him back into his seat as the aircraft turned hard. Sweat beaded on his forehead, then dripped past his eyes to flow around the radio/oxygen mask strapped to his face. Grasping the controls tightly, he craned his neck to peer out the left window panel of the cockpit.

"Damn," he swore explosively; the ME 262 that had appeared a few minutes earlier remained on his tail, its pilot matching his every move.

As if on cue, the Luftwaffe ace opened up with his quad 30mm cannon. Three of the bursts went wide, but the fourth peppered Bellamy's right wing. The jet's controls twitched with the sudden impact, but the RAF pilot gritted his teeth and remained in control. Instinctively, he reversed the direction of turn, darting away from the stream of high-explosive shells. For an instant he thought he'd broken away from the German, but no, a moment later that damned plane was back on his tail. He cursed: the G40 Pioneer had provided a decisive edge in the Battle of Britain two years ago, but was largely outclassed by newer designs like the German 262. Still, the aircraft was only one part of the equation — skill and experience were just as important, and Bellamy had both.

He rolled back to the left but still the Schwalbe followed. He jinked right — again it appeared glued to his tail. He dummed left, right, and then pulled straight back on the stick. The Pioneer shot upwards, a near-vertical path that the heavier 262 struggled

to follow. For a moment, the Pioneer pulled away, then the German aircraft's more powerful engines began to close the gap, its greater speed telling. Bellamy struggled to hold the Pioneer in the steep ascent as its airspeed dropped. "Come on, come on!"

Fire lanced up from the rapidly approaching 262, the near-stalled RAF jet an easy target. Shells tracked across the Pioneer's fuselage and Bellamy winced as a shard of canopy whistled past his eyes. The crate fought his efforts to remain upright. *Just a few more seconds*, time he wouldn't have if the Schwalbe fired again. Yet the fire didn't come and, just as the G40 finally stalled, rolling onto its back as its nose sought the ground, he looked down.

There beneath him, was the 262, spinning away with smoke streaming from one engine; the curse of the "superior" Luftwaffe jet, a tendency for the engines to "hiccup" when overstressed. He could see the German pilot struggling to regain control of the aircraft after his unexpected loss of power. "Tough luck, old boy," he muttered grimly, fighting his own sluggish controls to pull the Pioneer into a dive. With the Pioneer pointing nose-down his airspeed increased, and with increased velocity the controls firmed up. He goosed the rudder to turn the nose right and pressed down slightly on the stick. He waited a moment as the Schwalbe drifted toward his crosshairs, then depressed the trigger, letting forth a gout of flame from the nose-mounted Hispano cannon.

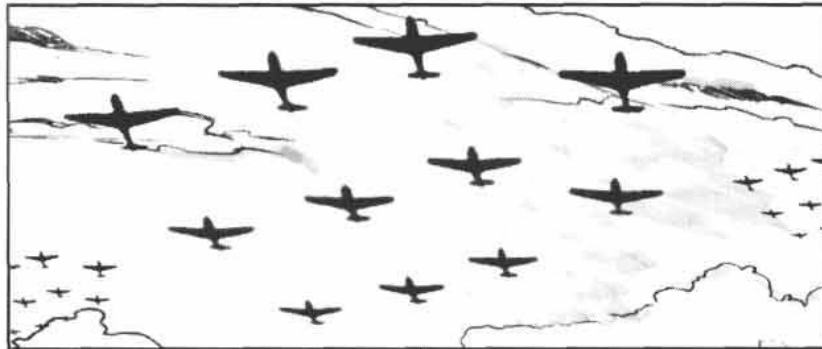
The first round burst on the shark-like nose of the 262, but the others went wide. The Pioneer dove past the German jet and Bellamy opened the throttle wide, seeking clear air.

The aerial joust continued.

# WAR IN THE AIR

Ever since man first urged mechanical contraptions skyward in the 18th century, he has sought to use the ability of flight in war. Balloon spotters were used in both the Franco-Prussian war and the Boer War, but it wasn't until the end of 1903 when the Wright Flyer took to the air at Kittyhawk, North Carolina that the dream took form. Within four years, both the British and US Armies were developing aircraft for use in the field. The Great War, between 1914 and 1918, saw the first large-scale use of air power in war; aircraft engaged in dogfights over the fronts, while zeppelins bombed factories and towns deep in enemy territory. Compared to today's superscience designs, the aircraft of the time were crude, but the conflict birthed many of the tactics and principals in use today. Aerial reconnaissance became a vital part of warfare, and many of the staples of the Modern Age — such as carrier aviation — were first employed.

The twenties saw a renaissance in aviation, with many of the rich and famous investing in aircraft and aviation technologies. Philanthropist-adventurers like Howard Hughes pushed back the frontiers of mechanical flight, developing aircraft that could go further, faster and higher than those before them. The wood and fabric designs of the Great War quickly gave way to all-metal models, and by the mid 1930s, much of the infrastructure of the current war was in place.



## PRELUDE TO WAR

The Japanese invasion of Manchuria in 1931 was the first modern-age conflict to utilize aircraft, working in conjunction with ground forces to push back the Chinese defenders. The Italian invasion of Abyssinia in 1935 likewise demonstrated the effectiveness of airpower, with high explosive and gas bombs used against the primitively armed defenders. Italy was condemned for its actions, but this diplomatic incident was soon overshadowed by greater conflict in Europe.

Though the Treaty of Versailles had forbidden Germany from developing an air force, Hitler nonetheless assembled one under cover of "flying clubs" (the *Deutscher Luftsportsverband*). On 9 March 1935, the existence of the *Luftwaffe* — long suspected by France and Britain — became public knowledge, prompting an aerial arms race. The new air force lacked experience but it was well equipped, with early versions of the Bf 109 and Ju 87 "Stuka" already in service. Their lack of experience was not to be an issue for long.

## • THE SPANISH CIVIL WAR

On 17 July 1936, Spanish Army garrisons in Morocco rebelled against the government, followed in short order by many of their peers on the mainland. On 28 July, German transport aircraft of the German *Kondor Legion* arrived in Morocco at the request of General Franco, followed two days later by Italian aircraft. These German pilots were not there in an official capacity, but rather as volunteers and 'tourists,' sent to advise and instruct the nascent Nationalist air force. In truth, they were to gain first-hand experience of modern air warfare. Spain was to be the proving grounds for the bloody tactics that would soon become a trademark of the Third Reich.

After the Soviet Union deployed I-15 and I-16 designs in support of the Spanish Republicans, Germany responded with Bf 109Bs. German fighter tactics advanced swiftly, with both refinements of Great War methods and the development of new ones. Air-to-air combat was not the only area to see tactical advancements. The *Kondor Legion* developed a range of bombing techniques, attacking both ground and naval targets. On 14 August 1936 a Ju 52 successfully bombed the Republican battleship *Jaime I*, while Ju 87s used the conflict to "practice" attacks in support of ground troops. On 26 April 1937, elements of the *Kondor Legion* attacked the Basque town of Guernica, causing massive civilian casualties. The attack prompted harsh condemnation but foreshadowed what was to follow in Europe and China in short order.

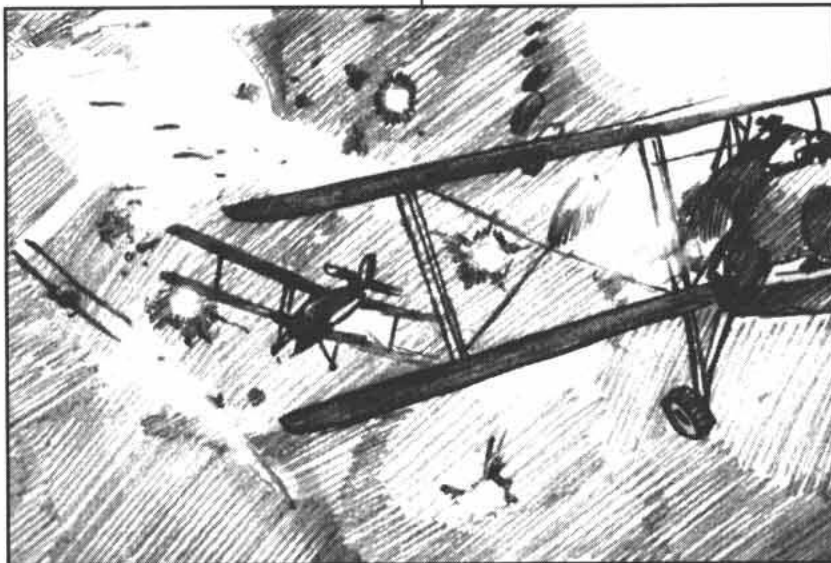
Though not active participants in the Spanish conflict, the Allies did not sit on their laurels. Both Britain and America worked on developing RADAR detection equipment (the British had a substantial lead, deploying the first system in 1937) and in new weapon and pro-



pulsion technologies. In 1937, the British also began practical development of a jet engine, based on a design by Frank Whittle. Fortunately for the RAF, the British jet engine program progressed more smoothly than the German equivalent, begun at roughly the same time. The Luftwaffe had more success with rocket-powered designs than their jet equivalents, testing the HE 112 in 1937 and the HE 176 in 1938.

Meanwhile, the conflict between Japan and China — dormant since 1931 — reignited after an exchange of fire near Beijing. The Japanese had a distinct edge in numbers and technology, but the Chinese boasted American-trained pilots and crews. Nonetheless, the Chinese were brutalized by the invasion, sustaining serious losses. Annexation proceeded apace across the continent, the Spanish Civil War ending in March 1939 with a Nationalist victory. Flushed by their success, the pilots of the Kondor Legion, including such notables as Gunther Lutzow, Adolph Galland and Werner Molders, returned home and passed on the lessons of the war; Hitler already had plans to exploit this new expertise.

Having absorbed Austria and parts of Czechoslovakia 1938, Germany also demanded concessions from Poland, namely control of the port of Danzig and a land corridor to East Prussia. The Poles refused, but Hitler reiterated his demands in early 1939. Having acquiesced to Germany's previous annexations, on March 31 Britain and France vowed to stand by Poland against the German demands. Throughout the summer — as the Luftwaffe absorbed the lessons they'd been taught in Spain — tensions rose. Negotiations were attempted, but to no avail. At 0445 on September 1, 1939, the German army — supported by over 1500 Luftwaffe aircraft — crossed the border into Poland.



## BLITZKRIEG

Two days after the German invasion of Poland, Britain and France declared war on Germany, the first RAF strikes against German targets taking place one day later at Wilhelmshaven. In Poland, however, the situation was spiraling rapidly downward. Panzers and Kämpfers quickly overran the border defenses, already weakened by Luftwaffe bombing attacks. The German air force also staged precision attacks on Polish supply dumps, factories and lines of communication, limiting their ability to counter the invasion force. When the Soviet Union also invaded on September 17, Poland was doomed. Though scattered resistance would continue until early October, the cause was lost. To all intents, the campaign took less than three weeks, a clear vindication of the German military's new combined use of infantry, armor, Kämpfer and aircraft in "lightning war" — Blitzkrieg.

The summer of 1939 also saw clashes between the USSR and Japan. These were the culmination of border incidents in the Amur River basin and around Lake Khasan dating back to 1937, now oc-

curring on a much grander scale and incorporating large numbers of aircraft on both sides. Though this conflict ended in mid-September, mutual distrust characterized this border for the rest of 1939 and 1940. Egged on by their success in Poland, the Russians turned their eyes toward Finland, which they invaded on November 30. Called the "Winter War," this apparently one-sided conflict would rage throughout the coldest months of 1939-40. Russian numerical superiority was expected to quickly deal with the Finns, but the Russians were complacent and used obsolete equipment. Finnish Fokkers, Hurricanes and Moraine-Saulniers 406's repeatedly trounced the Illushins of the Soviet air force, but by March 1940, numbers had taken their toll and the Russian military finally took their key ground objectives. On March 12, the Finns sued for peace, having lost 25,000 troops and sixty aircraft. Soviet losses were closer to 200,000 men and over 750 aircraft, a truly pyrrhic victory. Stalin typically blamed others for this disastrous performance, and ordered the construction of "Supertanks" like the T44. Walker and aircraft forces, so effective for the Ger-



mans, were ignored, a shortsighted decision that was to cost the USSR dearly in the summer of 1941.

Direct conflict between the Allies and Germany was scarce during the first winter of the war, earning it the nickname of the 'phony war,' or, more derisively, the 'Sitzkrieg.' Between January 12 and April 6, the RAF and the French made leaflet ('Nickel') raids against targets throughout German territory, while the RAF also attacked German shipping. Attacks on German vessels on the Schillig Roads had cost twelve out of twenty four bombers in December 1939, but their attack on U31 in March 1940 was much more successful, netting the British the first "kill" of a submarine by aircraft. During this time, British troops and RAF personnel transferred to France in advance of an expected German attack.

The German strike at Norway in April 1940 marked the first use in the war of paratroops, who proved invaluable in the seizure of Oslo and Stavanger. Britain and France had likewise planned to move on Norway as a means of halting the flow of vital minerals from Sweden to Germany and though surprised by the assault, Allied naval, air and ground forces quickly moved against the Germans. On April 10, fifteen British Skua dive-bombers sank the cruiser *Konigsberg* at Bergen, the first major warship to be sunk solely by airpower. Three days later, Swordfish from HMS *Warspite* bombed the U64. Despite their naval and air successes, the campaign in Norway fared badly for the British, who withdrew their troops from Namsos and Aandalesnes at the end of April, and from Narvik in early June. By the time the last British troops left on June 8, Norway was little more than a sideshow.

On May 10, German forces crossed into Holland and Belgium. As in Norway, paratroopers played a major role, supported by glider-borne troops. An attempt to abduct the Dutch queen was foiled by adventurers, but the German assaults were largely successful. French bombers staged a series of interdiction raids on bridges and roads to slow the German advance, but with mixed results. At the same time, British forces of Bomber Command attacked the German mainland with a similar objective. Exploiting the lessons of Spain, the Luftwaffe likewise made use of mass bomber attacks, effectively destroying Rotterdam on the 14th. Unfortunately, the city had already surrendered but a communications failure prevented the abort order from reaching the sixty Heinkel bombers of the attack force.

## Howard Hughes

*The Modern Age is home to some remarkable people in every field, and aviation is no different. Hughes, born December 24, 1905 in Houston, Texas, is a manufacturer, aviator and motion-picture producer as well known, ironically, for his aversion to publicity as well as for the uses to which he regularly puts his vast wealth. Orphaned at 17, he quit school and took control of his father's business, the Hughes Tool Company. He would later move to Hollywood, in 1926, to produce a series of movies (Hell's Angels, Scarface) that would introduce new stars like Jean Harlow and Paul Muni to the screen.*

*Despite his work in film production, Hughes remains a passionate aviator at heart. On September 12, 1935, in an airplane of his own design, he established the world's landplane speed record of 567.23 kilometers per hour. On January 19, 1937, in the same craft, he lowered the transcontinental flight-time record to a mere seven hours and twenty-eight minutes. A year and a half later, flying a Lockheed 14, he circled the Earth in a record ninety-one hours and fourteen minutes.*

*Hughes is best-known, however, for the Hughes Aircraft Company of Culver City, California. The company is notorious for its daring and experimental planes (many designed by Hughes himself). It is whispered that the government provides Hughes with secret funding to develop advanced technology for the US Army — including an American version of the individual jet pack! For the moment, Hughes is working on a design for an eight-engine, wooden flying boat intended to carry 750 troopers: the Spruce Goose.*







## • THE REICH SWEEPS OVER EUROPE

With Holland surrendered, and German troops attacked unexpectedly through the Ardennes — air attacks on the bridgehead at Sedan were ineffectual and cost many Allied planes — the French and British began to withdraw from Belgium. Unfortunately, the speed of German panzers and Kämpfers surprised the Allied troops, driving through their rear areas and reaching the mouth of the Somme on May 20. The forces in Belgium and northern France were encircled, unable to escape despite brave counterattacks by armor and aircraft. Herman Goering told Hitler that he could destroy the encircled troops with the Luftwaffe alone, a plan that suited Hitler as it left the ground forces intact to assault the rest of France.

British, French and German aircraft clashed over the enclave, but despite heroic efforts by the Allies, it soon became apparent that their position was untenable. The evacuation of the British Expeditionary force and elements of the French First Army and Belgian Army began on May 27, codenamed "Dynamo," and utilized a host of warships and small craft from all over Southern England. The Luftwaffe kept up the pressure on the Allies, costing a hundred and forty German aircraft (to the Allies' hundred and eighty and two hundred ships). By June 3, 220,000 British and 120,000 French and Belgian troops had been saved, though the French troops immediately redeployed in the futile defense of France. On June 11, Paris was declared an open city and five days later the French sought an armistice, hostilities ending on June 25. L'Armée de l'Air had lost almost nine hundred aircraft in the campaign. Britain now stood alone against the might of the German Reich.



## THE BATTLE OF BRITAIN

Hitler wasn't finished with Britain. Plans for the invasion of the British Isles were already in place, scheduled to take place later that summer. Codenamed 'Sealion,' they called for a reduction of Britain's defenses by the Luftwaffe, including the elimination of the RAF and the destruction of ports and food sources. June 21 saw the Luftwaffe's first use of the Knickebein radio guidance system in a daylight attack on Britain, but the Battle of Britain proper did not begin until July 10, with mass air attacks on shipping in the English Channel.

Hugh Dowding, commander of the RAF, refused to be drawn by these attacks, instead holding back his aircraft until Britain itself came under assault. This first phase of the battle lasted until August 12, when the Luftwaffe attacked RAF airfields and radar stations. Radar had demonstrated its worth on July 22 when it was used to direct a nighttime interception of a German force near Brighton. The system likewise allowed the RAF to scramble and face specific German threats rather than wasting resources on patrols.

The RAF took substantial losses, but these were generally lower than those suffered by the Luftwaffe, who often lost as many as two times the number of aircraft they themselves had downed. Massive losses of Ju 87 Stuka dive bombers prompted their withdrawal from the battle by mid-August and Goering's vaunted "Eagle Day" of August 15 proved disappointing, despite concentrating on Fighter Command's airfields. More serious to the RAF than its material losses were injuries and deaths among its pilots, who were being lost faster than they could be replaced. Fatigue was also taking a major toll on the British crews, but fortunately bad weather around the 20th gave them breathing room. On August 20, Prime Minister Churchill paid tribute to the RAF fighter pilots in a speech that quickly became legendary.

## • LONDON IS BURNING

On August 24, the air war entered a new phase. That day — in contravention of Hitler's directive banning the use of terror attacks without his express permission — the Luftwaffe bombed Central



London. This provoked a major response from the British, who bombed Berlin the next night with a force of eighty bombers. The damage to the German capital was minimal, but such attacks would continue for the rest of the war.

Attacks against Fighter Command continued and both the RAF and Luftwaffe sustained grave losses, much more even than in earlier phases of the war. British losses outstripped their production for the first time, and Dowding feared that the end was nearing. Indeed, when London was subject to a massive air attack on September 7 all troops in Britain were alerted to the prospect of invasion in the next twenty-four hours. Fortunately, Hitler chose to postpone the invasion until the end of September, giving the RAF a little breathing room in which to recover. Nonetheless, on September 15 Goering ordered a major air offensive against London and Fighter Command's facilities, but received a rude surprise.

Having flown for the first time on July 19 at RAF Cranwell, the prototype Gloster E.28/39s were deployed against the assault. Later known as the G40 Pioneers, these dozen jet-powered aircraft, based at Duckworth, gave the RAF an additional edge, allowing them to quickly pursue the slower Luftwaffe flotillas. The few squadrons the RAF could field were precious and used with parsimony at first: the new jets required a totally different method of dogfighting, and the British pilots had to learn all of their lessons the hard way. Still, in what became known as the 'Greatest Day,' the Luftwaffe lost almost two hundred aircraft to the RAF's thirty-five. These massive losses shattered the Luftwaffe's morale and two days later, the German chancellor canceled plans for invasion.

The air war limped on until the end of October, with German and Italian aircraft attacking British cities, but by that point it was clear that invasion was no longer possible due to the RAF's technological superiority. Over the months that followed, the campaign would be replaced by sustained bomber raids, known colloquially as the 'blitz,' a sustained campaign against British civilian centers that lasted until May 1941. The devastation of Coventry on November 14/15 was the opening move of this terror campaign, to which Arthur Harris of Bomber Command reciprocated in the months that followed.

### • FOREIGN EFFORTS

While the defense of their home island occupied the bulk of the British attention, it was not their only concern. On October 18, the Japanese bombed the Burma Road, hampering the flow of supplies to the Chinese. On November 11, Swordfish from HMS *Illustrious* raided Taranto harbor, putting a significant portion of the Italian fleet out of commission and forcing the remainder into a defensive posture. Unfortunately, not everything went the way the British would have hoped in the Mediterranean. German Stukas damaged or sank several British warships in early 1941. In March of that year, German aircraft succeeded in mining the Suez Canal, denying its use to the British for three weeks. This hampered efforts to supply the island-fortress of Malta, which nonetheless held on bravely despite repeated Luftwaffe assaults. The Royal Navy's attempts to supply the island resulted in major losses of ships and aircraft, all routes to the island being within reach of land-based German bombers. Fortress Malta would, however, become a legend.

Britain's efforts to support Greece against Italy came to naught when Germany invaded Yugoslavia and Greece, forcing the British to make an ignominious retreat that cost them much material. Additionally, the arrival of Rommel and the Afrika Korps in Libya pushed the British back into Egypt. The battles in North Africa would rage until 1943 and featured the deployment of tank-busting aircraft by both sides. The campaign also saw the first use of the German Horten flying wings, used both as Kämpfer transports and bombers.

Flying wings also played a major role in Operation Mercury, the German invasion of Crete on May 21, allowing them to land substantial numbers of infantry and Kämpfers despite British successes against German naval transports. The defenders fought bravely, but by the end of May were forced to abandon the island. The Royal Navy lost three cruisers and six destroyers, with a carrier, three battleships, six cruisers and seven destroyers damaged, all by Luftwaffe attacks. The only bright spot for the British during this time was the Atlantic, where on May 26 Swordfish from the *Arc Royal* managed to cripple the German battleship *Bismark*, allowing it to be caught and sunk by British warships the next day.

### FOLLY UPON FOLLY

April 2, 1941 saw the first flight of a German jet aircraft, the He 280, followed two weeks later by the first flight of the Me 262 (originally planned with propellers, until the new jet engines were delivered at the last second). These technological breakthrough — the latter aircraft entered mass production at the end of May — may have contributed to Hitler's decision to invade Russia in late June.





Operating in support of the ground forces, the Luftwaffe assault was devastating, able to destroy almost two thousand Russian aircraft, the majority still on the ground. Airdropped infantry and Kämpfers allowed the invaders to swiftly neutralize centers of Russian resistance, while the superiority of German aircraft designs quickly became apparent, with Luftwaffe pilots rapidly notching up dozens of kills. Indeed, by the end of Operation Barbarossa, more than a dozen pilots reported over two hundred kills! Four German Heinkels bombed Moscow on July 21, but plans for an airborne assault on the Russian capital were postponed when the extent of its air defenses became clear. In retaliation for this assault, the Russians bombed Berlin on August 7; Moscow would eventually be taken by the Germans in November of 1941. The Germans occupied the city for several months, delaying the Russian counter-offensive, and the eastern front in Eu-

rope saw more fighting and lasted longer than expected.

Though still neutral, the USA received details from the British of the Whittle turbojet in July 1941, kick-starting their advanced fighter program though it would be two years before they could deploy a working prototype. In the same month, the RAF began operations with the US-built B-17, a stopgap measure used until the deployment of the native Avro Lancaster in early 1942. By the end of the year, the RAF also deployed American Mustangs.

In the Far East, the Chinese war continued apace. In the summer of 1941 the Japanese made extensive use of bombing raids against Chinese positions, notably the city of Chungking. The Imperial Army initially rebuffed German calls for an offensive against Russia, preferring instead to conclude the war in China and the Pacific before launching a new venture, but in October they began a series

of cross-border actions, creating the 'Manchukuo Front.' Imperial aircraft launched deep interdiction raids against communications lines in the Amur Basin, one of which resulted in the severing of the railway lines along which all Soviet reinforcements had to flow. Russian resolve wavered in face of this threat, but rapid reorganization allowed the Soviet forces to slow the assault. Though flying aircraft technically superior to their Russian opponents, the Japanese pilots lacked the combat experience of their German counterparts and the air war over Vladivostok was much more evenly balanced than that over Moscow. Meanwhile, relations with the USA deteriorated during this period and plans were put in place for an offensive against the US Pacific Fleet before the end of the year.

In the USSR, the Luftwaffe had almost free reign, with Soviet pilots forced to rely on suicide tactics to slow the German advance. Despite ingrained sexism in the VVS (Voyenno-Vozdushne Sily,



### Modern Valkyries

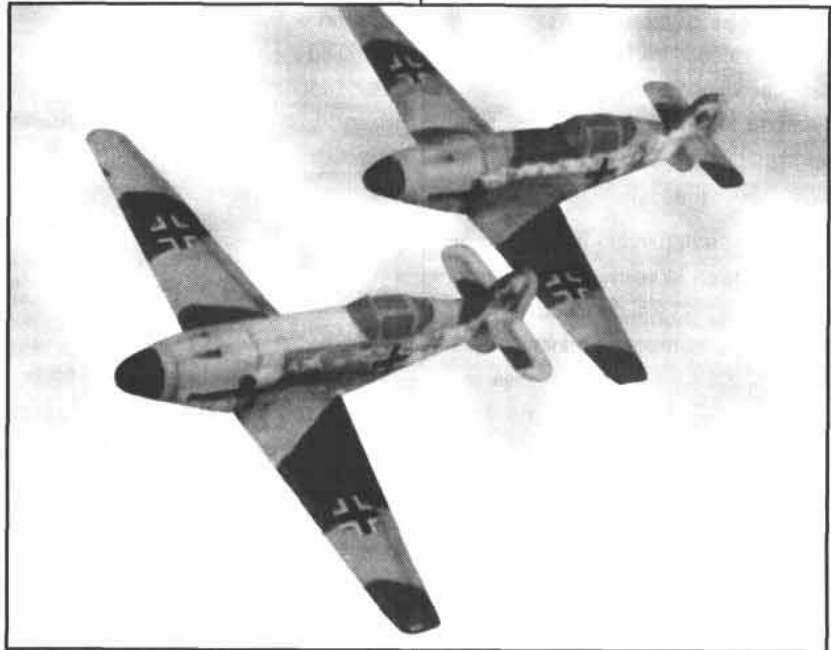
*As the conflict wore on, it was inevitable that women would enter the workforce in great numbers to support the war efforts. It thus came as little surprise when they started to appear in the ranks of military forces as well. Women were ideally suited to piloting small planes and cramped walkers; before long, quite a few units were partially or entirely made up of female personnel. The Night Witches, for example, is a harassment and ground attack squadron that has been giving numerous headaches to the Germans on the Eastern front. On the Pacific front, a group known as the Liberty Belles has been reported, though no one seems to know where they operate from.*



Soviet air force), women were drafted as mechanics and pilots. This action caused considerable tensions in the Russian Air Force, as some chauvinistic pilots refused to fly with a female wingman or to pilot an aircraft with a female technician. Nonetheless, desperation eventually forced them to accept such measures and by 1942 there were three all-female air regiments, incorporating notable pilots like Liliya Litvyak, who would become known as the "White Rose of Stalingrad." Bad weather slowed the German advance that winter, and though they came to within nineteen miles of Moscow, the offensive stalled. To make matters worse, a new force was about to enter the war.

On December 7, three hundred and fifty aircraft of the Japanese Navy attacked the American Pacific Fleet at anchor in Pearl Harbor. The assault force of fighters, rocket planes and torpedo bombers lost around thirty aircraft, but sank six battleships, two cruisers and three destroyers, as well as destroying most of the American aircraft on the ground. They failed to sink the American carriers — which were out at sea — or totally destroy those ships they did damage, but the attack still had a bleak consequence: the extensive damage to the Pacific Fleet's oil depots. This was to set the stage for a prolonged Pacific conflict as the United States struggled to rebuild Hawaii, affecting all of their efforts in the Pacific.

President Roosevelt called the attack "a day of infamy" while the Japanese commander, Admiral Yamamoto, declared "I fear all we have done is awaken a sleeping giant and fill him with a terrible resolve." The USA immediately declared war on Japan, with Germany and Italy declaring war on America on December 11.



## DARKEST HOURS

Two days after the attack on Pearl Harbor, Japanese aircraft bombed Singapore, Luzon, the Mindanao Islands, Wake and Guam. On the 10th of December, aircraft of the Imperial Navy sank HMS *Repulse* and HMS *Prince of Wales* off Malaya. With them went the main striking power of the Royal Navy in the Far East. Hong Kong fell to the invaders on Christmas Day, followed by Singapore on February 15, 1942. On the 19, Japanese carriers air raided Darwin, Australia, causing extensive damage to the port, an attack that would be repeated on March 22.

In early March, General MacArthur withdrew from the Philippines to Australia, while the Japanese made extensive use of air power to reduce the last pockets of resistance in the islands. Amazingly, the US troops managed to hold out until April 9, though many of the survivors were to suffer great hardship in the Bataan Death March and the captivity that followed. On April 3, Japanese air-

craft launched heavy raids on Mandalay in Burma, while on the 5th carriers air attacked Colombo, Sri Lanka.

Britain's bad luck continued at home, with air attacks failing to prevent the warships *Scharnhorst*, *Gneisenau* and *Prinz Eugen* from sailing through the English Channel into German territorial waters. In Russia, the German army was forced to rely on airlifts to supply the isolated 16th Army near Smolensk. This situation, in the winter of 1941/42 would be paralleled a year later in the Kessel at Stalingrad.

## • THE DOOLITTLE RAID

On 18 April, the Japanese were shocked by an air raid on their home islands. Sixteen B-25 Mitchell bombers, equipped with experimental Goddard rocket boosters and placed under the command of Lieutenant-Colonel James Doolittle, took off from the carrier *Hornet* and bombed Tokyo, Yokohama, Yokusuka, Nagoya and Kobe. The attack caused little actual damage but provided the Allies with



an immense psychological boost and demonstrated to the Japanese their unfortunate vulnerability. Doolittle's aircraft escaped to China, though most were wrecked or destroyed by their crews after crashlanding.

On May 4, a Japanese invasion force bound for Port Moresby left Rabaul but was ambushed by aircraft from the USS *Yorktown*. A number of minor vessels were lost but the invasion fleet steamed onwards. They proceeded to the Coral Sea where, on 6 May, they were attacked by B-17s from Australia. They next day, they were again engaged by the *Yorktown*, this time accompanied by the USS *Lexington*. After some brief sparring that sank the Japanese carrier *Shoho*, the main engagement of the Battle of the Coral Sea began on the

morning of May 8. In what would later be called the first true carrier air battle, the *Lexington* was badly damaged and abandoned, while the Japanese *Shokaku* was crippled and forced to withdraw to Truk. The Allied fleet withdrew, seemingly defeated, but Japanese plans to invade Port Moresby were abandoned for the time being.

Stalin, having finally realized the weaknesses of the Russian air force, began tests of the Bereznik Isnaev rocket fighter on May 15. Flights of the first prototypes met with mixed results, but on May 30 two were deployed near Moscow where they downed several German bombers. On the same day, Arthur Harris' bomber war against Germany reached its ultimate expression with a raid of one thousand bombers against

Cologne. Operation Millennium was to become an obsession of Harris', with numerous cities singled out for attention. On June 4, the Millennium raid on Bremen included testing of Gee blind-bombing equipment that allowed the aircraft to attack a target without actually seeing it.

Wary of America's reach, Japan sought to deny them bases from which to operate. The Aleutian Islands of Alaska, and Midway in the central Pacific were their principal targets. On June 4, the Japanese bombed Dutch Harbor in Alaska and moved against Midway. The American garrison weathered the initial air assault and, while the Japanese were rearming, US carrier aviation from the *Hornet*, *Enterprise* and *Yorktown* assaulted the Japanese fleet, accompanied by B-17s from Midway. The Imperial Carriers *Kaga* and *Soryu* were sunk in the initial engagement, while the remaining two carriers, the *Akagi* and *Hiryu*, managed to escape purely through luck the next day. The *Yorktown*, damaged on June 4, was finally sunk by a Japanese submarine on the 7th, ending the Battle of Midway. The Japanese ability to project their power into the Pacific was reduced, but not destroyed. Rumors of a Japanese secret mega-battleship project would seem to reinforce this.

## Secret Weapons Stalemate

*The scientists on both sides of the conflict are continuously developing new weapons in an effort to stay ahead of the competition. This has led to the emergence of a number of peculiar prototype weapon systems — some useful, others not. The Aerial Mines and the Rammer Airplane never really caught on; other developments were passing fads that visited the battlefield only briefly before a stalemate was reached.*

*The development of the Me-163 rocket plane both pleased and worried the Luftwaffe. Here was a splendid high speed interceptor which, unfortunately, was prone to explode on landing, killing Germany's precious pilots. A number of Komets were thus modified to accept a servo-pilot — essentially, a metal drum filled with a radio receiver and a computer. It was equipped with external servo-control levers and a television on top, and fit in the cockpit seat. This transformed the Komet into a remotely operated fighter that could also undertake maneuvers of its own if contact was lost with the ground. The only external difference was the armored canopy, which only had an elliptical clear front window for the television.*

*The Allies were soon to realize the new nature of the bold little fighters that kept harassing their bombers. Some planes were modified to carry radio jammers intended to block the control transmissions. These ECM aircraft were easy to recognize, their large antennae array and radome making them stand out from the rest of the formation. They were soon escorted by bodyguard "Flak bombers," airplanes which sacrificed their bomb loads and some of their defensive guns in exchange for massive turrets bearing shotgun-like cannons. They would swat the remote fighters with little difficulties, but manned aircraft responded too fast. After a few months, most of the Komets went back to human pilots, and the specialized ECM planes were re-assigned to more useful purposes.*

## • THE EUROPEAN FRONT

August saw the first American air attacks in Europe, with rail sidings near Rouen targeted by B-17s escorted by RAF spitfires. August also saw the ill-fated Operation Jubilee; the Ground operation was a disaster, and the RAF sustained major casualties in the air battle — 106 losses compared to 170 Germans. The tragedy would, however, provide valuable lessons for the future.



Germany, stalled in its drive, turned south, staging a major assault on the manufacturing city Stalingrad. The initial ground campaign went well, with aircraft playing a major role in the attack on the city, which began on August 19. Bombers sought to level the city, while Ju 187s dove on transports bringing reinforcements across the Volga. Despite their best efforts, the Germans failed to complete their seizure of the city and the campaign dragged on into the winter.

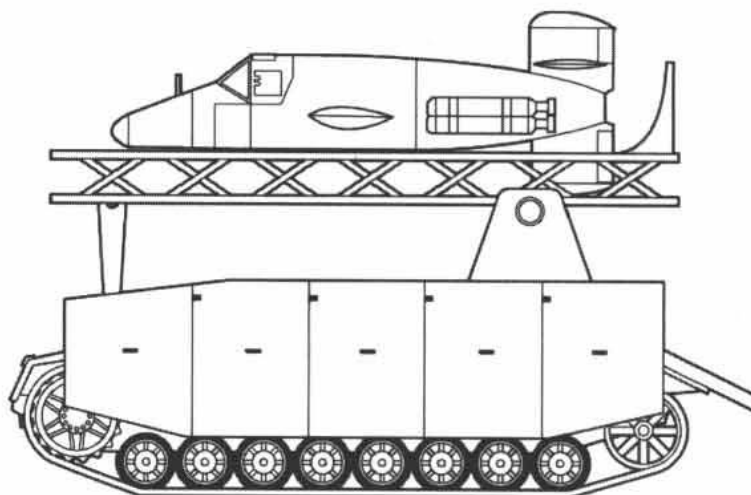
In the Far East, US troops landed on Guadalcanal but after an attack by the Japanese fleet, the American warships withdrew, leaving the marines without supplies or air cover. Fortunately, the troops had captured the Japanese airstrip on the island and were able to use it as a base. At the end of August, US and Japanese carrier fleets again clashed, this time near the Solomon Islands. This battle was inconclusive and both fleets withdrew. The battle on Guadalcanal would rage until February 1943, with air power — including the new American Airacomet jets and battle-ship-launched Roughriders — continuing to be a major factor.

In November, the first major Allied amphibious operation in the west took place in North Africa, with an Allied Expeditionary Force under Eisenhower landing in Morocco and Algeria under the codename 'Torch.' German aircraft

wrought considerable damage on Allied troops off Algiers, while paratroop reinforcements landed in Tunis. The war in North Africa would continue until mid 1943, but the Germans were now in a difficult position.

The Russian counteroffensive of November 1942 caught the Germans by surprise, and the 6th Army and 4th Panzer Army were trapped in Stalingrad. The Reich troops fought on in the pocket, referred to as the Kessel, but came under attack on the ground and in the air

by the reinvigorated Russians. The supply situation in the Kessel was appalling, with scarcely a tenth of the needed food and ammunition making it into the enclave, despite Goering's assurances to Hitler that the Luftwaffe could meet the needs of the embattled troops. The airlift continued until January 16, 1943, when the Russians overran the airfield at Pitomnik. Realizing the situation was futile, Von Paulus surrendered the Kessel on January, 31 1943.



### In Defense of the Reich

*Leery of the course of the war and the ever increasing Allied bombing raids, the Luftwaffe high command has begun a program for improving the aerial defense of the Fatherland. Much of this program has been kept secret from the Führer, who would likely see it as an admission of intolerable weakness. As a result, existing or salvaged material are used in priority. This has lead to the creation of some interesting contraptions.*

*A number of basic anti-aircraft units, such as guns and guided rockets, have been tied in with the existing Freya radar network to provide early defense. Rapid-intervention interceptors, such as the rocket-propelled Natter, have been deployed on airfields on or near the border. These stationary installations are vulnerable to enemy attacks, however, and a series of mobile Natter and Komet launchers have been developed from surplus Panzer III and IV hulls. The turret of the tank is removed and replaced by a deployable launch rail with a built-in blast deflector. The interceptor, equipped with solid-fuel boosters, sits on the rail, ready to be launched at a moment's notice. Mobile interceptors such as this are believed to have already been deployed in occupied France.*

### Orient Korps Air Raiders

*Some German bombers and fighter escorts have made it to Nazi-sympathetic Indian-held fields, where they continue to perform raids on the British forces in Asia. It is believed that twenty or so aircraft remain, being slowly whittled down by casualties and combat losses (some being replaced by captured British aircraft).*





## AERIAL TECHNOLOGY

Aviation technology has come a long way since the Wright brothers first flew, the crude aircraft of the 1900s giving way to the combat biplanes of the Great War, the stunt flyers of the 20s and 30s, and the lethal fighting machines of the Modern Age. The core principals of flight remain the same, but the methods and execution have changed dramatically. No longer is aerial warfare a duel between gentleman-pilots, swooping low over the battlefield in wood and cloth biplanes, dropping bombs from their cockpits on the troops below. It is a violent dance in the sky, pushing man and machine to the edge of their endurance, and often beyond.



## STRUCTURE AND DESIGN

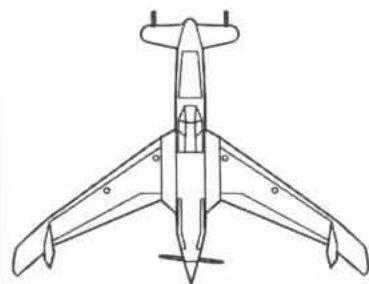
Perhaps the greatest revolution of the last twenty years — albeit the least glamorous — is the radical shift in design and construction technologies. Where once aircraft were built of wood with fabric — or even paper — skins, today they have metal skeletons and coverings. Indeed, the distinction between framework and skin has blurred, with the outer layers of the aircraft playing a vital role in the design's integrity, supplementing the skeleton to give strength greater than the individual parts could provide. This "monocoque" design has greatly increased the stress tolerances of aircraft in the Modern Age, allowing them to fly faster and maneuver harder than those of the Great War or the 1920s.

Biplanes have given way to monoplanes, and even these are becoming increasingly sophisticated. Swept- and delta-wing have increased high-speed performance, while some designs have massive wing areas to allow them to fly at altitude or to transport massive loads. Indeed, some designs — notably those of Horten in Germany and Northrop in the USA — lack a distinct fuselage and have been dubbed "flying wings."

### Progress

*The Second World War is a time of great technological advancement, and the participants continuously design and manufacture many new technologies. Many others are in various stages of planning, but for reasons, perhaps, of time, resources or sheer lack of willpower, are being delayed or will never be produced. The Germans in particular are making great advances in the field of aircraft technology, proposing a wide range of new designs and modifications which could, should they come to pass, greatly change the course of the current conflict.*

*Many of these projects would never have seen the light of day were it not the development of the computator and other electric data processing devices. Most modern engineering firms have started to use basic computator systems that greatly speed up the conception and manufacturing process. This allows a team of designers to conceptualize, test and manufacture components much more efficiently than anyone had ever dreamt possible in the days of draft paper and the slide rule. The net result is the operational deployment of technologies and aircraft that were little more than pipe dreams or prototypes only a few years ago.*





## NEW VEHICLE TYPES

The continual development of new aircraft types has led to some interesting vehicles that are unlike anything seen so far in the field of aviation. Beyond simple design improvements, such as the swept-wing or the turbo-charger, a number of more exotic devices have taken to the air. Some are hybrids of two concepts, such as jet-propelled biplanes, while others merely make use of unusual layouts, such as the canard, to draw additional performances out of existing airframe technologies.

Rotary wing aircraft may be the most impressive development, however. Though autogyros, also known as gyrocoptors, have been relatively common for at least a decade, a new improvement, bearing a motorized lift- and propulsion-supplying rotor, has recently appeared on the scene: the Helical Aerodyne. Though slower and more fragile than conventional aircraft, their agility and (in the case of helical aerodynes) ability to hover makes them ideal transports. Already, production vehicles such as the Sikorsky R5 have begun to demonstrate their worth to several militaries. Whether such aircraft will become a staple of the air war remains to be seen, however.

## THE HUMAN FACTOR

Almost all aircraft of the Modern Age are equipped with breathing apparatus to allow high-altitude flight. There are some concerns that the performance of modern aircraft exceeds the tolerances of the human pilots (indeed the RAF Manual of Air Tactics, 1938 edition, stated "maneuver at high speeds in air fighting is not now practicable because the effect of gravity on the human body during rapid changes of direction at high speed causes a temporary loss of consciousness").

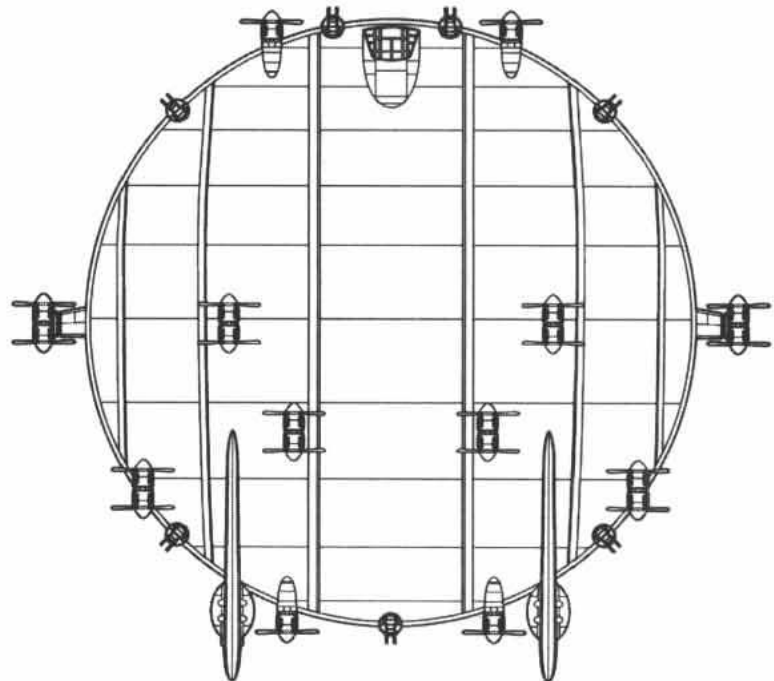
This has prompted the RAF, Luftwaffe and USAAF to research technologies to safeguard and assist their pilots. Tests have been carried out with various cockpit configurations to reduce the effect of G-forces on the pilots, while the USAAF has an early prototype of an elastic suit intended to stop blood pooling in a pilot's limbs during high-speed maneuvers, thus reducing the risk of losing consciousness. Such a suit can be combined with an oxygen supply that would enable a plane to fly harder and higher than anything previously built. Unconfirmed reports suggest that Ger-

many, Japan and Russia are also experimenting with pharmacological methods of increasing pilot endurance.

Mindful of the important resources represented by trained air crews, Britain and Germany have started to experiment with ejector seats, intended to throw a pilot clear of a stricken aircraft (jet speeds being too fast for traditional bail-out methods to be practical). The Luftwaffe and Imperial Japan have also experimented with wholly detachable cockpits, with various degrees of success.

## Luftfortresses

*Perhaps the greatest surprise of the Modern Age is Germany's renewed interest in Zeppelins as a military platform. Reich Marshal Hermann Goerring has authorized the construction of four "Luftfortresses," heavily armed and armored behemoths that have been likened to aerial battleships. Though lacking the speed and agility of aircraft, their self-sealing hydrogen gas cells will allow them to glide slowly above the battlefield, delivering volley after volley of fire against enemy positions; this neutral buoyancy will also grant them phenomenal range. Though officially instated for use on the Eastern Front, it has been suggested the flying battleships could be used in a new Battle of Britain or even to strike at America.*

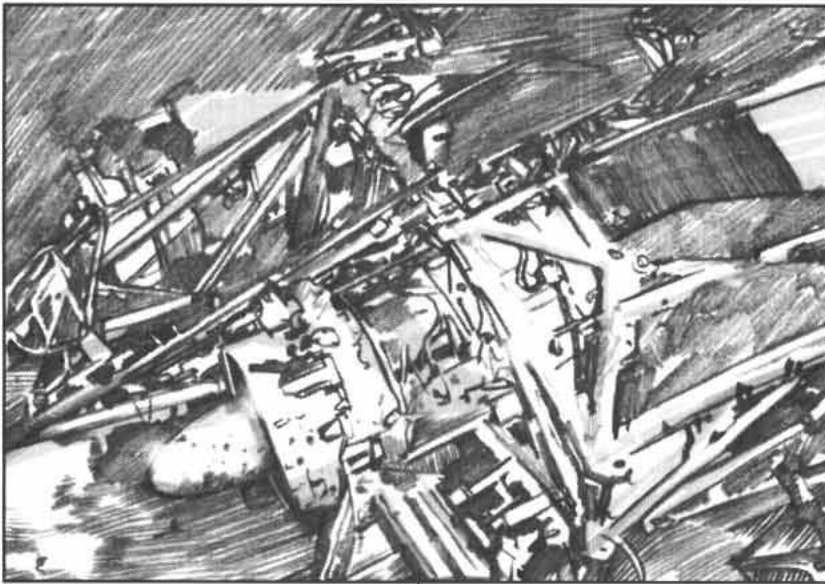






# PROPULSION

The revolution in propulsion systems is simultaneously the most glamorous and ignored change in aviation technology. Great prestige has been attached to the jet engines of the RAF and Luftwaffe, and to the rocket planes of Japan, the USA and Russia, but traditional prop engines have also undergone some truly major changes. Bombers operate at the edge of the stratosphere while rocket-powered interceptors climb to meet them at speeds approaching that of sound. This has brought new issues to light regarding aircrew safety and airframe resistance, but the relentless march of progress cannot be stopped: planes are flying higher and faster than ever.



## PISTON ENGINES

The piston engines in use in the Modern Age are bigger and more powerful than their predecessors, capable of driving the aircraft almost as swiftly as the new-fangled jets. Combined with sophisticated propeller designs, such as the variable pitch blades that allow finer control of speed, these new engines push modern airframes to their limit. Indeed, some configurations — such as “pusher” props rather than the traditional “puller” design — enhance the acrobatic capabilities of fighters, while contra-rotating blades on the same axis negate the sideways pull of some engines.

Despite the emergence of the jet engine, the piston engine is not on its way out yet. More reliable and cheaper to build, it can provide almost the same speeds if installed in the proper airframe.

Advanced add-on systems, like fluid injectors and turbo-compressors to boost combustion rates or high speed ducted fans, greatly improve performances, while the new temperature-resistant alloys developed for jets do just as good a job for pistons and crankcases. With the ongoing experiments in supersonic range propellers, the piston engines still have several years of useful service life ahead of them.

## JET ENGINES

Whereas a standard aircraft propeller accelerates a large volume of air by a small amount, a jet engine accelerates a small volume of air by a large amount. It does this with the help of a compressor which increases the pressure and temperature of the inlet air before sending it into a number of combustion chambers. There, fuel is injected and burned, heating the air. The hot air needs to occupy a larger volume and expands through the only available opening, a turbine, which converts some of this temperature rise to drive the compressor. A nozzle accelerates the air using the remainder of the energy added in the chamber, producing a high velocity jet exhaust that pushes the plane forward.

Jet engines are, of course, still in their infancy. The concept has been understood for centuries but only since the 1930s has the technology been accessible, and only since 1940 have useful designs been in service. Frank Whittle and Hans von Ohain have pioneered the practical application of the technology, Whittle's implementation for the RAF being more robust while Ohain's for the Luftwaffe is more sophisticated. One can only imagine what will be possible with jet propulsion once the technologies have matured! Some claim that it may allow aircraft to travel faster than the speed of sound, one of the few remaining aeronautical frontiers.

## ROCKET ENGINES

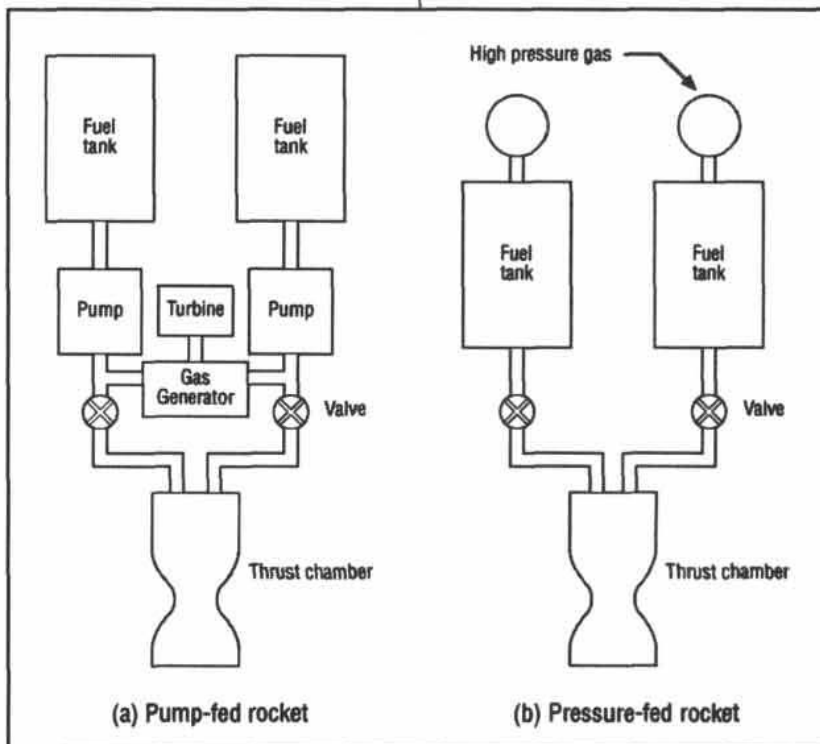
Liquid fuel and solid-state rockets have also been used on aircraft, a cheaper — if less efficient or reliable — method of propulsion. Rocket thrust is the reaction force produced by expelling particles at high velocity from a nozzle. The



most common rocket engine uses hot exhaust gases produced by chemical combustion; the chemicals or propellants are of two types, fuel and oxidizer, and both are required for combustion. The engine's ability to produce thrust will endure only so long as the supply of working fluid holds out.

In the solid-chemical rocket, the fuel and oxidizer are combined and cast into a solid mass in the specially designed combustion chamber, with a hole down the center. After being ignited by a pyrotechnic device, the propellant burns on the entire inside surface of the perforation. The hot combustion gases pass down and are ejected through the nozzle to produce thrust.

The liquid rockets in use are mostly bi-propellant-based: they require a liquid fuel and liquid oxidizer. These are contained in separate tanks and are mixed only upon injection into the combustion chamber. They may be fed to the combustion chamber by pumps or by pressure in the tanks. Propellant flow rates must be extremely large for high-thrust engines; pump-fed system power is usually developed by a hot gas turbine, supplied from a gas generator which is actually a small combustion chamber. The pressure-feed system eliminates the need for pumps, but high-



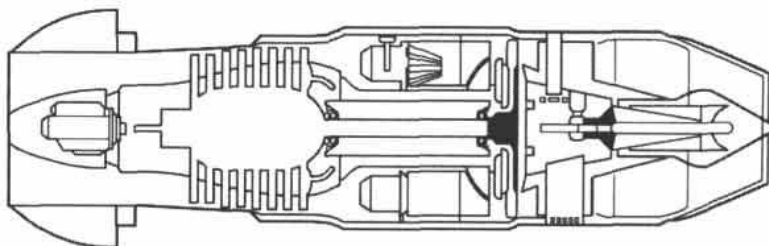
pressure tanks lead to a need for heavier structures. On the other hand, the absence of pumps raise the overall reliability, and this system is thus often used in missiles.

Rocket technologies form the mainstay of Russian and Japanese entries into the high-speed aircraft stakes, while they serve a secondary role in Germany, or as a stopgap measure in the

USA. Of the major powers, only Britain does not use rocketry as a means of aircraft propulsion, though the RAF uses it as a takeoff aid and, like Germany, to propel the new generation of guided weapons.

## The Jet Age

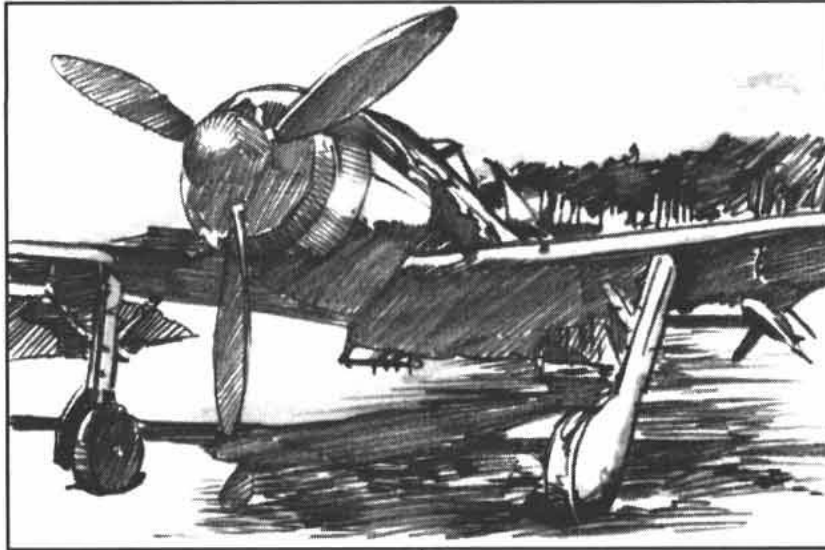
*The Germans were much quicker than the Allies to jump on the jet propulsion bandwagon. While the British and American scientists explore several options such as turbomotors, the scientists of the Reich are turning prototypes after prototypes of new fighter planes, many of them built around standard mass-produced jet engines (like the Jumo 004 pictured at right).*





## WEAPONS AND SENSORS

Last but not least are weapon systems. Solid bullets remain the mainstay of small rifle-caliber guns, but larger weapons — those of 20, 30 or even 50 mm caliber — favor explosive shells. Such cannons are designed to penetrate armor and wreak havoc on armored and unarmored units alike. During the early phases of the war, they were the weapon of choice for both anti-air and anti-ground attacks, but their reliance on the pilot or gunner's aiming skills has led to a decline in favor of a new generation of weapons, ranging from rockets to more esoteric contraptions.



### PROJECTILE WEAPONS

Most aircraft guns and cannons are belt- or magazine-fed automatic weapons with good rates of fire. Several types of ammunition are in general use, from solid bullets to high-explosive or incendiary shells. The former are easy to manufacture and mostly used for the smaller caliber weapons; many guns shared common ammunition with ground vehicles to reduce supply problems. The second type, explosive shells, was designed to cause a maximum blast effect by combining a thin, fragmentable shell casing with a load of explosive material. Some of the larger calibers contain enough power to obliterate a heavy bomber with only a few solid hits. The latter shell, the incendi-

ary one, was meant to be targeted at fuel tanks, but the hydrodynamic fuse fit so that the shell will only explode once in contact with liquid, unfortunately, does not always work.

Despite their widespread use and relative familiarity, some gun types have earned fearsome reputations among air crews. For example, the German MK 108 30mm cannon is dreaded by Allied bomber crews, who gave it the nickname 'pneumatic hammer' thanks to its distinctive sound.

### ROCKETS AND MISSILES

Crude unguided rockets have been in use for many years, but recently efforts have been made to allow them to be

steered toward their targets. Work had begun on air-to-air guided projectiles before the war, but the first weapons of this type did not reach the battlefield until a couple of years into the conflict. They were developed to give fighters the ability to shoot down enemy bombers without having to face the latter's defensive guns, but their use soon spread to dogfighting as well. Wire- and radio-guidance systems allow these new missiles to be used against targets at a greater distance than would be possible with traditional guns. Though this technology is in its infancy, it is rapidly becoming a weapon of choice in the Luftwaffe and RAF. Indeed, rumors abound that German scientists are developing new generations of autonomous computer-directed missiles capable of intelligently selecting and flying toward an enemy target, be it in the air, on the ground or at sea, *without* need for a pilot or gunner!

Current missile designs tend to feature a cylindrical or cigar-shaped fuselage, with several swept wings and tail fins for lift and stability. Small pods, placed either on the fins or the main body, hold the spools of very fine wire that unwind during the missile's flight to carry the controller's instructions; some models have flares to aid the pilot in guiding the projectile. Propulsion and power is supplied by a rocket engine using either solid or hypergolic fuel. The warhead is mounted in the nose and is detonated either by the controller or an impact/acoustical proximity fuse, tuned to the pitch of the target's propellers.

Using missiles requires the development of some new tactics. The carrier aircraft reaches the same altitude or slightly higher than its target; the missile is dropped from a modified bomb rack, and its engine ignites. The controller (either the plane's pilot or a dedi-



cated gunner) can then steer the missile by the use of a small joystick in the cockpit. Several seconds after launching, the proximity and impact fuses are armed; some models include a self-destruction fuse as well for the user's safety. Missiles carry several kilometers' worth of wire, and can reach speed of more than a 1000 kph.

Germany is developing the Vergeltungswaffe (Retaliation Weapon) series of long-range flying bombs, the first of which — the FZG 76 (V1 to the Allies) — is to be first tested in 1942 and deployed a year later. America has its own comparable program in the JB-2. Japan too has a flying bomb program, but disdains the dumb- or computator-piloted concepts in favor of designs flown by 'kamikaze' suicide pilots, a practice the Germans have been eyeing with interest.

## ADVANCED WEAPONRY

Experiments have also taken place regarding the use of the ray guns and lightning generators already deployed in fortifications and some tanks. To date, however, the power requirements of such systems have made a practical aerial system impossible, but the inventors of this Modern Age have merely taken these setbacks as a challenge to their ingenuity. Superscience will solve the problem.

## SENSORS

A weapon is useless if the target cannot be seen. Until the start of the war pilots had only one sensor system available — their eyes — but ground-based radar stations, used first by the RAF and later the USAAF and Luftwaffe, were able to "vector" fighters toward their targets. Eventually, radar equipment would be small enough to be mounted directly

on planes. Though other sensors, such as the German Vampyr infrared sight, started appearing on planes by the middle of the war, radar and its variants remained the main type of aircraft sensor for the bulk of the conflict. Efforts were made to counter radar's effectiveness, and that of radio direction-finding equipment, which led to the development of Electronic Countermeasure (ECM) systems. Efforts to enhance sensors — and to evade them — would be a major part of the late war.

### • RADAR

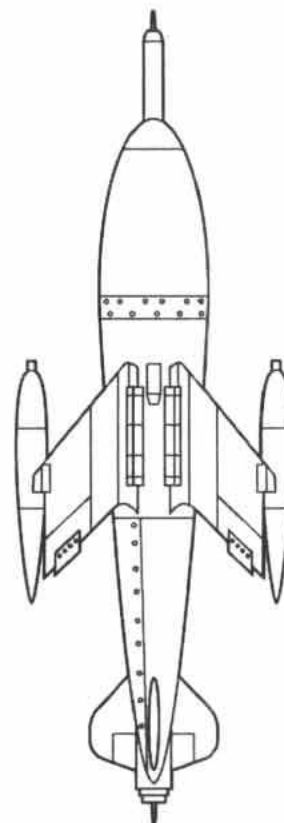
As far back as June 1932, there had been reports of planes interfering with radio signals. Sir Robert A. Waston-Watt, A British electronics specialist, came up with the idea of RDF, Radio Direction Finding. With his staff, he submitted a paper about a new type of sensor codenamed radar in 1935 ("radar" is an acronym for RAdio Detection and Ranging). The device would transmit radio pulses towards a target, then receive a return portion of the transmitted signal after the signal had contacted the target. By observing the intensity and time delay of the returned signals, the position and speed of incoming aircraft could be extrapolated. By the start of the war, both sides had a basic radar network in place. They were short-ranged and inaccurate, but they at least provided early warning of an attack.

This combination proved effective but wasn't ideal, and considerable effort was spent on reducing the size of the equipment to allow it to be installed directly in the aircraft. This innovation allowed the aircraft to operate independently of ground bases, particularly useful over enemy terrain or at night, when radar-equipped nightfighters were able to ambush enemy bomber flotillas,

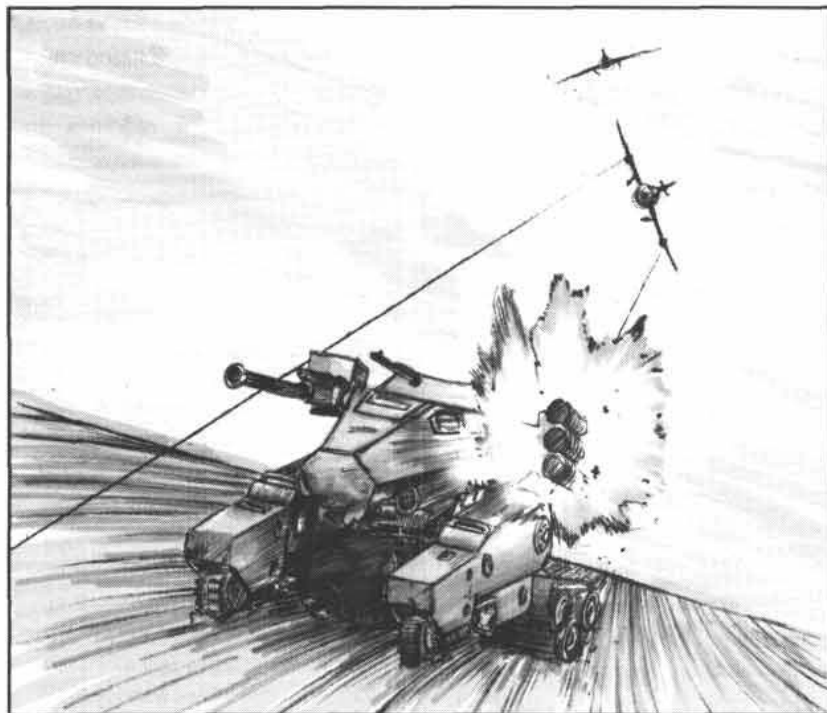
though it remained to expensive for use in all designs. Radar-equipped planes were easy to spot by their antennae array and large bulging radomes, and many fighter pilots went automatically after the large dish-equipped, radio-spoofing bombers.

## The Kramer X-4

*The Germans were among the first to develop reliable air-to-air missile technology, and their X-4 missile would serve as a template to many. Its production is simple, the design set up so that unskilled labor can assemble large numbers in a relatively short amount of time. Only the production of the liquid-fuel rocket motor causes difficulties, with the BMW facility at Stargard currently the only reliable source.*







## DEATH FROM THE SKIES!

"We are under air attack. Grid reference HC 279, 434. I repeat this is Kämpfer nine three one ..." The voice was scratchy, distorted by a mix of atmospheric, stress and background noise.

Rutger craned his neck round to speak to his navigator, sitting in the tandem seat behind him. "Hermann, talk to me. Where is it?" The Horten 229 wobbled slightly as he re-centered the stick, causing sunlight from the new dawn to glint off the leading edges of the "flying wing."

He heard the rustling of papers as Hermann flipped through his charts. "Got it. Near Mechili, on the edge of the Jebel Akhdar." There was the clicking of a slide rule. "It's stretching things but it's within our combat range. Just."

Rutger knew it would be at the limit of their reach — they'd spent most of their fuel on a night sortie against the British transport aircraft attempting to supply Malta — but he wasn't be about to leave his fellow Germans at the mercy of the of the British when he could do something about it. "Give me a heading."

He swung toward the heading Hermann read out and opened the throttle. The Horten leapt forward as its twin Jumo turbojets reached peak power, the aircraft eating up the kilometers. For eight minutes they flew arrow-straight toward the target, unspeaking, just calmly going through their combat checklists. Five minutes out from the target, Hermann spoke.

"The dome is hot, preparing for a sweep." Rutger heard a switch thrown and heard a faint crackle as the radar system went active. The navigator was silent for a few mo-

ments. "I'm getting five returns, through three show as friendly. The other two seem to be climbing away from the target site."

The Luftwaffe pilot closed his eyes for a moment. They were probably too late to save the Kämpfer but could certainly make the Tommy aircraft pay for what they'd done. "Understood. Prep the X-4." They still had a Ruhrstahl/Kramer missile onboard, a wire-guided weapon that they could steer onto the target. Perhaps overkill — the weapon was intended for use against heavy transports and bombers rather than fighters — but it would ensure the British swine didn't trouble them again.

More clicks from the rear seat as Hermann threw switches and activated the tiny television screen that would serve as his eyes on the missile. "Ready."

"Okay. On my mark; drei, zwei, eins — barkassel!" There was a clunk and the aircraft shuddered as the cruciform weapon dropped away. Another second and the missile's engine kicked in, rocketing it away from the speeding jet. There was a whining sound: guide-wires unspooling at high speed.

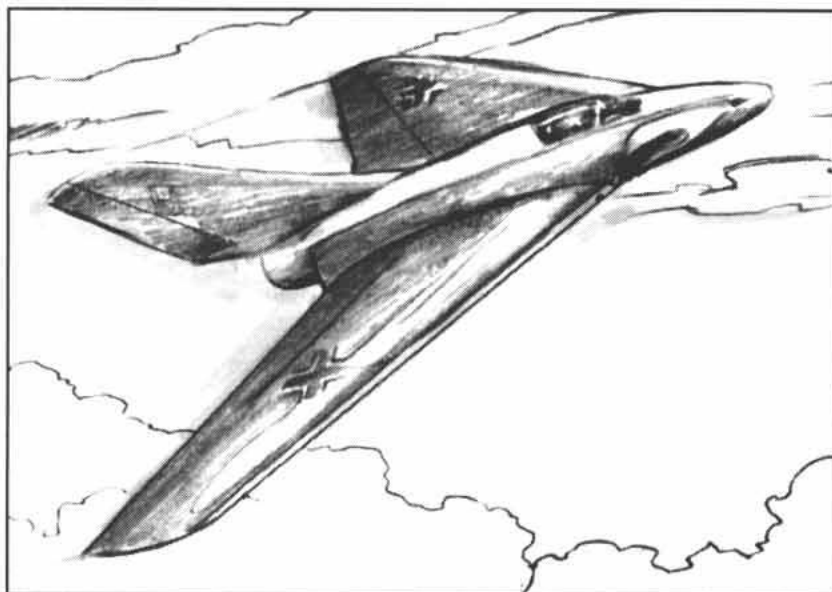
"Fifteen seconds to impact." In the distance, Rutger could see light glinting off the canopy of the British aircraft, too far to identify them with the naked eye. Not too far for Hermann and the speeding missile. "Hurricane tankbusters. Going for the leader." Fire erupted in the dawn sky as the missile struck home, its 20 kilograms warhead shattering the flimsy aircraft. Fire rained down on the desert and the surviving tankbuster dove for the deck, seeking protection from the hidden assailant.

Hermann whooped with joy — another kill marker for their fuselage! Rutger remained icy, throwing a switch near his left hand. "Hold on, I'm going to guns. You can run but you can't hide." The bat-winged aircraft dove toward the fleeing Hurricane, its 30mm cannons blazing.

# BASIC GAME MECHANISMS

The aerial battles of World War II hold a particular fascination for many people. **Luft Krieg** is a ruleset that allows Players to refight such engagements using their own tactics. The Gear Krieg setting incorporates many advanced ideas and technologies, giving Players access to a wide range of combat options. This chapter supplies all the basic and advanced rules necessary to simulate battles and skirmishes in the Gear Krieg world; very specialized scenario-related rules, along with more aircraft, will be found in a subsequent supplement.

For the purpose of the game, the aircraft are represented by small models, referred to as miniatures. The locale where the battle will be fought is a tabletop landscape, or an approximation of it. A tape ruler (or other similar instrument of measure) is used to regulate movement and measure the range of the weapons.



## COMBAT UNITS

The standard **combat unit**, represented on the mapboard by a miniature, is either a single fighter, bomber or missile. Fighters are generally organized into groups of two or more aircraft, while bombers may form part of an "air flotilla" or operate independently. The group's name and number of units can change according to its origin; for simplicity, groups of fighting units are referred to as **combat groups** for game purposes.

An overall Commander must be chosen for each side, with a Second in Command. Their identities can remain secret, but must be noted down for future reference. The Commander's Leadership and Tactics Skills are one level above normal. The Second in Command's Leadership Skill is one level above normal. If the Commander becomes a casualty, he or she is replaced by the Second in Command. If both are put out of Action, all future Leadership Skills are rolled at the Skill level of the crew with the highest Leadership Skill.

## Acronyms and Synonyms

*A number of abbreviations and acronyms appear in this book. For ease of reference, the most common are listed here:*

ACRONYM	MEANING
AE	Area Effect
AUX	Auxiliary System
CP	Command Points
- ICP	Initiative Command Points
- TCP	Tactical Command Points
ECM	Electronic Countermeasures
ECCM	Electronic Counter-Countermeasures
LOS	Line of Sight
MoF	Margin of Failure
MoS	Margin of Success
MP	Movement Point
MU	Measurement Unit
RAF	Royal Air Force
ROF	Rate Of Fire
USAAF	United States Army Air Force
VTOL	Vertical Take-Off/Landing
VVS	Voyenno-Vozdushne Sily (Soviet Air Force)

## MEASURES AND SCALE

**Luft Krieg** has been written with miniatures in mind. A proper battleground would take up several meters to allow realistic weapon ranges, and thus the scale of the battlefield will have to differ from the scale of the model — a common wargaming convention. Individual units are "enlarged" so that they are visible on the landscape. Players should choose a game scale that fits their resources and requirements (see the *Game Scale* table, next page).

The game can be played with either the English/US system or the metric one, but all Players must use the same measure system. To avoid confusion, the rules are written in Measurement Units (MUs) rather than inches or centimeters: the length of one MU depends on the scale used.





The actual position of the unit is considered to be the exact center of the miniature representing it. All measurements are taken from this center point. The vertical dimension of the battlefield is important: assume the aircraft is actually one MU above the miniature's position on the table surface for every point of altitude. Calculate Line of Sight (LOS) from this point.

**Luft Krieg** can be played in one of two broad timescales, *Dogfighting* or *Air War* (see table below). The former uses short bursts of time (6-second game turns) to simulate the constant jockeying for position of the contestants. It is best used

for games involving only two or three planes per side. Air war turns are a little more abstract, each 30-second turn reflecting the major maneuvers of a battle. It is suited to most game scenarios and can handle dozens of planes per side if need be.

The rules remain the same regardless of table scale, and, in both case, each Movement Point (MPs — see page 28) represents 30 kph. Usually, one MP translates to one MU of movement, but some environments require additional Movement Points to move through, simulating difficult atmospheric conditions or maneuvers.

### Game Scale Table

Situation	Aircraft Scale	Ground Scale	Time Frame	Movement Unit
<b>DOGFIGHTING</b>				
Large Open Area	1/48	1/48	6 s/turn	MU = 6" = 16 cm
Large Table	1/72	1/72	6 s/turn	MU = 4" = 10 cm
Medium Table	1/87	1/87	6 s/turn	MU = 3" = 8 cm
<b>AIR WAR</b>				
Medium Table	1/144	1/1000	30 s/turn	MU = 1"
Small Table	1/285-1/300	1/10,000	30 s/turn	MU = 1 cm

### Gear Krieg and Luft Krieg

*There are various ways of integrating Luft Krieg with the ground-based Gear Krieg tactical wargame (DP9-501). The easiest option is to play the two games on the same mapboard — the rules are fully compatible, though each contains special-case rules for the setting. This is best suited to large playing areas so as not to restrict the actions of the aircraft.*

*Another solution, more appropriate for those with more restricted space, is to use two maps: one for ground forces and one for aircraft. The air map should include a miniature version of the ground map; in effect, the two maps represent roughly the same battlefield, though the Air War map covers a larger area.*

### The Hand of Fate

*Sometimes a situation may arise that is not covered by the rules, or where the rules are unclear. If the matter cannot be resolved quickly, roll a dice to determine a course of action rather than allow the game to bog down in arguments.*

## DIE-ROLLING STANDARDS

Gear Krieg uses everyday six-sided dice to add a random element to the game. These are sometimes referred to as "1d6" in the rules, "2d6" for two dice, 3d6 for three, and so on.

When two or more dice are rolled simultaneously, their results are not added together. Instead, the highest result is considered to be the outcome of the die roll. If more than one "6" is rolled, each extra "6" adds one (1) to the total. If every die rolled turns up "1," the die roll is a Fumble and counts as an overall result of zero and no modifiers may change this value. Unless specifically mentioned otherwise, all die rolls work in this way.

The totals of die rolls are often influenced by modifiers. Modifiers are added to the total of a die roll. If negative modifiers lower the total below zero, the final result is always zero and cannot go any lower. Modifiers are not applied to Fumbles.

### Die Rolling Examples

*Example 1: Angie rolls two dice. The dice read 3 and 5. The total of the die roll is 5 (the highest individual die result).*

*Example 2: Brian rolls five dice. The dice read 1, 6, 4, 6, and 6. The total of this die roll is 8 (the highest roll + 2 for the two extra sixes).*

*Example 3: Carole rolls three dice. All three dice read 1. He has fumbled the die roll. The total is considered to be 0.*

*Example 4: Dennis rolls two dice and has a +2 modifier. The dice read 1 and 5. The total of the die roll is 7 (highest roll + 2).*



## RATINGS AND SKILLS

In *Luft Krieg*, pilots and crew are rated in terms of their Skills. A Skill is a learned talent or ability, which is often improved with practical experience. There are four important Skills in the game: Piloting, Gunnery, Leadership and Tactics. It is a common practice to rate a crew in terms of general training: for example, a crew rated as Veteran is assumed to have an average Skill level of 3.

The Skill level is the number of dice used for Tests. For example, a level 2 crew rolls two dice in combat. Untrained people, such as civilians, have Skill Level 0; they use two dice for Skill Tests, but retain the *lowest* result; if either die comes up "1," they have Fumbled.

### Skill Levels

SKILL LEVEL	TRAINING QUALITY
1	Rookie
2	Qualified
3	Veteran
4	Elite
5	Legendary

## MARGINS OF SUCCESS AND FAILURE

Most attacks and tactical Actions require Skill Tests. These consist of a die roll whose result is compared to another die roll or a fixed number called a **Threshold**. The difference between the results is called Margin of Success (MoS) for the winner and Margin of Failure (MoF) for the loser. If the roll is a tie, the MoS is zero. For instance, a Qualified attacker (Skill level 2) uses his Gunnery Skill and rolls two dice: a "1" and a "4." The defending Veteran (3) defender rolls three dice for his Piloting Skill: a "2," a "3," and a "6." The attacker has a MoF of 2 and fails to hit his opponent.

## NUMBER OF ACTIONS

An aircraft's Actions are limited by the total number of crewmen. All aircraft automatically get one Action. Aircraft with two or more crewmen get additional Actions at no cost. It takes two crewmen to get one more Action, four for two Actions, and so on, doubling each time though this may be modified by Perks and Flaws. The number of crew and/or

Actions are listed on the aircraft data card. Some or all of these additional Actions can be lost when crew casualties occur. If the number of crewmembers goes below the crewing threshold, one Action is lost. A crewless unit cannot perform Actions. It is possible to take more Actions than indicated during a combat turn, but each additional Action causes a -1 penalty on all Actions.

### Number of Actions Examples

*Example 1: A bomber has a crew of eight people. This aircraft gets its one basic and three additional Actions due to its crew complement, for a total of four Actions per turn (without penalty). If the bomber needed to perform five Actions, it would suffer a -1 penalty on all five. No benefit is gained from performing less than four Actions.*

*Example 2: If the bomber's crew was injured and one crewmember was incapacitated, the aircraft would have an effective crew of seven, giving it only two additional Actions (instead of three). The short-handed bomber would now be able to perform up to three Actions without penalty.*

*Example 3: Another bomber, this time with six crewmen, has the Automation Perk (rating 2). Ordinarily, six crew would give a total of three Actions but the two levels of automation give the aircraft an "effective crew" of 8, thus allowing it four Actions.*

### Crew Actions

CREW	ACTIONS	CREW	ACTIONS
1	1 (Basic)	8-15	4 (Basic +3)
2-3	2 (Basic +1)	16-31	5 (Basic +4)
4-7	3 (Basic +2)	32+	6 (Basic +5)

### Action Examples

- Activate an auxiliary system (communication, ECM, etc.)
- Bail out of the aircraft
- Carry out a special maneuver (some require may two Actions)
- Carry out evasive maneuvers
- Drop a number of bombs
- Embark/disembark a number of passengers equal to the Size of the aircraft
- Fire one weapon once
- Fire one set of linked weapons once
- Perform a single physical attack (ramming)



## DATA CARDS

Each aircraft has an appropriate data card that details the necessary statistics for game play. These cards allow clear tally of damage and other important information. The information is broken down into three parts: Attributes, Weapons and Perks & Flaws.

### • ATTRIBUTES

Aircraft Attributes show the overall strength and prowess of each machine. Variations in the numbers between aircraft indicate various design objectives. There are nine Aircraft Attributes: Threat Value, Size, Number of Crew, Speed, Maneuver, Sensors, Communication, Fire Control and Armor. Depending on the equipment carried, not all are used by a given aircraft.

**Threat Values** are a good measure of an aircraft's strength. Every combat unit, including infantry, is rated according to a Threat Value (TV). The basic Gear Krieg rules provide Threat Values for stock units; games can be easily balanced by allocating an equal amount of points to each side, which are then used to purchase aircraft according to their TVs.

Every aircraft is assigned a **Size** value based upon its mass and volume. Size values are primarily used for cargo space and to determine the outcome of physical attacks and collisions. Because it is based on volume as well as mass, Size is not linear: a Size 10 aircraft is not just twice as big as a Size 5 aircraft, but eight times as big.

Combat aircraft always carry a **Crew** (though some may have automated mechanisms instead), which determines the number of Actions it may take in a turn.

An aircraft's **Speed** is translated directly into Movement Points (MPs). Moving a distance equal to the Measurement Unit of the scale selected costs a certain number of Movement Points (see *Movement*, page 26). Aircraft can move at two different rates, or Speeds. **Combat Speed** is the highest speed an aircraft can achieve and still attack effectively. **Top Speed** is twice as fast as Combat Speed, but the aircraft's effectiveness is strongly impaired and it is limited in its maneuvering.

Each plane also has a **Stall Speed** that indicates the minimum speed at which it can generate lift and remain airborne. If no Stall speed is indicated, assume a value of 0.

**Maneuver** indicates an aircraft's ease of control and its responsiveness. The value is used as a modifier to all Piloting Skill rolls and may limit the maneuvers the aircraft can successfully carry out. The Turn Radius are based on it (page 31).

**Sensors** is a generalized rating of the quality and sophistication of an aircraft's detection systems (if any are present). This value covers all the various sensor systems, regardless of their actual nature (radar, infra-red, etc.).

**Communication** systems, such as radios, are especially important to allow units to talk to each other during battle and to coordinate their fire. They are not always present — planes without them cannot use some Command Points.

**Fire Control** is a catchall category for targeting devices and weaponry. Common targeting devices include calibrated telescopic sights, gyro-stabilized mechanical sights, or just a primitive piece of metal with ranged distances marked on it. The value is used as a modifier to all weapon attack rolls.

**Armor** represents the toughness of the aircraft's armored hide and general structure. Three values are listed: Light Damage, Heavy Damage, and Overkill. They are equal to one, two, and three times the base Armor value, respectively. When an aircraft is hit, the attacker's damage is compared to each of the aircraft's Armor values. The attack's effect is the last armor stage it has exceeded (see *Damage* for more, page 45).

### • CREW SKILLS

Skills indicate the quality of an aircraft's crew. They are rated by experience: a higher Skill indicates greater ability. As mentioned earlier, Skill level 2 is considered average.

**Piloting** is the Skill of flying and maneuvering an aircraft. Piloting is required to evade attacks, recover stalls and perform difficult maneuvers.

**Gunnery** is crucial to all ranged attacks. It is the Skill of aiming aircraft-mounted weapons and using fire control mechanisms.

**Leadership** is the commanding officer's Skill at leading troops and planning tactics. Leadership Skill is used to check for combat initiative and for morale purposes.

**Tactics** represents the pilot's expertise in engagements and the proper positioning and ordering of aircraft to attack or defend against an enemy force. This is useful to gain a general tactical advantage throughout the game.

A selection of crew is provided on the next page. They are listed with a corresponding Threat Value modifier; multiply the aircraft's TV by this value to determine the final Threat Value. By default, most tactical games should be played with Qualified crew.

## • WEAPONRY

Most military aircraft carry weapons of some kind. Regardless of their performance, these weapons all share similar characteristic, such as Accuracy, Damage Multiplier, Range, Rate of Fire (ROF) and Ammunition.

**Fire Arcs** determine whether or not a given weapon can be aimed at a target. There are eleven standard arcs: Forward (F), Right (Rt), Left (L), Rear (Rr), Fixed Forward (FF), Dorsal Forward (DF), Dorsal Rear (DR), Dorsal Turret (DT), Ventral Forward (VF), Ventral Rear (VR) and Ventral Turret (VT). A visual representation of the fire arcs and a more detailed description may be found on page 36.

Each weapon has four **Range Bands**: Short (S), Medium (M), Long (L) and Extreme (Ex), which represents the effective combat range of the weapon. The Short Range is also called the Base Range; the Medium, Long and Extreme ranges are equal to twice, four times and eight times the Base Range, respectively. All vehicular weapon ranges are listed in MUs.

In addition to the effects of the aircraft's main fire control systems (the Fire Control rating), the **Accuracy** of each individual weapon affects the odds of successfully damaging opponents. It is applied as a modifier to each attack roll made with the weapon. Accuracy can drop because of damage (see System Damage, page 46).

The **Damage Multiplier** of a weapon is a rating of how devastating and destructive the weapon's attack is. The Damage Multipliers work on an exponential scale, not a linear one. A Damage Multiplier of x10 is more than twice as effective as a Damage Multiplier of x5 — in fact, it is *four* times as effective!

## Crew Skills

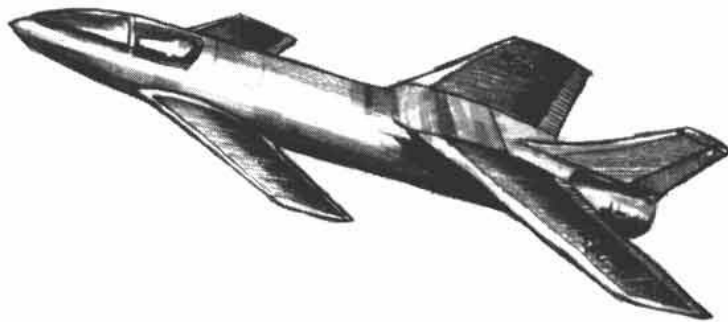
TYPE	PILOTING	GUNNERY	LEADERSHIP	TACTICS	TV MULT.
Rookie	1	1	0	0	x0.25
Qualified	2	2	1	1	x1
Veteran	3	3	2	2	x2.25
Elite	4	4	3	3	x4
Legendary	5	5	4	4	x16

Many aircraft carry more than one weapon, and sometimes more than one of a given weapon. The **Quantity** column lists the number of that particular weapon which the aircraft carries.

The **Rate of Fire (ROF)** of a weapon is listed in its own column. A weapon with an ROF of 0 fires a single shot and is then reloaded; it expends one round of ammunition per attack. Weapons with ROF of 1 or more are rapid loading and can fire many more shots during the same interval of time. They can lay

down a hail of fire to saturate an area with firepower or hit more than one target at once, but expend considerable amounts of ammunition while doing so. Rapid-fire rules, along with various attack options, can be found on page 40.

The amount of **Ammunition** loaded into a weapon is listed next. If a weapon's ammunition drops to zero, it can no longer fire. Some attack types, such as physical rams, do not expend ammunition, but they may cause damage to the attacker itself!



## THE COMBAT TURN

A tactical game is subdivided into combat turns that simulate a short moment in the battle. Units get a certain number of Actions during that turn, which can be used to shoot, communicate important information or scan the area. If Players truly want to have the opportunity to make several attacks during the turn, they can still do so, but at a cost in accuracy since the crew will be trying to get more things done in the same amount of time and will thus be less careful. It is possible to declare several Actions instead of just one for the turn, but this will cause a penalty to each Action.

During each combat turn, the following four steps occur in order, except the Step Zero (setup), which only occurs at the beginning of the game.





## STEP ZERO: SET-UP

A battle always begins with the Set-up, which occurs only once. Each side makes a Tactics Skill test using the Skill level of their Commander. Fumbles count as a die result of one. Reroll ties.

Each Player should record the result of the Tactics roll. Each point represents one Tactical Command Point (TCP) that can be played at any time during the game. Command points represent an Action reserve for unexpected situations; they are fully explained further on.

The winner chooses which Player will begin placing combat groups on the map. Players alternate, each placing one combat group at a time on the mapboard. After placing a unit, the Player must declare its speed (stationary, Combat, or Top Speed) and its altitude (denoted by placing chits or a die on the Data Card or near the miniature). Pre-designed scenarios have clearly defined set-up locations for each faction.

When not using pre-designed scenarios, the Players set up on the first three MUs of the table edge on opposite sides. In such circumstances, the aircraft should start at level 10. However, it is possible to "tradeoff" altitude between aircraft. Subtract the altitude of each from 10, and for every three points, one aircraft can start one altitude level higher than the default. For example, John deploys three Spitfires. He places the first at level 8 and the second at level 6, respectively two and four points below the default of 10, for a total of six. Dividing six by three gives us two: the third and final Spit may start at level 12.

If, during the first turn, a unit is attacked before it has been moved, it is treated as if it were moving at the maximum rate possible for its speed for the purpose of defense rolls.

## STEP ONE: DECLARATION PHASE

Both sides declare any extra Actions and individual evasive maneuvers for the turn. Use one or more counters to mark extra Actions taken to avoid confusion during game play. This token can be placed either near the playing piece or on the data card, whichever the Player finds more suitable.

## STEP TWO: INITIATIVE PHASE

Initiative determines which side has the advantage during the present turn of combat. Each side rolls an Action test based on their commander's Leadership Skill. If only two machines are facing each other, the Piloting Skill is used instead of the Leadership Skill. The highest result wins. Draws are re-rolled.

Take the difference of the two rolls; the winner of initiative gains that many Initiative Command Points for the turn, up to the number of units in play on the winning side (i.e., if the side which won the initiative has three planes, they only get three ICPs, even if they won by more than three points). Unlike Tactical Command Points, Initiative Command Points are not conserved from turn to turn; at the end of any turn, all unused Initiative Command Points are lost.

The Player who lost initiative choose which side goes first for all subsequent phases of that turn. Once the number of Command Points is determined and recorded, the Initiative Phase ends. Use of Command Points is detailed in *Command Points* on page 28.

## STEP THREE: ACTIVATION PHASE

The side whose turn it is to play may move any or all units in one of their combat groups. Units that shift speeds (Combat to Top and vice-versa) must declare so immediately after movement (the new speed will only be applicable next turn). Actions, such as firing or activating a system, may be resolved at any time before, during or after the movement. Attack penalties are based on the unit's total movement; if Combat Speed is announced, the unit cannot spend more than Combat MPs.

Each unit moves and takes its Actions before another unit is activated. If a unit does not move or act when its combat group is activated, it cannot do so at a later point in the turn.

Once every unit in the combat group has moved and acted (or forfeited its chance to do either), the other side activates one of his own combat groups, which may move and take Action. This exchange goes back and forth until all groups have moved and acted.

A combat group may only move once per combat turn. If one Player no longer has any combat groups left to use, the opponent activates their remaining combat groups one by one until they have all been moved.

### • SNAP-FIRE

At any time during the activated unit's movement, any enemy unit that has not already been activated may use one (or more) of its Actions to fire or perform a task against the moving unit (and only against the moving unit). This is called "snap fire." Attacks may be directed at any point along the moving unit's path, but the unit's full movement counts towards the Defense roll. The total MP al-



location of the target is used to determine the defense speed modifier, even though the actual displacement may be shorter, because this is a hurried reaction for the attacker.

Snap firing does not cost Command Points but it reduces by 1 the total number of attacks that the snap-firing unit has for the turn. The defender must spend at least one MP or end its movement before each of the attacker's Actions if more than one Action is used. Forward observers (units that spend an Action feeding enemy coordinates to friendly units) must always act before the firing unit(s).

### • TAILING

Starting the turn behind an enemy aircraft can give considerable benefits in combat, known as tailing. Getting into the appropriate position is a difficult task, reliant on a several factors. To Tail another aircraft, a unit must:

- Have the target aircraft in its Front Arc
- Be in the Rear Arc of the target aircraft
- Be within 2 MU of the target
- Be at the same altitude level as the target
- Neither aircraft must have moved this turn

To tail another craft, the active Player must announce the tailing attempt and both the active unit and target should make a Piloting Skill test, adding their Maneuver to their roll. The Threshold for the active unit is 4, for the target unit 5. If the target's MOS is higher than that of the active unit, it escapes the tail, otherwise it becomes Tailed. The Tailed aircraft is immediately activated and must move and fire out of sequence. Once the target aircraft has taken its Action, the tailing aircraft is activated.

If an aircraft was tailed in a previous turn and the chasing aircraft remains in a tailing position (and has not yet activated) when the target next activates, the tailing aircraft may request another Piloting Skill test (as above) to see if the Tailing continues. Though this does not gain the tailer an advantage in maneuvering, as in either case the target activates before them, it does give them a position combat bonus (see page 37).

### STEP FOUR: MISCELLANEOUS EVENTS PHASE

During this phase, any unusual events, such as bombing attacks, are resolved. At the end of the phase, Initiative Command points go back to zero and any Actions not spent are lost.

Repeat Steps 1 to 4 until the battle is resolved or pre-planned objectives are met. A combat group may only move once per combat turn.

### Tailing Example

*Pinky's Hurricane begins its turn behind an Italian Machi C202 "Foglore" over the Western Desert. The Machi is in Pinky's Front arc and his aircraft is in the Foglore's rear arc. Both aircraft are at Altitude Level 15 and within 2 MUs, and the Italian has yet to move. As a result, Pinky decides to try and tail the enemy aircraft.*

*The Maneuver score of the Hurricane is -1 to which he adds the result of his Piloting Skill roll, 6, for a total of 5 and a MOS of 1. The Machi's Maneuver score is -2 and a 5 is rolled for the pilot, a total of 3 and a MOF of 2. Pinky succeeds and the Italian must immediately activate and move his aircraft. Pinky can then follow the enemy aircraft and gains a bonus if he engages it in combat.*

### Turn Summary Table

STEP ONE:	DECLARATION PHASE
Both sides declare any extra Actions and evasive maneuvers.	
STEP TWO:	INITIATIVE PHASE
Each side rolls a test based on their commander's Leadership Skill.	
STEP THREE:	ACTIVATION PHASE
Move any or all units in one combat group.	
Once every unit has acted, the other side activates one combat group.	
STEP FOUR:	MISCELLANEOUS EVENTS PHASE
Bombing attacks are resolved.	
Initiative Command points go back to zero.	
Any Action not spent at this point is lost.	

*Repeat Steps 1 to 4 until the battle is resolved or pre-planned objectives are met. A combat group may only be activated once per combat turn.*





## COMMAND POINTS

Command Points represent the commander reacting to or anticipating the enemy's Actions. There are two types of Command points: Tactical Command Points (TCPs) and Initiative Command Points (ICPs). TCPs are available throughout the game, but cannot be regained once spent. ICPs are valid for one turn only, but are refreshed during each new Initiative roll. Other than this, there is no functional difference between the two.

A Command Point can be used as an additional regular Action incurring no "extra Action" penalty.

A Command Point can be used to buy a one-time +2 modifier to a single Defense roll (representing a quick warning message).

A Command Point can be used to activate a unit out of sequence — to get it out of harm's way, for example.

In the latter case, the unit must not have been activated (i.e., moved) previously, and it cannot be moved again when its combat group is activated (though it may act if it has any Actions left). A Command Point may also be spent to neutralize a Tailing roll, canceling the forced activation.

Command Points may be used by any unit with a functional Communication system or within Communication Distance (equal to the commanding aircraft's Communication range).

### Using Command Points

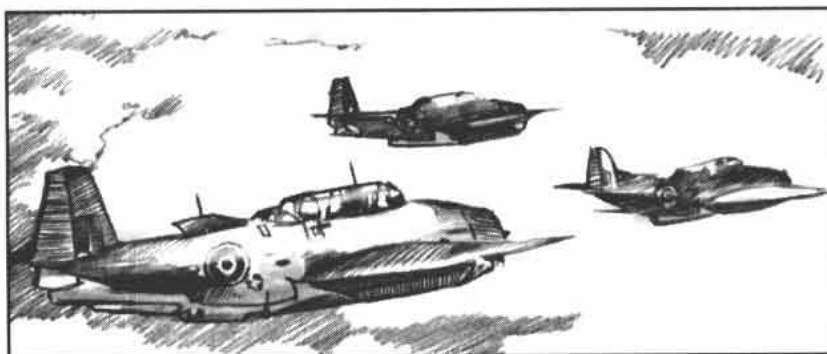
- Extra Action (no penalty)
- Defensive maneuvering (+2 to single defense roll)
- Activate a unit out of sequence (if it hasn't been activated already)

## MOVEMENT

An aircraft can cross a certain distance based on its Movement Points (MPs). The aircraft's datacard contains the values for Combat Speed and Top Speed. Combat Speed allows an aircraft to engage in offensive Actions unhindered. Top Speed is twice as fast as Combat Speed, but severely impairs Actions. Unless equipped with appropriate Perks (such as Lighter Than Air or VTOL), a flying unit must move or else stall and plummet (see page 30).

Speeds are listed in MPs; one MP equals movement across one clear MU, or about 30 kph across clear sky. Thus an aircraft with a Combat Speed of 6 MPs moves at about 180 kph. Every turn, each aircraft receives as many Movement Points as its current speed (Combat or Top).

Each Movement Point (MP) lets the unit move a distance equal to one Measurement Unit. The actual tabletop distance will vary according to the scale, and thus the MU, chosen for the playing surface; see page 21.



## ALTITUDE

Aircraft must keep track of what altitude level they at. One altitude level is equal to one MU. Each altitude level climbed costs 3 MP. Dropping one altitude level costs 1/2 MP (round up). Aircraft dropping multiple levels in a single turn may gain MPs (see *Diving*, page 32). Aircraft must stay one altitude level above the ground or crash (see *Crashlanding*, next page). One exception to this rule is landing. When an aircraft lands, it must end its movement at Combat Speed, on terrain with a Ground MP cost of no more than 1 (rougher terrain will result in a crash landing). Aircraft with the Improved Off-road Ability on their Ground

movement mode can land on Rough ground. On the following round, the aircraft switches to its Ground movement mode (Top speed), if any. Otherwise, it must remain stationary.

Always record an aircraft's altitude every round after moving it. Its current altitude level can be either written down on a chit or piece of scrap paper, or a 10 or 20-sided dice can be placed next to the unit on the table, the correct number facing up.

Some aircraft have the Maximum Angle of Attack Flaw, which forces them to move forward for a certain number of MUs before being able to climb one altitude level. Aircraft without this Flaw



have enough power to climb almost straight up if they want, spending up to half their MPs within a single MU.

Note: As most aircraft fly at considerable altitudes, the terrain effects of the ground below them are irrelevant. Ignore terrain effects unless attacking ground targets or some high ground, such as a mountain, obstructs the line of sight between two aircraft.

### • CRASHLANDING

Whenever an aircraft is forced to land on Rough terrain (or worse), or no longer has landing gear (Ground movement system destroyed), it is said to be crash-landing. The amount of damage suffered is:

**Crashing Damage = Two Dice x Aircraft Size x (Current Speed/2)**

Most aircraft are at Stall speed when they land, though some circumstances may require the pilot to land at higher speeds. Some (or all) of the damage can be avoided by the pilot. A Piloting test (with any applicable modifier) must be made against a Threshold equal to the cost in Ground MPs of the surface he is landing on. The Margin of Success of that roll is subtracted from the die roll used to determine crash landing damage, while a Margin of Failure is added to the roll.

Crashlanding on water (known as ditching) is no less difficult than on land but is slightly less likely to destroy the aircraft. To simulate this, add 1 to the MOS (or reduce the MOF by 1) when determining crashlanding damage. If the aircraft doesn't suffer an Overkill result, the pilot and crew can escape (though their survival still hangs in the balance as they are most likely reliant on the arrival of rescue vessels). The aircraft automatically sinks after 1d6 rounds.

### Crashlanding example

*The "Dante's Daughter," an Avro Lancaster with a Maneuver rating of -3, a Size rating of 10 and a Stall Speed of 5, is about to crashland on Rough terrain (Ground MP cost of 2). The pilot attempts a smooth belly-landing. Using his Piloting Skill, he rolls a 6, modified down to a 3 because of the Maneuver rating, for a Margin of Success of 1. He then rolls two dice for the crashlanding: the highest result of the two is a 4, from which he subtracts the Piloting MOS of 1 for a net score of 3. He multiplies this by the aircraft's size (10) and half the aircraft's MP, rounded up (3), for a total of 90 damage points. Unfortunately, the Lancaster has an Overkill rating of 45 and disintegrates spectacularly.*

### Speed Examples

*A Spitfire IX is moving at Top Combat Speed. The scale of the terrain is 1/144, making one MU 1" across. The aircraft thus receives (11 MP x 1" =) 11" for movement purposes. The aircraft spends its full MP allowance for Combat Speed and the pilot opts to red-line the throttle and accelerate to Top Speed. Next turn, the aircraft must spend at least 11 MP and may spend as many as its full allowance for Top Speed, which is 21 MP.*

### SPEED

An aircraft normally receives a number of Movement Points equal to its Combat Speed value. Each also has a Stall Speed, and if the number of MP spent is less than this value then it may stall (see *Stalling*, page 30). Otherwise, the aircraft is said to be traveling at Combat Speed. Attacks can be made normally at this rate of movement. Aircraft moving at half their Combat Speed or less, and not stalled, gain an additional +1 to their attack rolls due to the additional stability provided by lower speeds (see *Modifiers*, page 37).

An aircraft that expends its full Combat Speed MPs can shift to Top Speed in the next turn. This shift must be declared by the Player immediately after moving the unit. The aircraft is considered to be at Top Speed for attack and defense purposes for the rest of the combat turn.

In subsequent combat turns, the aircraft receives Movement Points equal to its Top Speed value. The aircraft must ex-

pend a number of Movement Points greater than its Combat Speed while at Top Speed, even if it means a collision. An aircraft may return to Combat Speed after any number of turns of Top Speed movement. The Player declares the return to Combat Speed immediately after moving the unit.

Players should put a Top Speed counters beside the aircraft moving at Top Speed to prevent disputes over the speed at which an aircraft is moving. Aircraft at Top Speed temporarily reduce their Maneuver Rating by 1.

### • OVERSPEED

An aircraft whose velocity exceeds its current Top Speed (for example, as a result of diving or engine damage) is considered to be Overspeeding. Each point of Overspeed temporarily reduces the aircraft's Maneuver by 1. This is in addition to any modifiers for Top Speed or aircraft type. If an aircraft's total Overspeed equals or exceeds its Stall



Speed, the pilot must make a Piloting Skill test against a Threshold of 4. The test is not modified by the Maneuver value but a -2 penalty is applied for every point of Overspeed beyond the plane's Stall Speed value.

If the roll succeeds, the aircraft is unharmed, while a fumble results in the immediate disintegration of the aircraft. In every other case, the aircraft takes damage. For each point of MOS, the aircraft takes Light Damage (including the appropriate armor reduction). Every point by which an aircraft's current speed exceeds 40 (the speed of sound) is added to the Threshold unless the aircraft's unmodified Top Speed is 40 or higher.

### • MULTIPLE MOVEMENT SYSTEMS

Most aircraft have only a single movement mode while in the air, referred to as Normal Flight, but a rare few have alternate modes such as VTOL. To transit between normal flight and VTOL (or vice versa) the aircraft must be at Combat Speed, not at Top Speed. This shift must be declared by the Player immediately after moving the unit. The vehicle is considered to be using the new movement mode until it is switched again.

A vehicle with multiple movement systems may only switch modes once per turn. This option must be announced during the movement phase.

### • STALLING

Most aircraft have a Stall Speed attribute. This attribute indicates the minimum speed at which an aircraft must fly to avoid stalling, i.e. losing altitude due to reduced lift. If the aircraft is moving below this limit at the end of any movement, the plane begins to stall. The pilot may attempt to fight this, making a Piloting roll against a Threshold of 4 + the number of MU below stall speed. If the roll is successful, he retains control of the plane, which (temporarily) avoids the full effect of stalling but suffers a -1 penalty to Maneuver. If the roll fails, or an aircraft is reduced to 0 MP, stall effects come into play.

Stalled aircraft lose altitude levels, with increasing rapidity if the aircraft remains stalled. To pull out of a stall, the pilot must first wait until the aircraft loses a number of altitude levels equal to the aircraft's Stall Speed, then make a Piloting roll against a Threshold of 6. If the number of levels lost in a turn allow, the pilot may make multiple attempts to pull out of the stall.

If the pilot's Margin of Success is 2 or higher, he can select his craft's heading when he pulls out of the stall; otherwise, determine it randomly with a roll of the die. If the die roll does not succeed, the pilot can make another attempt once the Stall speed is reached again, up until the aircraft has lost the maximum number of altitude levels for that turn (see the *Altitude Loss* table).

A stalled aircraft cannot attack or take any other actions, for the pilot is too busy trying to regain control and the crew are simply hanging on for dear life. Those attacking a stalled aircraft gain a +1 bonus, for much the same reason.

Aircraft with the Lighter-than-Air perk cannot stall. Aircraft with the VTOL trait can stall if they haven't switched to the VTOL movement mode.

### ALTITUDE LOSS TABLE

# OF TURNS	DROP
1	5
2	10
3	15
4+	20

*# of Turns is the # of turns the aircraft has remained stalled.*

*Drop is the number of altitude levels lost during the turn. The maximum number of altitude levels lost in one turn is 20.*

### Overspeed Examples

*Diving out of control, our Spitfire accelerates to 24 MP. With a Top Speed of 21, the aircraft is Overspeeding by 3 and thus suffers a -3 Maneuver penalty. In the next turn, the Spitfire accelerates to 27, an Overspeed of 6 — this is above the plane's Stall Speed of 5, and the aircraft is now in danger of disintegrating! The pilot rolls his Piloting Skill and gets a 4, modified by -2 (twice the difference between the Overspeed and Stall values). The aircraft suffers two Light Damage hits.*

## Stalling Examples

A British Tempest is flying at an altitude of 24. It has a Stall Speed of 6 but only moved 4 MUs in the last turn. The Qualified pilot attempts to avoid the stall (Threshold 6) but rolls 3 and 4. The aircraft stalls and begins to lose altitude, falling five elevation levels (as per the table). Using his Piloting Skill, the pilot tries to regain control, but the plane must first lose six altitude levels to match the Stall speed! He cannot make an attempt this turn.

In the following turn, the aircraft remains stalled. It falls another altitude level (down to 18) and the pilot tries to pull out. He rolls a 2 and a 4, a failure. Being in its second turn of stalling, the Spitfire falls another six altitude levels (down to 12) and the pilot tries again to cheat fate, but his rolls of 3 and 3 are insufficient to help him. Now he begins to panic! The plane falls three more levels to match the chart.

At the start of the third turn, the aircraft falls three altitude levels (to 6!). This will be the pilots last attempt to pull out before his aircraft decorates the Kent countryside. Luckily, he rolls two sixes for a score of 7 and pulls out of the dive a scant dozens of meters above the ground. Good show, old bean! However, as the pilot's MOS was less than 2, the final facing of the aircraft is determined randomly.

## Turning Examples

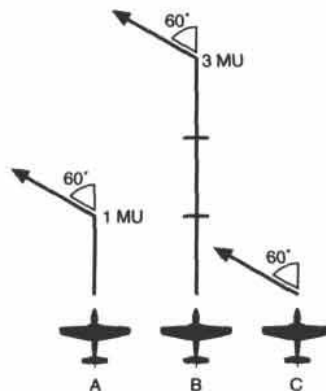
Example 1: A Bf 109G has a Maneuver score of 0 and is traveling at a speed of 8. As such, its Turn Radius is 1 (1 MU + 0) and it must move forward 1 MU before turning up to 60 degrees.

Example 2: An unladen Lancaster has a Maneuver of -3. Its base Turn Radius is thus 4 (1 MU + 3) and must move 4 MU forward before turning. If flying at a speed of 5, stall speed, the Lancaster would have an effective Turn Radius of 3 (4-1 for speeds under 6).

Example 3: A ME 262 "Schwalbe" has a Maneuver of -1 and thus would normally have a Turn Radius of 2. The 262 is, however, a jet and so suffers a +1 jet penalty when calculating Turn Radius; the "Schwalbe" thus has a base Turn Radius of 3. If the 262 flew flat out at a speed of 28, this Turn Radius would increase to 4 (3+1 for speeds over 20).

## Turn Radius Diagram

Aircraft A has a Maneuver bonus of 0 and can change its facing by 60-degrees (and only 60-degrees) after each MU moved. Aircraft B has a Maneuver rating of -2, therefore it has a turn radius of 3, which means it has to travel three MUs before turning. Aircraft C is a VTOL and can turn any amount, paying 1 MP for each 60-degrees.



## TURNING

An aircraft can turn up to 60 degrees left or right at no MP expense after moving forward at least one MU. Aircraft with negative Maneuver values must travel straight ahead one more MU per negative Maneuver point before turning. This extra distance is known as the Turn Radius. Aircraft with active VTOL movement or the Lighter-than-Air Perks may turn at any time but must pay an MP for each 60-degrees (or part of).

Aircraft moving at speeds below 6 have their Turn Radius reduced by 1 (if the Radius is already equal to 0, treat the aircraft as VTOL for purposes of maneuvering). Aircraft moving at speeds greater than 20 have their Turn Radius increased by 1, i.e. they must move an additional MU before turning.

Aircraft traveling at Top Speed or Overspeed suffer Maneuver penalties that may influence their Turn Radius, as do damaged aircraft and laden bombers (see *Bombing*, page 42).

### • TIGHT TURNS

Aircraft can try to make turns tighter than their Turn Radius will allow, but in doing so they automatically have to roll on the *Aircraft Control Loss Table* (see page 33), adding one for every point the actual Turn Radius was tighter than the aircraft's normal Turn Radius.

### • JETS AND ROCKET PLANES

The high thrust of jet and rocket motors limits the turning ability of aircraft so-equipped. Jet aircraft automatically add +1 when calculating their turn radius. Rocket-powered aircraft add a +2 penalty when determining their turn radius.





## SPECIAL MANEUVERS

Unlike ground vehicles, which are limited to 2-dimensional movement and by the forces of gravity, aircraft can exploit their entire environment, resulting in fluid and breathtaking maneuvers. Some types of aircraft are prohibited from attempting certain maneuvers, while aircraft with a poor Maneuver score may find it impossible to successfully complete certain maneuvers.

### • SIDESLIPPING

Sideslipping allows the aircraft to slowly drift left or right without the need for radical maneuvering. For every three MUs of forward motion, the aircraft can move up to one MU left or right without needing to change facing. Sideslipping has no MP cost.

### • ROLLING

An aircraft rolls when it rotates around its main axis, keeping a more or less straight heading. Rolling does not affect movement per se, as only the aircraft's horizon really changes. This adds a +1 bonus to evading enemy fire and a -1 penalty to any attacks made by the rolling craft. Its difficulty Threshold is 4. On a failure, roll on the *Aircraft Control Loss* Table. This maneuver costs one Action. Only fixed-wing aircraft can execute a roll.

### • LOOPING

The traditional air show maneuver, looping can have tactical uses. There are two kinds of loops: a Full Loop and a Half Loop (also known as an Immelmann). In a Full Loop, the craft more or less ends the maneuver where it started, keeping approximately the same heading. In a Half Loop, the craft keeps on going straight at the top of the loop (or the bottom, for an inverse

loop), thus executing a reverse turn. All loops require one (Half Loop), or two (Full Loop) Actions.

To execute a Full Loop, a craft must spend a number of Movement Points; the tightness of the loop depends on how many MPs are spent. The MP cost of the loop is determined by the desired Turn Radius  $\times 6$  (with a minimum Turn Radius as outlined in *Turning*, page 31); the difficulty of the maneuver is equal to that of the selected Turn Radius +1 (minimum 3; double the difficulty Threshold for rotary-wing aircraft). Lighter-than-air craft cannot perform loops. The aircraft ends its movement anywhere within a distance and altitude of its starting point equal to the Turn Radius in MUs.

A Half Loop is handled similarly, though the cost in Movement points is a little less (selected Turn Radius  $\times 3$ ). The difficulty Threshold is the same as for a Full Loop. As above, the craft ends its movement within a number of MUs equal to the TR of its starting point. Heading and altitude are fixed: heading is changed by 180°, and altitude must be increased (or decreased, for Inverse Loops) by an amount equal to at least the selected Turn Radius  $\times 1.5$  and up to twice the Turn Radius, as desired.

A pilot who fails his test during a Looping must roll on the *Aircraft Control Loss* Table (see next page), adding +1 for a Half Loop, +2 for a Full Loop and +3 for any kind of Inverse Loop.

An aircraft that is Tailed may undertake a loop to attempt to break the tail. The opposed Piloting test is as outlined in *Tailing* (page 27), but on this occasion the target aircraft adds the Turn Radius of the maneuver as a bonus to his roll. If its MoS is greater than that of the attacker, it evades the pursuit and is no longer considered Tailed, and the other aircraft does not automatically activate.

### • GLIDING

It is possible for a fixed-wing aircraft to keep on flying even if it no longer exerts any thrust, by gliding down to the ground. Each round a plane glides, it must lose any combination of 2 points of either speed (in MPs) or altitude. Should the aircraft's speed fall below its Stall Speed, it will immediately stall and lose altitude levels accordingly. Gliding aircraft can use the diving maneuver (see below) to gain speed.

Planes that can reach supersonic speeds (i.e. with Top speeds of 40 or more) are not very good at gliding. For each round spent gliding, they must lose any combination of three points of speed or altitude, with a minimum altitude level loss of one. Planes with the Glider Perk, on the other hand, only have to lose one altitude level or speed point per combat turn. Those rare aircraft with both the Glider Perk and capable of supersonic speeds conform to the standard aircraft rules, i.e. must lose any combination of two points of either speed (in MPs) or altitude.

### • DIVING

A good way to rapidly lose altitude, a dive is nonetheless a risky maneuver, as there is always the risk of being unable to pull out. To dive, the aircraft must spend a number of MPs equal to at least its full combat speed and loses that number of altitude levels, plus a number of levels as indicated in the *Altitude Loss* table (page 30).

At the beginning of the following turn, the pilot may attempt to pull out of the dive. Pulling out requires a Piloting roll (modified by the aircraft's Maneuver value) against a Threshold of 4. A failed Piloting test means that the aircraft cannot pull out this turn and begins to fall as if it were stalling. The aircraft will lose



a number of altitude levels equal to the MPs it originally spent in beginning the dive plus a number of levels as indicated in the *Altitude Loss Table* (page 30), until the pilot can pull out of this uncontrolled fall (Piloting vs. 6). If the aircraft's altitude drops below ground level, the plane crashes and is completely destroyed. A Fumble on the pull-out roll requires another roll, this time on the *Aircraft Control Loss Table*; apply the indicated effects in addition to the normal effects of a failed Piloting roll, unless they're redundant or contradictory.

The pilot of an aircraft pulling out of a dive can choose any facing he wants; see *Stalling* (page 30) to determine the aircraft's heading when coming out of an uncontrolled fall. The speed of an aircraft pulling out of a dive is equal to the amount of altitude levels dropped in the last round of the dive. By such means, the aircraft may temporarily exceed its Top Speed.

## G-EFFECTS

In the early days of flight, a major concern was that the pilot would make demands of his aircraft that would place undue stress on it and, perhaps, cause damage or even a crash. In the age of Superscience, it is rarely the pilot who pushes the aircraft beyond its capabilities but rather an aircraft that pushes human endurance to — and perhaps beyond — their natural limits.

Whenever an aircraft spends more than 10 MPs in one go (for example to carry out a special maneuver or to climb or dive), immense G-forces act on the pilot's body, making it difficult to act and perhaps even causing him to fall unconscious. In such circumstances, the pilot should immediately make a Piloting Skill roll against a Threshold of (3+ number of MP spent over 10). If the maneu-

ver was an outside (inverse) loop, add +1 to the Threshold. If the roll succeeds, the crew continues to act normally. If failed, the MoF is applied as a penalty to any Piloting Skill rolls undertaken for the remainder of the turn. In the event of a Fumble, the crew blacks out and may not spend any Actions this turn. If a Piloting Skill roll is required while the crew is unconscious, it automatically fails and the pilot must roll on the *Control Loss table*.

## LOSS OF CONTROL

Whenever a pilot fails during a delicate maneuver, or Fumbles any Piloting roll, he must roll one die and check the result on the *Aircraft Control Loss Table* below. Specific maneuvers may modify the roll, otherwise the result is taken straight.

### Maneuver Examples

*With a Tommy Hurricane on his tail, Werner attempts a series of acrobatic maneuvers to evade incoming fire. He throws his Gustav into a roll, the evasive maneuver increasing the difficulty of landing a successful hit on the Bf 109G. This requires a Piloting roll against the Threshold of 4. He rolls his 3 dice — and succeeds with little difficulty. The British pilot fires — but thanks to the modifier applied by the roll, misses Werner's aircraft. Unfortunately, the Hurricane remains on his tail. Time for more drastic action!*

*The Luftwaffe ace decides to try a loop. As he is at Combat Speed, Werner can spend no more than 11 MP. Fortunately, the Gustav has a Maneuver of 0 and thus has a minimum Turn Radius of 1. This costs 6 MP and requires a Piloting roll. The difficulty is Radius +1, but the minimum is 3. Werner rolls and successfully completes the loop. He and the British pilot immediately check to see if the Hurricane remains on his tail ...*

### Aircraft Loss of Control table

DIE ROLL	EFFECT
1	Nothing more than a good scare. (Pilot loses 1 Action.)
2	Aircraft Sideslips, as per maneuver. Roll randomly for left or right.
3	Aircraft Skids (turns 60-degrees, but keeps going in the same direction) for a number of MUs equal to the roll of one die. Roll randomly for left or right if necessary. If the aircraft runs out of MPs during the skid, it must make them up by beginning the next movement phase with the remainder of the skid.
4	Aircraft suffers Light Structural Damage.
5	Aircraft loses a number of altitude levels equal to the roll of one die.
6-7	Aircraft Stalls.
8-9	Aircraft suffers Light Structural Damage and Stalls.
10	Aircraft suffers Heavy Structural Damage.
11	Aircraft Suffers Heavy Structural Damage and Stalls.
12+	Aircraft falls into an uncontrollable spin. It suffers Heavy Structural Damage and will plummet to the ground and crash unless the pilot makes a Piloting roll vs. a Threshold of 10.



## COMBAT

Combat is essentially divided into two distinct Actions: first to find the enemy, then to attack it. Both provide offensive and defensive opportunities that must be taken advantage of in order to gain the upper hand in battle.

Game play is divided among much the same line. A unit must be able to acquire its target (either visually or through sensor or communication devices) before it can attack it.



### LINE-OF-SIGHT

It is a requirement for a unit to "see" its target to fire. The ability to detect and target an opposing unit is called, for simplicity, having a Line of Sight (LOS). This does not necessarily implies that the target is within human visual sight,

merely that it can be acquired and locked on by the sensors and fire control devices available to the detecting unit. Units are considered to have a Line of Sight to their target unless one of the conditions listed in the shaded box below exists:

#### Blocked Line of Sight

- *The target is beyond the detecting unit's range.*
- *Any terrain between the two units is one or more elevation levels higher than both the units (a mountain for example).*
- *Either unit is within the aircraft's dead zone. The dead zone is a cone beneath the aircraft into which the pilots and/or gunners cannot see due to the fuselage. Any aircraft within a number of horizontal MU less than the difference in altitude between the two units is in the dead zone. Some Perks can reduce or eliminate the dead zone.*
- *The Concealment value between the aircraft and the target is greater than the aircraft's Detection rating (see page 34).*

There are several simple ways to check line-of-sight. The string is a common and easy-to-use method. An ordinary string or thread is placed from the sensors of the firing unit to the visible portion of the defender (or the center points of both, if playing the tactical scale). If the string is not hindered in any way, the LoS is clear. If it is, the model is in partial cover, or, if the string is blocked completely, in full cover. Other methods include direct visual sighting (impractical on large playing surfaces) and, for the well equipped, laser pointer sighting.

Range and altitude are measured from the center of the base to the center of the target's base. This prevents problem with long fuselages, gun barrels and other model features.

### • DETECTION

Pilots and crewmen are always on the lookout for enemy units. Some aircraft have a passive Detection Rating; this rating is used to calculate whether a unit can gain line-of-sight to its target (see example next page).

The aircraft's Sensor rating (if present) is added to its crew's Skill level to produce the passive sensor rating. Aircraft not equipped with sensors get a base Detection value of 4 in daylight or 2 at night from unassisted vision. The highest value is the aircraft's Detection rating. This may be modified by certain Flaws (see page 74).

#### Detection Example

*A fighter has a Sensor rating of +1 and its Qualified pilot has a Skill level of 2. The aircraft, therefore, has a Passive Sensor rating of 3. Its Daytime Detection value is 4 (visual) and its Nighttime Detection value is 3 (passive sensors).*



## • ACTIVE SENSOR LOS

Some aircraft carry basic sensor suites to locate enemy units lurking nearby: radar sets, simple IR cameras and spotlights, etc. By performing an Active Sensor sweep, these systems can be used to obtain a line-of-sight on an enemy unit even when acquiring visual or passive sensor line of sight is impossible.

To activate the aircraft's sensors, a Crew Skill test, modified by the aircraft's Sensor value, is made (it is assumed that the sensor most suited to the task was used). The Threshold number is equal to the target's Concealment value (found by adding the Obscurement values of all the terrain MUs between the two units to that of the defender's position). One is subtracted from this number for every MU the defending unit moved this turn. Likewise, one is subtracted for every weapon the defender fired this turn. Lastly, add the rating of any stealth system Perk possessed by the defender to the Threshold. The table at right is a summary of the bonuses and penalties that modify the Threshold.

A success gives the detecting unit a clear line-of-sight to the defender. A draw, failure or fumble does not grant LOS (fumbles have no further effect in this case). Aircraft with no sensors cannot perform active sensor detection. Active sensor sweeps, unlike passive or visual detection, require a full Action to complete.

Active sensors cannot be used against targets if they are within one altitude level of the ground as the systems in use at this time are incapable of reliably distinguishing aircraft from ground clutter.

## Detection Threshold Modifiers

### APPLIED TO ATTACKER'S ROLL

Sensor Bonus	variable, by default 0
--------------	------------------------

### APPLIED TO (CONCEALMENT) THRESHOLD

Stealth Bonus	variable, by default 0
---------------	------------------------

Movement Penalty	-1 per 5 MUs moved by target (round down)
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Combat Penalty	-1 per weapon fired by target this turn
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## Terrain Table

TERRAIN	OBSCUREMENT
Clear Skies	0*
Light Cloud	0.5
Heavy Cloud	1
Storm Cloud	2

\* If Clear Skies is the only terrain/weather between the target and the spotter, its effective Obscurement is -2 (it's hard to hide in an open sky)

## Sensors Example

A German ME262 nightfighter with a -1 Sensor rating moves to engage a British Lancaster in the dark over Bremen. The Elite pilot (Skill level 4) gives the aircraft a passive detection value of 3 (4-1), marginally better than the base detection of 2 at night. It can thus spot any aircraft within LOS, provided that there is no more than 3 points of Obscurement between the two units. Light cloud dots the skies and the ME262 cannot see the Lancaster 10 MU away (a total Obscurement value of 5). As a consequence, Fritz powers up his radar set.

The Concealment value of the Lancaster is 5 (the Obscurement value) and it has not fired any weapons. The bomber has moved 8 MU (a -1 modifier), for a Detection Threshold of 4. The radar of the ME262 B1 is rated at -1, and so when Fritz rolls his Skill test (resulting in a 4) he must subtract 1 from the result. The net 3 means he fails to detect the Lancaster, but he knows it is there...

## Line of Sight Examples

Fritz's ME 262 continues to chase down the Lancaster. The distance is now only 8 MU; in the light cloud over Bremen, the Obscurement Value between the two aircraft drops to 4. As it is night, the Lancaster remains beyond Fritz's Detection range (3 with passive sensors) though were this daylight the British aircraft would now be in range of his Mk 1 eyeball (base Detection value of 4 in daylight).

Fritz finally sneaks up on the Lancaster. He maneuvers to a position 2 MUs away and 3 altitude levels below the Lancaster, safely in the bomber's dead zone. He prepares to use his SchrägeMusik assembly on the unsuspecting behemoth. Unfortunately, the Lanc is the MK II with a ventral turret. It doesn't have a dead zone, which the German Ace discovers when the lumbering bomber opens fire on him!





## • CONCEALMENT

The Concealment value is equal to the Obscurement of all terrain directly between the two (round down to the nearest number). In aerial combat, this is usually limited to the effects of cloud and weather but may, in some low altitude engagements, include the presence of buildings and terrain features such as hills.

The Terrain Table indicates the Obscurement values for each type of terrain, per whole MU, while the *Weather Table* (page 48) details the effect of various environmental conditions. Obscurement makes a target difficult to detect and cause penalties that are applied to the attacker's roll.

## • FIRING ARCS

Aircraft may only target opponents that are within their weapons' firing arcs. Each weapon is mounted within a certain arc and can only fire in it; targets that lie outside the arc cannot be targeted.

There are eleven common firing arcs. The first four are 180-degree arcs on their respective sides. Side arcs include directly forward and backward. The fixed forward arc is a 120-degree arc on an aircraft's front facing. These arcs encompass 45-degrees above and below the aircraft. (Note that side or rear fixed arcs are also possible, but uncommon.) In game turns, for every one MU distance from the aircraft, the firing arc applies to one Altitude Level above and below the aircraft. For example, a target one MU in front of a fighter and two Levels below it cannot be targeted by weapons in the front Arc. However, were that aircraft two MU in front it could be attacked (as it is within a number of Altitude Levels equal to the range.)

The dorsal and ventral arcs allow gunners to fire at all targets above (Dorsal) and below (Ventral) the aircraft. The

Dorsal-Forward arc allows the weapons to fire at targets in the forward 180 degrees *and* at a higher altitude level than the firer. The Dorsal-Rear arc allows the weapons to fire at targets in the rear 180 degrees *and* at a higher altitude level than the firer. The Dorsal-Turret arc allows the weapons to fire at any target at a higher altitude level.

The Ventral-Forward arc allows the weapons to fire at targets in the forward 180 degrees *and* at a lower altitude level than the firer. The Ventral-Rear arc allows the weapons to fire at targets in the rear 180 degrees *and* at a lower altitude level than the firer. The Ventral-Turret arc allows the weapons to fire at any target at a lower altitude level.

## ATTACKS

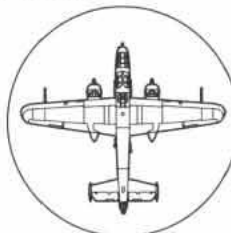
If a unit has a Line of Sight to a target within its weapon's firing arc and range, it can attack that target.

When an attack occurs, an opposed Skill test is required to determine the success of the attack. The attacker uses his unit's Gunnery Skill and the defender uses his unit's Piloting Skill to make the test, both rolls modified by the appropriate Attributes and situation modifiers.

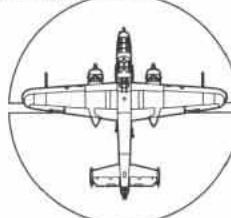
If the attacker wins the Skill test, the attack succeeds. If the defender wins or if a draw occurs, the attack misses. The table on the next page contains a list of the modifiers to both rolls; they are explained further in the text.

### Fire Arcs

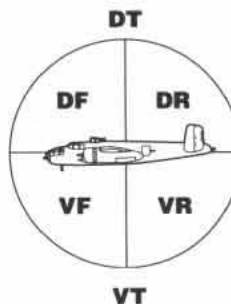
**Turret** (360°)



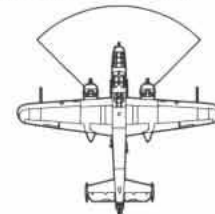
**Forward** (180°)



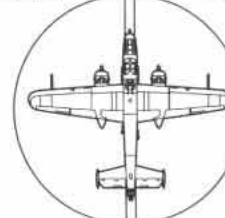
**Rear** (180°)



**Fixed Forward** (90°)



**Left** (180°)



**Right** (180°)

### Defense Arcs

**Front** (180°)





## ATTACKER MODIFIERS

Life is not a firing range; combat is always harder under certain conditions, easier under others. Modifiers resolve this by introducing penalties and bonuses to each and every combat roll. Apart from the quality of the aircraft's Fire Control computer and the accuracy of the weapon, three other factors apply: the range to the target, the obscurement (or cover) between the attacker and defender and the attacker's own movement.

### • RANGE

Every ranged weapon is rated by a value known as its Base Range. The Base Range is further expanded into four Range Bands, each one doubling the maximum distance of the preceding band. The further away the target, the harder it is to hit and damage it. Half the difference in altitude levels between the firer and attacker is added to the range between the two units, each level of difference counting as 1/2 an MU of distance (round up).

### • OBSCUREMENT

Environmental conditions may obscure a target and make it difficult to hit squarely. The Obscurement value of the defender (see *Line of Sight*, page 34) is subtracted from the attacker's roll to represent this lack of accuracy.

### • MOVEMENT

The speed of both attacker and defender can impact on the accuracy of combat; aircraft moving at high speeds are harder to hit but also have greater difficulty hitting targets due to the shaking and bumping that occurs at such velocities. Conversely, aircraft traveling slowly are easier to hit but suffer less from vibration.

## Attack and Defense Modifiers

### ATTACK ROLL MODIFIERS:

•	Fire Control Rating
•	Weapon Accuracy Rating
•	Range Modifier
•	Attacker Movement Modifier
•	Obscurement Penalty

### DEFENSE ROLL MODIFIERS:

•	Maneuver Rating
•	Defender Movement Modifier
•	Arc of Attack Modifier

### POSSIBLE OUTCOMES:

If Attackers total is > Defender's	HIT
If Attacker's total is ≤ Defender's	MISS

## Attack Modifiers

### RANGE MODIFIER

Short (from 1 MU to base range)	0
Medium (from previous to two (2) times base range)	-1
Long (from previous to four (4) times base range)	-2
Extreme (from previous to eight (8) times base range)	-3
Target Tailed this turn	+1

### OBSCUREMENT MODIFIERS

Clear Skies	0	Light Cloud	0.5 (round down)
Heavy Cloud	1	Storm Cloud	2

### MOVEMENT MODIFIERS

Stationary	+2	Half Combat Speed or less	+1
Combat Speed	+0	Top Speed	-3

### MISCELLANEOUS MODIFIER

Target is infantry	-2
--------------------	----

## Defense Modifiers

•	Maneuver value		
•	Target Speed Modifiers		
MUS MOVED	DEFENSE MODIFIER	MUS MOVED	DEFENSE MODIFIER
0	-3	7-9	+1
1-2	-2	10-19	+2
3-4	-1	20-99	+3
5-6	+0	Tailed by attacker this turn	-1

### DEFENSE ARC MODIFIERS

If attack is in the defender's Front	0
If attack is from defender's Rear Flank or Above	-1
If attack is from defender's Rear or Below	-2



## DEFENDER MODIFIERS

The Defense roll is not an actual dodging of the attack, but is rather an abstract representation of the target's attempts at evasion and its use of any available obscurement (clouds or terrain features if at low altitude), both impossible to properly represent at the tabletop level. Targets rely on the following modifiers to help them avoid shots. In general, the only defense of large and ungainly aircraft is their speed, as their poor Maneuver rating will often severely hamper their defense.

Attacks coming from the rear are much more dangerous than attacks from the front, both because the armor is thinner there and because the crew's attention is much more focused on the front arc.

### • MANEUVER VALUE

Each aircraft has a set maneuver value by design. Negative maneuver values are for slow ponderous aircraft like bombers and transports. Positive maneuver values are for fast and agile aircraft like fighters.

### • TARGET SPEED

An enemy unit's speed affects how easy it is to hit. Speed modifiers are determined according to the following ever-increasing scale. If the target has yet to move in the turn, its last recorded movement is used to determine its modifier. On the first turn of combat, assume that the aircraft has moved the maximum number of MUs for its current speed in its current terrain.

### • DEFENSE ARC

The defender's orientation, when attacked, can reduce his chances of successfully avoiding damage, either because of inattention or thinner armor. More importantly, crews cannot defend against attacks they do not see coming.

## Attack Example

*Cuthbert Jones, ventral gunner of a Lancaster, opens fire on the ME 262 sneaking beneath his crate. The Lancaster is moving at Combat Speed and used all its MPs (+0). The aircraft's fire control is rated at -3 and the gun's accuracy is rated at +0. The ME262 is 2 MU and 3 Altitude Levels away (a total Range of 4), placing it in the Long Range bracket (-2). He makes his Gunnery Skill roll and obtains a 6. Unfortunately, his total modifier of -5 reduces the result to a 1.*

*Fritz's ME262 must avoid the incoming fire. On his last move, the ME262 traveled 9MU (+1) and its base maneuver value is -1 while the attack came from above (-1). Fritz makes his Piloting Skill test and obtains a score of 3. This is adjusted by the defense modifiers for a net score of 2. Fortunately for the German pilot, this is higher than Jones' score of 1 and the attack misses. Fritz dives away, shaken but undamaged.*

*Abandoning his stealth attack, Fritz decides to attack the Lanc directly. Looping round, he closes on the lumbering bomber from the rear. The ME 262 moved at Top Speed (-3) and has a fire control rated at +0. His Mk 108 Cannon are rated at accuracy 0 and the distance to the target is 3 MU, Short Range (+0). He makes a Gunnery Skill roll and gains a 5, adjusted to 2 by the modifiers.*

*The Lancaster pilot attempts to avoid the incoming fire. The Lanc traveled 8 MU (+1) but has a base maneuver of -4 while the attack came from the rear. He rolls a 4 for his Piloting Skill, which is modified down to a 1. Fritz's cannon hit the bomber with an MOS of 1.*

## MELEE ATTACKS

There are few aircraft that can make effective melee attacks. Aircraft can ram (and some are designed to do so, notably the Luftwaffe's Natter and the Japanese Baka kamikaze aircraft) though doing so is usually an act of desperation. All melee attacks use the attacker's Piloting Skill instead of the Gunnery Skill.

### • RAMMING

Ramming is an Opposed Piloting Skill roll. Unlike other attacks, ramming inflicts collision damage on both the attacker and the defender. Impact speed is first determined based upon the direction of the ram. Head-on collisions add the speeds of the attacker and defender. Side impacts take the attacker's speed, and rear collisions take the difference between the two speeds.

From the impact speed, a damage modifier is determined using the Impact Speed Table. This is added to the Size of each aircraft involved in the collision to determine its Impact Damage Multiplier. Each aircraft will take an amount of damage equal to the Margin of Success of the Attack multiplied by its opponent's Impact Damage Multiplier (see *Damage*, page 45). The larger the unit, the more damage it will inflict on the other unit involved in the collision.

If it survives the collision, the velocity of the ramming aircraft is reduced by the Size (or Size + Velocity in a head-to-head) of the opponent. If the velocity is below Stall speed the aircraft immediately stalls (no Piloting roll allowed). If the attacker gets a MoF and still had MPs to spend, he moves one MU forward and ends movement there; otherwise, he stops at the collision point.



The velocity of the target aircraft is unaffected save in a head-to-head collision where it reduces velocity by the Size + Velocity of the other aircraft and may also stall. It must, however, make a Piloting Skill roll (Threshold 7) or else lose control and roll on the Loss of Control table (adding the MOF and the ramming aircraft's Size to the roll).

## DEFENSIVE MANEUVERS

"Defensive Maneuver" is the term used to describe a aircraft's extra efforts in avoiding enemy fire, using acrobatic maneuvers and the like. A Defensive Maneuver counts as an Action and must be declared at the beginning of the combat turn (units may not "abort" to Defensive Maneuvers later in the turn).

Performing Defensive Maneuvers add a +3 bonus to all defense rolls for the combat turn, but prevent the unit from attacking or performing any other Action that turn. Multiple "evasive Actions" cannot be performed to accumulate defensive bonuses. Defensive Maneuvers may not be taken while moving at Top Speed.

## AIMED SHOTS

A gunner may elect to perform an aimed shot versus a specific component of an aircraft rather than just aim for the center of mass. Allowed targets are Fire Control, Structure, Crew Compartment, Movement Systems, and Auxiliary Systems. These locations are represented by the numbers 1 to 5 on the Systems Damage Table (see *Damage*, page 45). Aimed shots have a -1 modifier to their roll, but if the attack succeeds, result 6 on the table also correspond to the desired location.

Aimed shots, being less likely to hit than other attacks, are usually best used for specific objectives. For example, destroying an aircraft's fragile antennae array is more likely to silence it than a random hit to the structure.

### • TINY TARGETS

For scenario purposes, high precision shots versus tiny targets (tail wheels, for example) are possible. The shot must

be aimed (-1 Accuracy) and a Margin of Success of at least 3 is required to hit. If the MoS is lower than 3 but above 0, the attack hits the targeted location but not the tiny target. For example, a gunner wishing to destroy the tail wheel on a fighter's structure would make a precision shot; if the MoS is under 3, he hits the Structure instead. Small targets and their locations are mentioned in the scenario when this option is available.

## Ramming Speed

RAMMING DIRECTION	IMPACT SPEED
Head On	Attacker Speed + Defender Speed
Side	Attacker Speed
Rear	Attacker Speed - Defender Speed

## Impact Speed Modifiers

IMPACT SPEED	DAMAGE MODIFIER
1-2	-2
3-4	-1
5-6	+0
7-9	+1
10-19	+2
20-99	+3

## Physical Attack Example

*With a FW 189 pounding a heavily loaded barge as it crosses the Volga and his own IL-2 out of ammunition, Comrade-Pilot Iosef decides to take desperate Action against the German swine. With all the skill and courage of a pilot of the Rodina, he tries to fly his "Sturmovik" into the side of the fascist fighter-bomber. He rolls a 5 on his Piloting Skill roll, while the fascist pilot scores a 3, a MOS of 2.*

*His Sturmovik is traveling at a speed of 12 and as this is a side attack, is the only speed that counts. The speed modifier (+2) is added to the IL-2's size of 6 for a net damage multiplier of 8. With the MOS of 2, this inflicts 16 damage on the FW 189, just light damage. Iosef's aircraft also takes damage, the FW 189's size of 5 plus the Impact Speed Modifier for a net damage modifier of 7. This is again multiplied by the MOS of 2 for 14 points of damage to the Sturmovik. Iosef's plane survives the impact but now has a velocity of 0 and is stalled. Can the hero of the Rodina recover control of his aircraft before it is too late?*





## BURST FIRE

Burst fire is generalized and abstracted into a form that is easier (and faster) to use during the game, rather than worry about each and every bullet or rocket sent toward the enemy. Any weapon with a Rate of Fire (ROF) rating of 1 or greater is capable of burst fire.

The Rate of Fire is added to the weapons Damage Multiplier when the weapon is used against aircraft and other hard targets such as buildings and other structures. This represents the increased damage effect caused by the pounding of many projectiles upon the target's armor.

A successful burst fire attack versus infantry and other targets with no Armor value, on the other hand, adds the ROF bonus to the Margin of Success instead of the Damage Multiplier to represent the devastating effect of the multiple rounds on the unprotected target(s).

Ten rounds of ammunition are expended (not entirely realistic, but much simpler game-wise) for every point of Rate of Fire bonus used in the attack. Burst fire has the effect of lowering the weapons total effective damage for the ammo fired because many rounds will simply not connect with the target.

To conserve ammunition, the attacker may elect to use only part of the weapons entire ROF rating. If the ROF rating is equal to zero (by choice or by design), only one round of ammunition is expended per firing of the weapon.

## Burst Fire Example

*Heinrich's Bf 109 "Gustav" drops onto the tail of a Spitfire and fires his 30mm MK 108. The gun has a ROF of +1 and he decides to unleash the full force of the cannon on Tommy, expending 10 rounds of ammunition. He hits with a MOS of 3 and the weapon's normal Damage Multiplier is x10. Since the ROF is +1 this increases to x11, for a total of 33 points of damage.*

*A short while later, Heinrich strafes a Russian convoy. He catches an infantry unit in the open and attacks them with his 13 mm MG131 machine gun, opting to use the full ROF of +3 and expending 30 rounds. His MOS is 2 which would normally inflict 8 points of damage (2x the Damage Multiplier of 4). As the target is unarmored the ROF adds to the Damage Multiplier, increasing it to 7. As a result, the attack inflicts 14 points of damage (2 x (4+3)).*

## Walking Fire Example

*A flight of three Zeros are bearing down on the American fleet. Our canny hero, Chuck "Ironman" O'Connor, dives out of the sun in his P.51, catching them unawares. He rakes his 0.5 in Brownings across the Japanese flight — the guns have an ROF of +3, allowing him to attack up to 4 aircraft. By attacking two extra targets his effective ROF against each aircraft is +1. He still expends 30 rounds of ammunition.*

### • MISSILE ROF

Unlike other weapons, rocket and missile launch systems do not expend ten rounds of ammunition per point of ROF bonus used in the attack. Instead, the number of rockets or missiles used doubles for every point of ROF that is applied to an attack. Thus, an attack with ROF +1 requires 2 missiles, ROF +2 requires 4 missiles, ROF +3 requires 8 missiles, ROF +4 requires 16 missiles, and so on, doubling every time. This reduction in ammunition cost both represents the increased effectiveness of rockets and acts as a counterpoint to their vulnerability to anti-missile devices.

### • WALKING FIRE

Weapons capable of burst fire can be used to attack multiple targets in a single Action by walking the burst across the targets. Walking fire must be declared

before any attacks are made. The Player then chooses the targets of his attack. A number of targets equal to the weapon's ROF plus one may be attacked; the targets may not be more than 1 MU apart from one another. For each extra target, the weapon's ROF is reduced by one for damage purposes (but not for ammo expenditure). All targets must be within the weapon's firing arc. Each separate attack is rolled separately. Each individual target may not be attacked more than once per round by the same weapon (no extra attacks against one target).

### • SATURATION FIRE

A burst fire weapon (ROF equal to or greater than +1) can be used to saturate a zone and automatically attack anyone entering it. The weapon is put on full automatic fire and ammunition is emptied liberally, filling the air with a



virtual wall of projectiles. Every unit that is in the target area or enters it later in the combat turn suffers an attack automatically, regardless of speed, maneuver or allegiance.

To perform saturation fire, the attacker chooses a target point. The attack is then rolled for normally except that half the weapon's ROF (rounded down) is added to the total; the ROF is *not* used to increase the Damage Multiplier or Margin of Success of the attack. After rolling, the attacker records the total. Any unit within a radius of (RoF x MU), or that enters this zone later in the combat turn, must defend against this number or be damaged by the saturation fire. The Margin of Failure of the defender is treated as the Margin of Success in a normal attack (i.e. total damage = Margin of Failure x Damage Multiplier of weapon).

There are two limitations to this type of fire: the saturation zone cannot be further than the Medium range of the weapon, and the weapon uses 30 shots of ammunition (or 8 rockets) per ROF point used in the attack. If the weapon does not have this much ammo left, the result still stands (although the ammo magazine is emptied). A least 10 rounds of ammunition (or 4 rockets) are required to saturate an area.

If the attacking unit finds itself in its own saturation fire zone (possible with high ROF weapons fired at Short range), it does not have to defend against it. Targets not in the weapon's fire arc cannot be attacked, regardless of the diameter of the saturation fire zone.

## AREA EFFECT WEAPONS

Area effect weapons (like flak shells) attack everything in their radius, irrespective of friend or foe. These weapons are rated in Area Effect (AE), the radius in MU of their blast area. An AE of radius 0 means that only targets within a 1 MU diameter are affected. A single attack roll is made; each and every aircraft (allies included) touching the affected area must roll their defense against this value. Even if the blast is completely defended against (e. g. Margin of Success equal to 0 or more), any unit in the blast zone still takes half the explosion's Damage Multiplier in concussion damage.

## STRAFING

Aircraft can attack ground targets with their guns, wreaking considerable damage on slow-moving ground units and structures. This strafing attack uses the standard attack rules, but with the following modifications:

- The Attacker suffers a -2 penalty to his attack roll;
- The defender gains only half the benefit for their movement and increases any negative modifiers by half (round down in both cases);
- The defender automatically suffers the "Attacked from Above" penalty;
- All strafing attacks are considered to be AE attacks, targeting an area 1 Ground MU wide and 2 Ground MU long, aligned with the aircraft's flight path. Make a separate attack roll for each unit in the area of effect;
- Attacks by ROF weapons use the Burst Fire rules to modify their MoS or Damage Multiplier (depending on the target). Linked weapons operate normally (see page 77).

## Saturation Fire Example

*Gunther's DO-17 moves in to bomb a factory near Southampton. The British gunners know he's coming and lay down a wall of AA fire. The Oerlerikons have an ROF of +4 and the gunners opt to use the full volume of fire, though this costs them 120 rounds of ammunition! The attack roll is 5, to which they add half the MOS for a result of 7, the number that Gunther (or any others who enter the zone later in the turn) use as a Threshold for their defensive roll. Furthermore, because the ROF is +4, the AA screen spans an area 4 MU in radius, a veritable "cloud of death"! Gunther makes his defensive roll but only gets a 5, an MOF of 2. His DO-17 thus takes damage as if the Oerlerikon gunners had an MOS of 2.*

## Area Effect Example

*Having narrowly survived the "Cloud of Death," Gunther pulls away from the factory, only to have an AA shell (AE1, DMx20) explode nearby. Though it missed hitting the DO-17 directly, Gunther's plane is within 2 MU of the shell (the AE value +1) and is thus caught in the blast. The attack roll is a 4 and Gunther's defense roll is a 6. He escapes the brunt of the damage but the Dornier still suffers a 10 point attack (DM of 20 divided by 2). Ordinarily this wouldn't damage the bomber, but on top of damage from the "Cloud of Death" ...*



## Strafing Example

Pinky's tank-buster Hurricane dives against a PzKpfV Ausf A "Valkurie" which is escorting a group of infantry. He decides to let-rip with his twin 40mm cannon, strafing both the walker and the infantry, adjusting his flight path to ensure both fall in the target area. Pinky's crate is moving at Combat Speed and used its full MP allocation. His Fire Control is -2 and the weapon is +0 accuracy. The targets are in the Short Range bracket (0). Together with the -2 penalty for strafing, Pinky's total modifiers are -4. He makes a Gunnery Skill roll and gets a 7 for a net result of 3.

The Valkurie moved only 2 MU, which would ordinarily impose a -2 Defensive modifier, but the strafing penalty reduces this to -3. Its base Maneuver value is -1 and the attack came from above (-1), for a net modifier of -5. Heinz makes his Piloting Skill roll and gets a 6, modified down to 1. This results in a MOS of 2 for the Hurricane's 40 mm cannon, inflicting 24 damage points on the walker, equaling its Overkill score and causing it to explode in a ball of flame.

Pinky's Gunnery roll against the infantry is 6 but an additional -2 penalty is applied to anti-infantry attacks, for a net result of 0.

The target troops moved only 1 MU but infantry do not use defensive movement modifiers (Gear Krieg, page 63). The -1 penalty for an attack from above is applied, however, for a net modifier of -1. The defense roll for the infantry is 4, modified down to a 3. A success, and the infantry escape damage as the men scatters and dive into the nearest ditch and foxholes.

## BOMBING

Bombs fall into two broad categories: air-to-ground missiles and ordinary bombs. Air-to-ground missiles follow the same rules as normal guided weapons.

Ordinary bombs are simply dropped from the aircraft, and where they fall depends on the aircraft's velocity, altitude and the method of bombing. There are three such methods: normal bombing, carpet-bombing and dive-bombing. Bomb attacks must be declared and calculated at any time during the bombing unit's movement phase, but are resolved during the Action phase.

A Gunnery roll (Threshold 4) is still required to see if the target point was hit; in the case of a failure, the bomb falls one MU away from the target for every two points of MoF, either short or long (even MoF = long, odd MoF = short). If a Fumble is rolled, the bomb did not explode or it hit way off-target (because of high winds, bent fins, collision with a bird, etc.). A draw is still a hit.

### • NORMAL BOMBING

In normal bombing, the target point is determined by how fast and high the plane was going when it dropped the bomb, as well as its direction (for speed, use the number of MUs moved during the preceding round). Bombs follow the same direction vector as the plane that dropped them. To find out how far (in MU) the target point is from the drop point, divide the aircraft's speed by 3 (round fractions down). With conventional bombs, this distance may not exceed the aircraft's altitude. Glide bombs (those such as the Hagekorn with the Glider perk) may travel a distance equal to the aircraft's altitude. Guided bombs (see *Guided Bombs* on next page) can modify their target point by one MU in any direction.

Depending on the aircraft's altitude, the bomb may or may not hit in the same turn it was dropped on. Divide the aircraft's altitude by fifteen (rounding any fraction down) to determine the length of delay; Roll for the attack in the Action phase of the designated combat round.

### • CARPET-BOMBING

A tactic used for the mass destruction of urban and rural regions, carpet-bombing consists of dropping very large quantities of bombs over a given area. To carpet-bomb a target, a plane must have a bomb rack with a ROF greater than zero. Determining the target point is done the same way as for normal bombing, except that the bombs cannot be guided (this rarely matters as accuracy is not the issue in carpet-bombing). The bombardier can choose to either devastate a target point (using the Burst Fire rules) or spread out the attack over the largest possible area.

In the latter case, the aircraft's direction, speed and altitude when released determines the impact of each bomb as per the rules outlined in Normal Bombing. The maximum number of bombs dropped per bombing Action of the crew equals the bomb rack's ROF.

### • DIVE-BOMBING

Dive-bombing uses a different principle than other types of bombing. The aircraft actually plunges towards the target to drop the bomb, pulling up at the last moment.

The target point can thus be chosen more easily: the bombing aircraft can pick either the point where he's diving, or a position up to 1 MU in front of it (front being the direction of pull out). The procedure is not without risk.



First, the aircraft must fall into a dive and spend the turn diving, losing a number of altitude levels indicated by the Diving rules (page 32). The next turn, the aircraft declares its attack and target point at the beginning of its movement phase. It then tries to pull out of the dive. The attack, as usual, is resolved during the Player's Action phase.

Dive-bombing can also reduce the attack delay for the bomb, as it starts with a higher vertical velocity than if it were simply dropped (see *Normal Bombing* on the previous page). For each altitude level lost in the diving round, subtract one from the aircraft's actual altitude level at the time of the drop.

### • GUIDED BOMBS

Some bombs are equipped with rudimentary sensors and steering fins that allow them to better attack the target. They are wire-guided and may modify their target point by 1 MU in any direction. Guided bombs are vulnerable to the severing of their guide wire and once per turn (including that in which it was dropped) a piloting roll is required against the Threshold of 4. On any result other than a success the wire breaks and the bomb is treated as a regular "iron" bomb (i.e. unguided).

#### Bomber Maneuver Penalty table

LOAD	PENALTY
Up to 1/4 maximum	0
1/4-1/2 maximum	-1
Over 1/2 load	-2
Over full load*	-3

\*Only allowed on aircraft with "Overloadable" Perk.

### • LADEN BOMBERS

The additional mass of bombs and other equipment greatly impedes the maneuverability of aircraft. While carrying internal payloads, the aircraft may suffer a penalty to their Maneuver score, based on the proportion of the total load. These penalties remain in effect until the

payload is dropped/jettisoned, at which point the penalty is adapted to reflect the new payload level.

External payloads count as only half (round down) their normal load but reduce the Top Speed of the aircraft. More details on such loads can be found in *Underwing Stores* on page 44.

### Bomb Attack Example

*Example 1: A Lancaster is tasked with destroying a factory on the outskirts of Hamburg. It approaches the target at an Altitude Level 15 and a Speed of 8. Dividing the speed by 3 and rounding down, the Lancaster should be 2 MU down-range from the target when it releases its bomb load if it is to stand any chance of success.*

*The pilot makes last-minute course corrections and at the designated point, the bombardier drops the Lancaster's load. At altitude 15 there is no delay between releasing the bomb and its impact. The bombardier rolls his Gunnery Skill to see if the bomb lands on target. Unfortunately, he rolls a 2 for a MOF of 2 and so the bombs fall 1 MU long (MOF of 2 divided by 2, and long because of the even result. Luckily for the Lancaster, the target remains in the blast area.*

*Example 2: A Russian TU-2 approaches a German arms dump inside the Kessel at Stalingrad. The crew decides to Carpet Bomb the facility, depriving the Fascists of as many supplies as possible. The TU-2's bomb bay has an ROF of 5 and so the Crew can release five bombs for the cost of one Action. They decide to drop a "stick" of five bombs, targeting a line 5 MUs long through the depot. Alternatively, they could drop all five bombs on a single point, increasing the Damage Multiplier of the explosion.*

*Example 3: Heinz's JU 87 Stuka screams down on the Russian barge as it crosses the Volga, seeking to release his bombs in a precision dive-bombing attack. He started the maneuver last turn at Altitude 30 and with a velocity of 6, the aircraft's full combat speed. The dive maneuver thus costs Heinz 11 altitude levels (6 for his speed, plus 5 for the first round of a Dive) and he is now at Altitude 19.*

*At the start of this turn he releases his bombs at the barge, which is 1 MU horizontally in front of the dive-bomber. Normally, a bomb released at Altitude 19 would take 1 turn to arrive at the target but as this is a dive-bombing attack, the number of levels dove (11) are subtracted from the actual altitude (19) to determine the effective altitude (19-11=8) when calculating the delay. The bombs scream in at the target this round. Now all Heinz has to worry about is the return fire — and pulling up from his dive.*





## • BOMB LOADS

Aircraft capable of carrying bombs or similar payloads list the number and mass of bombs allowed on their Data Card. For simplicity, *Luft Krieg* assumes each "bomb" equals 500kg, either a single large bomb or a rack of smaller munitions. Most bombs are of the standard High Explosive (HE) type, but other types also exist. Some, such as the Earthquake Bomb, may only be carried by aircraft capable of carrying Oversize Bombs.

## • UNDERWING STORES

Missiles, bombs and additional fuel tanks may be carried as Underwing Stores, slung on pylons beneath the aircraft's wings or attached to the fuselage. To make use of such stores, the aircraft must have a bomb capacity with the annotation UW (Under Wing). The "load" of these Underwing Stores count is only half normal (so a P51D carrying its full complement of two bombs is treated as only half-loaded, a -1 Maneuver penalty rather than -2).

Each Underwing Store reduces the aircraft's Top Speed by one. Combat Speed is unaffected unless Top Speed drops below Combat Speed, in which case the modified Top Speed also serves as the maximum Combat Speed. If this speed modification drops the aircraft's maximum speed below its Stall Speed the aircraft cannot take off. If airborne, the pilot must immediately (their next Action) jettison the external stores or the aircraft stalls automatically.

Aircraft attempting to land while carrying Underwing Stores must make a Piloting Skill roll against a Threshold of 2+ the number of remaining Underwing Stores. Failure results in a crashlanding (see page 29).

Underwing stores may be jettisoned at any time (costing 1 Action for any number of stores) or they may be used as per the normal rules for the store type: Bombs, Missiles (page 52) or external fuel (page 50).

## • AIR-DROPPED CARGO

Airdropped cargo uses the same basic rules as bombs, with aircraft's speed and altitude determining the impact point. Cargo canisters are equipped with parachutes to retard their fall. They descend two altitude levels per turn and may also drift in windy conditions. With no steering possible, the canisters will move downwind a number for MU equal to the Wind Force each turn. If he is to land his cargo on-target, a canny pilot will have to take this into account ...

## GROUND-AIR FIRE

Ground units will not sit idly by while they are attacked from the air. Units that can bear will usually fire back at the aircraft, though unless specially trained their effectiveness is sorely limited and reliant on the occasional "lucky shots."

Ground-air attacks add twice the aircraft's altitude to the horizontal distance to the target when determining which Range Band to use. Furthermore, the aircraft's Target Speed Modifier is doubled.

Units with the Anti-Aircraft Perk are equipped with special range-finders and gun mounts. They do not double altitude when calculating the range to a target, nor do they double the appropriate Speed Modifier.

### Bomb Type Table

BOMB TYPE	SIZE	RANGE	ACC	DM	SPEC
Cargo pod	2	0	0	0	Up to 500kg
Flare	0.5	0	0	0	Illumination, AE: 2
Fuel	2	0	0	0	Range x1.25
Torpedo	2	Special*	-1	x20	Water movement
Glide Bomb	2	0	-1	x8	AE: 1, Glider
HE Bomb	1	0	-2	x15	ROF: 2, AE: 0
Incendiary	1	0	-2	x10	ROF: 1, AE: 1, Incendiary
Fuel Air Explosive	5	0	-1	x25	AE: 2, Slow Burn
Cluster Bomb	1	0	0	x8	AE: 1
Guided Bomb	1	0	0	x12	AE: 1, Wire-Guided
Bouncing Bomb <sup>1</sup>	10	Special**	-2	x20	Oversize
12,000 lbs Bomb <sup>2</sup>	11	0	-2	x35	AE: 3, Oversize
Earthquake Bomb <sup>3</sup>	20	0	-3	x50	AE: 3, Oversize

\* Up to 5+1d6 MU from impact point in direction of flight if intervening terrain is Water; otherwise 0.

\*\*Up to 4 MU from impact point in direction of flight if intervening terrain is Water; otherwise 0.

1 This bomb type is also known as the "Dam Buster."

2 This bomb type is also known as the "Tall Boy."

3 This bomb type is also known as the "Grand Slam" or "Blockbuster."

# DAMAGE

The Armor rating of an aircraft represents the toughness of its best armored location. Aiming for the weaker points of the structure thus increase the chances of damaging the unit. A weapon's damage increases with the Margin of Success of its attack, since weapon damage is rated as a multiplier to the Margin of Success. Thus the better the marksman, the greater the damage.

$$\text{Total Damage} = \text{Margin of Success} \times \text{Damage Multiplier}$$

This final damage is compared to the Armor of the target aircraft. The table below lists the possible outcomes; only the most severe effect applies. For example, if an aircraft suffers Heavy Damage because it took damage exceeding twice its Base Armor, it does not suffer Light Damage as well. Regardless of the result of the Skill test, the Margin of Success cannot be greater than six for the purpose of damage.



## Damage vs Armor Table

DAMAGE TO ARMOR	OUTCOME	WHAT TO DO
Damage < than Armor	No Effect	Nothing; damage bounces off
Damage ≥ than Armor but lower than 2 x Armor	Light Damage	-1 to Armor Rating; roll on Systems Damage Table, Light
Damage ≥ than 2 x Armor but lower than 3 x Armor	Heavy Damage	-2 to Armor Rating; roll on Systems Damage Table, Heavy
Damage ≥ than 3 x Armor	Overkill	Aircraft Destroyed; remove miniature

*Armor = Aircraft Base Armor Rating*

## Aircraft Damage

*Example 1: An FW 190 is hit by cannon fire, causing 12 points of damage. This is higher than the aircraft's base Armor Rating of 8 but less than twice the Armor Rating. The aircraft suffers light damage and its Armor Rating is reduced by 1.*

*Example 2: A Henschel HS132 is hit by a Spitfire's cannon for a whopping 30 points of Damage. The HS132's Overkill rating is 15 (the third number — 3x Base Armor) and so it explodes in a ball of flame.*

## SYSTEMS DAMAGE

If the attack successfully causes damage to the enemy aircraft, the attacker must roll 1d6 on the *System Damage Table* (see next page) to find the exact location of the hit.

If a "six" is rolled on the table, a cascade result occurs: multiple systems fail, bullets ricochet inside the airframe, etc. The attacker may immediately roll twice on the table. If any of these new rolls produce a "six" again, it also generates two new rolls and so on until only damage results have been rolled. Note that the plane does not lose additional Armor points for these extra hits (see *Armor Loss* on the next page).

### • MULTIPLE SYSTEMS

When multiple possibilities exist for exactly which aircraft component is damaged — such as when a weapon is damaged on a multi-gun plane — a single die is rolled. If the result is an odd number, the defender chooses which system is damaged. If the result is an even number, the attacker chooses which system is damaged.

If the damage table indicates damage to a system that is not present on the aircraft (or that has already been totaled), the aircraft takes no further damage beyond the loss of Armor points (see further).

### • KILLING AN AIRCRAFT

An aircraft is not removed from play until it is either down to zero Armor points, it receives damage in excess of three times its base Armor rating in a single attack, or the *System Damage* table result indicates that it is destroyed. A Crew Killed result also eliminate an aircraft from the game.



### Systems Damage Table: Light Damage

ROLL	DAMAGED SYSTEM	RESULT
1	Fire Control	Roll on Sub-table A
2	Structure	Roll on Sub-table B
3	Crew	Crew stunned (-1 Action for 1 turn)
4	Movement*	-1 Movement Point
5	Auxiliary Systems	-1 to 1d6 Auxiliary Systems
6		Roll Twice on this table**

### Systems Damage Table: Heavy Damage

ROLL	DAMAGED SYSTEM	RESULT
1	Fire Control	Roll on Sub-table A and add +1
2	Structure	Roll on Sub-table B and add +1
3	Crew	Crew killed; 10% casualties, min. 1
4	Movement*	1/2 remaining MP (round down) & -2 Maneuver
5	Auxiliary Systems	1d6 Auxiliary System destroyed
6	Roll Twice on this table**	-

\*Choose Flight or Ground movement / \*\* If the attack was a called shot, the attacker hits his target location (as effects 1 to 5 on table, depending on target).

### Subtable A: Fire Control Damage

DIE ROLL	EFFECT
1	-1 Accuracy to a single Weapon
2	-2 Accuracy to a single Weapon
3	-1 Accuracy to all Weapons
4	Single Weapon destroyed
5	Fire Control system destroyed (-5 to all attacks)
6	Roll Twice on this table
7	Ammunition/Fuel Hit (roll 1d6)
1-3	Ammo Storage and Fuel Tank Ruptured (aircraft cannot move or fire weapons)
4-6	Chain Reaction! Ammo and Fuel Explodes! (Aircraft Destroyed and all Crew Killed)

### Subtable B: Structural Damage

DIE ROLL	EFFECT
1	Engine damage; -1 Flight Movement Point
2	Engine damage; 1/2 remaining Flight MPs (round down)
3	Control surface damage; -1 to Maneuver
4	Control surface damage; -2 to Maneuver
5	Control failure; -3 to Maneuver and aircraft goes out-of-control
6	Catastrophic crew compartment failure: 75% casualties, minimum 1
7	Complete structural failure; aircraft is destroyed; crew can attempt to bail out

### • DAMAGE TO ARMOR

Armor loses its effectiveness when damaged due to cracking and structural fatigue. Bits and parts may fall off, or chinks may develop through which the next attack will reach a vital system or component inside, hastening the aircraft's demise.

When an aircraft suffers Light Damage, it loses one point of Base Armor permanently in addition to the effect outlined in the System Damage Table. Heavy Damage causes an aircraft to lose two points of Base Armor permanently, in addition to the system damage. Each point of Base Armor lost reduces the amount needed to inflict Heavy Damage by 2 and the amount need to produce Overkill by 3.

Even if the aircraft has specialized armor-related Perks (such as Reinforced Armor), damage is always taken off the Base Armor rating. This is mostly done to simplify bookkeeping and keep the game moving along.

### • FIRE CONTROL

Fire Control is a catch-all category that represent the aircraft's targeting devices, acquisition gear and its weaponry. If more than one weapon system is present, all damage received is randomized following the procedure outlined in the previous section.

The damage penalties are applied to the affected weapon's Accuracy. If a weapon's cumulative penalties ever reach a total of -5, the weapon is put out of commission and cannot be used anymore. If the penalties drop to -6 or lower, the weapon is completely destroyed and blown off the airframe.



## Armor Damage Example

*The FW 190 is hit again, this time for 15 points. Ordinarily this would be light damage (Greater than Base Armor but less than 2x Base Armor). Unfortunately for the FW190, it has already been damaged and the Base Armor value is now only 7, meaning that 15 is more than 2x the Armor Value. The result is Heavy Damage, and a further armor reduction of 2 points (only 5 points remain).*

## Systems Damage Example

*The pilot of our FW190 rolls a die to determine the effect of the light damage on the aircraft. The result is 3, a crew hit, indicating that the pilot is stunned (-1 Action for 1 turn). He then rolls another die to determine the effect of the heavy damage and the result is a 6! He rolls twice more, the first result a 1 (Fire Control Damage) and the other a 4 (Movement Damage - 1/2 MP and -2 Maneuver). The Fire Control result requires the pilot to roll another die and add +1. He rolls a 3, modified to 4: One of the FW 190's weapons is destroyed. Things don't look good.*

## • STRUCTURE

Structure hits damage the aircraft's structural integrity. The airframe and other components are twisted out of shape or ripped apart, causing further damage to the mechanisms within. Most Structure hits are fairly straightforward: loss of Movement Points are applied to the Flight Movement Type, while Maneuver losses affect the aircraft as a whole.

Control Failure indicates catastrophic damage to the aircraft's control surfaces that send it out of control (roll on the *Control Loss* table). The pilot may attempt to regain control in subsequent turns but the aircraft's Maneuver is permanently impaired. Catastrophic Crew Compartment Failure is just that: the aircraft structure collapses, trapping the crew or ejecting them from the aircraft. The Reinforced Crew Compartment Perk is ineffective against this, but the Reinforced Structure Perk will absorb the hit as normal.

## • CREW

"Crew Stunned" result indicates that the aircraft loses one Action in its next turn. A "Crew Killed" result reduces the num-

ber of crew by one (and may thus reduce the number of available Actions) and applies for the rest of the game.

If the Actions were already taken that turn, the "lost" Actions carry over to the following turn(s) as an "Action Debt" and must be paid with either Actions from that turn or command points. A *Stunned* chit can be placed on the datacard as a reminder of Action owed.

The Crew result on the *System Damage* Table is also used to determine damage among the aircraft's passengers, if any are aboard. One die is rolled to determine whether the crew or the passengers take the hit (1-3 crew, 4-6 passengers). Damage is then applied as normal. Passengers cannot normally replace lost crew, though allowances can be made for this in a scenario.

An aircraft with a single crewmember is removed from play after a Crew Killed result, unless a Perk or Hero ability protects the pilot. An aircraft with multiple crewmembers is only eliminated when all crewmembers are killed. Unless controlled by an autopilot, pilotless aircraft are assumed to go out of control automatically.

## • MOVEMENT

Any penalty to the speed of the aircraft is applied to its Top Speed for the Flight Movement Type; the Combat Speed is then recalculated as needed. If all Movement Systems are reduced to 0, either through successive minuses (maximum -5) or Heavy Damage, the aircraft can henceforth only Glide (see page 32). If damage reduces the aircraft's Top Speed below its current velocity, the aircraft suffers the effect of Overspeed (see page 29).

## • AUXILIARY SYSTEMS (AUX)

Auxiliary systems include Sensors, Communications and any Perks that are labeled as auxiliary systems (e. g. life support, ejection seats). If any turreted weapon is present, the turret is counted as an Auxiliary system and may be disabled like the rest (turrets are not affected by "-1" results). A disabled turret is frozen in place and any weapon mounted in it becomes fixed in the arc where it was last fired.

If an aircraft's Sensors or Fire Control are utterly destroyed, the aircraft may still attempt to perform Actions that require these systems, but it suffers a -5 modifier. If an aircraft's Communications system is destroyed, the aircraft may not be used as a forward observer and may not receive Command Points.

Damaged AUX Perks have a -1 to any roll involving those particular systems (for example, -1 to Piloting when using a Catapult Hook), or a 20% loss in efficiency (on systems like refueling equipment). If a system's cumulative penalties reach -5 (100% efficiency loss), it is considered destroyed.





## ADVANCED COMBAT RULES

The core Luft Krieg rules cover most of the situations that take place in an aerial encounter, but Players may wish to incorporate a wider range of actions into their games, or to add more detail and actions to those already possible. These advanced rules provide a mechanism for doing so, covering a number of special situations and technologies. Using them may increase the complexity of games and thus the time taken to play. All the advanced rules are optional and all, some or none may be used, at the Player's discretion. All participants must agree on the advanced rules to be used; if no consensus is possible on a rule, do not use it. Though every effort has been made to cover all situations that may occur in a superscience air battle, there will be situations not covered in these rules. Some may be detailed in supplements to the game, while others should be agreed and/or resolved among the Players. Such "house rules" are part and parcel of many campaigns; if no agreement can be reached between the Players as to how to handle a situation, refer to *The Hand of Fate* (page 22).



### AIR & WEATHER

Many weather conditions complicate tactical combat, most of them by obscuring the targets or making flight difficult or even dangerous. They are, in many ways, the equivalent of the terrain features encountered by ground units.

#### • CLOUDS

While clouds have little effect on an aircraft's movement, they do provide an important source of visual obscurement

as indicated in LOS and Attacking (page 34). The basic rules assume that the cloud cover in the gaming area is constant across the map and altitude levels.

Players may opt to specify particular MU and/or altitude levels where the Obscurement effects take place. Players may also judge that these clouds move with the prevailing wind (a number of MU downwind equal to the Wind Force) at the end of the turn.

#### • EXTREME TEMPERATURES

Extreme cold ( $-40^{\circ}\text{C}$  or lower) or extreme heat ( $+50^{\circ}\text{C}$  or higher) is very detrimental to the functioning of aircraft. Any aircraft that lacks the appropriate Hostile Environment Protection Perk automatically suffers Light Damage whenever pushed to Top Speed. In addition, such aircraft must roll one die at the beginning of each combat turn. On a roll of one, the aircraft loses 1d6 MP for the remainder of the turn as the engine splutters and labors.

#### • NIGHT

Nighttime combat functions as daytime combat except that the Night Detection score of an aircraft is used instead of its Daytime Detection score (see page 34). Aircraft without sensors have a -1 modifier applied to all attacks.

Some units are equipped with powerful searchlights (see *Perks*, page 72). These can be turned on or off at the beginning of each turn. Active searchlights make the aircraft easier to spot: the aircraft is treated as being in daylight for all combatants. Enemy fire can target the searchlight by performing an aimed shot; if successful, the searchlight is automatically taken out.

#### • RAIN

Rain has an effect similar to clouds, and mainly causes visual obscurement. Light rain does not affect visual detection within 4 MUs. Beyond that it has an Obscurement value of 1 per MU. Medium rain has an Obscurement value of 1 per MU, while heavy rain has an Obscurement value of 2 per MU. For Active scanning, the value is 0, except if the rain is actually an electrical thunderstorm; in which case, heavy rain has an Obscurement of 1 for Active Detection.

Heavy rain can also affect an aircraft's flight: apply a -1 penalty to all Piloting Skill rolls, -2 for lighter-than-air craft.

### • SANDSTORMS

Sandstorms are common in desert locales. These turbulent dustclouds obscure both visibility and sensors alike. If both Players agree that a sandstorm is occurring during their combat, add +1 to the Obscurement value for every MU of intervening terrain. Additionally, an aircraft's Maneuver Value is reduced by 2 when flying in a sandstorm and aircraft not equipped with the Hostile Environment Protection: Desert Perk must roll 1d6. On a result of 5 or 6 the aircraft loses 1 MP as sand is sucked into the air intakes.

### • SUN AT YOUR SIX

A point on one edge of the table may be designated as the Sun. If this point lies directly behind a targeted aircraft, the attacker is temporarily dazzled and suffers a -2 Attack Penalty. Cunning pilots seek to have the sun behind them ("at their six") in order to increase the difficulty of attacks against them.

### • WIND

Strong winds may affect the flight of aircraft. Wind is described with two parameters: Force and Direction. Direction is self-explanatory: it is represented by a simple vector and is assumed to be consistent throughout the game map. The force of the wind is calculated in 30 kph increments — identical in essence to aircraft MPs.

Wind Force one (5 on the Beaufort scale) is equivalent to a good draft; flight with ultra-light craft (Size 3 or less) and lighter-than-air craft will be difficult, but

not impossible (add 2 to the difficulty of any maneuver). Wind Force two (7 on the Beaufort scale) indicates a strong wind, which will make flight with ultra-light and lighter-than-air craft nearly impossible (add 4 to the difficulty of any maneuver). VTOL aircraft pilots subtract 1 from their Skill.

A typical storm has Wind Force 3 (10 on the Beaufort scale): subtract 1 from the piloting skill for fixed-wing aircraft; for VTOL craft the penalty is -2. Higher Wind Force levels indicate hurricane-force winds: for each point above 3, increase the skill penalty by 1, and call for rolls on any maneuver other than moving straight ahead.

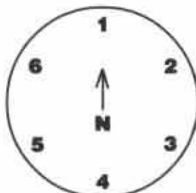
In addition to making flight more difficult, wind also affects an aircraft's overall movement. At the end of the movement phase of any aircraft, move it downwind an additional number of MUs equal to the Wind Force. Do the same for any normal or carpet-bomb trajectory, counting the appropriate number of MUs for every turn the bomb spends falling.

### Random Wind Force Table

DIE ROLL	WIND FORCE
1-3	No wind
4	Wind Force One
5	Wind Force Two
6	Wind Force Three

### Random Wind Direction

# = Die roll



## AUTOPILOTS

Since the earliest days of flight, devices have existed to ease the pilots' lot in long-distance flights. The most common is a mechanism for locking the controls in their current position so that an aircraft continues its last maneuver. This is usually straight and level flight, though if the controls are locked while the aircraft is climbing, diving or turning it will continue to do so as well.

The advent of the Computator has allowed the installation of more sophisticated "autopilot" systems in some aircraft. These devices can store a series of simple instructions that they execute in sequence. The Autopilot's rating is the number of commands that can be stored, each of which must be simple, unambiguous and be directly related to the aircraft.

Simple conditions may be attached to each command — "if the airspeed drops below 300 kph then..." or "...for ten minutes then..." — but must be related to the aircraft's instruments (speed, altitude, time, distance, fuel level). Commands can be stacked to form more complex patterns. For example, "maintain level flight for 10,000 meters then turn left to heading 270" is two commands executed in sequence.

An autopilot cannot really replace a human pilot: if the aircraft is required to make a Piloting Skill roll (for example to avoid a stall) it automatically fails unless the pilot intervenes.



## BARRAGE BALLOONS

Barrage balloons are tethered above vulnerable sites as a means of discouraging attack. They are unmanned Lighter-than-Air craft and have an Armor rating of 6/12/18. They are unarmed and cannot maneuver.

The altitude of each balloon should be noted and any aircraft that flies within one MU of the balloon and at an equal or lower altitude risks becoming entangled in the tether cable. To avoid this, the pilot makes a Piloting Skill Roll vs. a Threshold of 4. Aircraft equipped with the Cable Cutters Perk reduce the avoidance Threshold by 2.

Success indicates the aircraft avoids or cuts the cable, while failure results in a collision. The Damage Multiplier of the collision is the Aircraft's speed, which is multiplied by the MOF to determine the amount of damage suffered. Additionally, when an aircraft strikes the cable or balloon its speed is reduced to 0 and it suffers the effects of Stalling.

## ECM/ECCM

Some aircraft have ECM (Electronic Countermeasures) and ECCM (Electronic Counter Countermeasures) Perks that can affect communication and sensor operations.

Activating ECM or ECCM costs an Action and requires the pilot or Electronic Warfare officer to roll their Tactics Skill (Electronic Warfare Skill if using the *Gear Krieg RPG*) to which is added the system's Rating. This test takes place during the Activation Phase, though the system requires a turn to warm up and doesn't become active until the end of the following round.

If ECM is active and functional during the initiative phase, all Sensor and Com-

munication rolls made by enemy units in the round are affected and must beat the ECM Threshold. The unit which is using either of these systems is the one testing, not the receiver. Transferring Command Points requires a Leadership Test (Communication if using the *Gear Krieg RPG*) by the commanding unit. ECM affects all enemy units within the emitter's Sensor range, though friendly units are unaffected.

If ECCM is active during the initiative phase of the turn, all active ECM systems within the Sensor range of the ECCM unit must compare their own Threshold to the ECCM's Threshold (or Thresholds, if there are more than one ECCM system active). If the ECCM Threshold is equal or higher than the ECM's Threshold, the ECM has no effect that turn.

The ECM unit may spend an Action during the turn to try and increase its own Threshold in order to beat the ECCM in the next round. Likewise, the ECCM unit may spend an Action to try to raise its own Threshold for the next round. The new result stands, even if it is lower than the previous one. Friendly ECM units are not affected by their side's ECCM.

## ENDURANCE

The data card for each aircraft lists its range, the distance over which it can practically fly with a full load of armaments and then return to its base. Obviously, a one-way mission — for example ferrying aircraft from the USA to Britain — allows the aircraft to fly further (up to 2x Range) but other methods exist to extend the operational range: the addition for fuel drop-tanks (at the expense of armaments), a reduction in payload or, in a few rare cases, air-air refueling.

The pilot's Actions can also reduce the range of a fighter or bomber. Every kilometer covered at Top Speed (the exact distance will vary depending on the scale) reduces the plane's range by 5 kilometers; the extra performance comes at a hefty cost in fuel.

## • DROP TANKS

Any aircraft capable of carrying bombs may be equipped with external fuel tanks, either replacing or in addition to other ordnance. Each fuel tank masses 1,000 kg (two bomb points) and extends the aircraft's range by 25%. Aircraft without UW points (i.e. who carry their full bomb load internally) cannot use drop tanks. Fuel is always taken from Drop Tanks before internal fuel tanks.

## • AIR-AIR REFUELING

Suitably equipped aircraft (which are not common) may use the new technique of air-air refueling to top up their fuel tanks and extend their endurance. The cargo space of the tanker aircraft is filled with fuel which it can pump across to the target aircraft — assuming they manage to rendezvous and hookup.

The hookup maneuver requires both the tanker and refueling aircraft to make a Piloting skill roll vs a Threshold of 4. If either fails, the hookup fails and no fuel is transferred though another attempt may be made after 3 minutes. Success indicates that the aircraft hookup and the target's tanks are topped up, a process taking 1d6 x 1d6 minutes. If one of the pilots fumbles, more serious events ensue: a collision renders the refueling gear of both inoperable. If both fumble, the gross miscalculation destroys both aircraft, by the impact and/or a fuel fire.



## INCENDIARY EFFECTS

When an incendiary weapon hits a target, the damage is equal to the weapon's "Damage Multiplier" (called its Intensity score) plus the Margin of Success. While this may seem like less damage than most weapons, most incendiary weapons are labeled as Slow-Burn weapons. Slow-burn weapons cause damage over a number of turns equal to the MOS though these flames slowly die down, reducing the effective MOS by 1 for every turn after the first. Slow-burn weapons apply their later turns of damage to ground targets only if the unit remains in the burning area.

Some targets (infantry, wooden buildings and Lighter-than-Air craft) are particularly vulnerable to incendiary ammunition. Against such targets, the MOS is added to the Intensity and the result is then multiplied by the MOS to determine the amount of damage inflicted. Normal Slow-burn effects apply in such cases.

## PIGGY-BACK AIRCRAFT & TOWING

Few aircraft are capable of towing other aircraft (the Towing Gear Perk) or carrying them in "piggyback" mode (the Host and Airdroppable Perks). For those few aircraft with suitable equipment, the maximum towing capacity (in Size points) is equal to half the aircraft's own Size. This assumes that the towed item is designed to be towed (e.g. a glider or aerial target). Items not designed for towing, such as disabled aircraft, are considered to have double their normal Size for towing purposes.

### • TOWING

Appropriately equipped aircraft can tow aircraft up to half their Size. If the towed aircraft is a quarter (or less) of the tower's

Size, there is no reduction in speed. If the towed aircraft's size is between a quarter and one-third of the tower's Size, they are limited to Combat Speed; loads between one-third and one-half the tower's Size limit speed to half Combat Speed (round up) until the load is released. An aircraft cannot tow an object if doing so would reduce its speed below Stall Speed. Releasing a towed item requires one Action. The released aircraft has the speed, heading and altitude of the towing aircraft but must henceforth glide or activate its own engines. Upon releasing its load, the speed penalties are removed from the towing aircraft.

Any attempt by the towed aircraft to maneuver, or any failed Piloting roll by the towing aircraft, results in the release of the towed unit. If this happens, both aircraft must make a Piloting Skill roll (Threshold 4) with failure or a fumble requiring them to roll on the *Control Loss* table, adding their MOF to the roll.

### • PIGGY-BACK AIRCRAFT

Designed to be carried aloft by other, larger designs, small "parasite" fighters may have a Size up to the aircraft's towing capacity. Physically attached to the "host" rather than towed behind it, the parasites do not assess a speed penalty unless their Size is more than half the capacity (at which point the host is restricted to Combat Speed). The Size of the parasite aircraft applies as a negative modifier to the host's Maneuver score for as long as the two remain attached.

Once the parasite is released (requiring an Action from the host), the host's statistics return to normal. The released aircraft has the speed and heading of the host, but is on altitude level lower and must henceforth glide or activate its own engines. Parasite aircraft must have the Airdroppable Perk, while the transport must have the Host Perk to reflect the reinforced hookups and adaptors.

### Towing Examples

*Example 1: A Lancaster is modified with towing gear. As the bomber is Size 10, it can tow aircraft up to Size 5. However, if the aircraft is Size 2 or greater (a quarter of the Lancaster's Size, rounded down) a movement penalty applies. Our Lancaster tows a damaged Pioneer from the front-line airfield at Biggin Hill to its home base of Duckworth. The Pioneer is Size 4 and is thus small enough to be towed. Unfortunately, this "load" is between a third (3) and half (5) the Lancaster's Size and thus limits it to half Combat Speed (4 MPs). As the Lancaster's Stall Speed is 4 as well, the pilot had better be careful ...*

### Incendiary Examples

*A Lancaster is hit by an incendiary rocket with a Margin of Success of 3. The weapon has an Intensity of x13, plus the MOS of 3. In the first round, the Lancaster suffers 16 points of damage (Light damage); in the second round this drops to 15 (13+3-1). In the third and final round (the MoS was 3) the damage is 14 (13+3-2).*

*Lilya attacks a barrage balloon with a rocket pack, getting a MoS of 2. The balloon has the Lighter-than-Air Perk. The MOS is added to the Intensity of x13 and this is multiplied by the MoS. With an Overkill of only 18, the balloon explodes in flames.*





## REMOTE CONTROL: RPVS AND MISSILES

Mechanisms for controlling vehicles remotely are becoming increasingly common, ranging from missiles and decoys to remotely piloted aircraft and spotters. The technology is closely related to those of Autopilots, with the vehicle responding to external commands rather than to its own programming. Indeed, many remotely piloted vehicles have pre-programmed actions that they carry out on command or when they lose contact with the pilot.

Remotely piloted vehicles have no innate actions and are reliant on those of the pilot. Such units can only carry out tasks requiring the expenditure of an Action (such as firing a weapon or activating active sensors) if they have the Automation Perk. The rating of the Automation Perk is the maximum number of Actions the unit may carry out in a turn. A single person cannot control more than one vehicle at a time, though a vehicle can have multiple controllers.

The Skills used for remotely controlling a vehicle are those of the pilot, though each roll suffers a -1 penalty. Radio-controlled vehicles are vulnerable to the effects of ECM (as per the rules found on page 50) and must test every turn when in the area of influence of a hostile ECM.

Wire-guided units ignore the effects of ECM but require a piloting roll each turn (Threshold of 4) to avoid tangling the guide wires. Reduce this Threshold by 1 if the missile remains in the firer's Forward arc, and increase it by 1 if the Firer is at Top Speed. The first time this roll fails imposes an additional -1 penalty on the any skills used with the unit, while the second (or any fumble) severs the cables and breaks the link between the unit and the pilot (unless there is a backup communications link). If the firer Loses Control the cable is severed automatically. Whenever an attack is made against the firer, roll 1d6. On a result of 6 the cable is severed. Unit's unable to communicate with their pilot must follow their Autopilot programming or else Lose Control.

### • MISSILES

Most missiles are piloted remotely and follow the above rules. Some are semi-autonomous and rely on their sensors and autopilots instead.

All missiles remain on the mapboard until they run out of fuel, detonate or crash. Their speed, maneuverability and endurance varies by type (listed in the Missile Type Table) but the following rules apply to all:

- Missiles have a single speed and must spend their full MP each turn.
- Missiles have only limited endurance. "Fuel" lists how many turns a missile is active. Once out of fuel, it is removed from the table.
- Non-AE missiles must ram their target to detonate the warhead
- Missiles with AE warheads detonate if, at any point, they come within 1 MU and altitude level of another unit<sup>11</sup>
- Seeker-head missiles automatically move toward the nearest aircraft in their FF arc.
- Unless noted, missiles cannot glide and will fall out of control when they run out of fuel.

## ROTARY WING AIRCRAFT

The new-fangled rotary wing aircraft entering service with the US army and several other militaries use a different technique to remain aloft than "traditional" aircraft. They use a moving, rotary wing surface to gain lift (hence their name). This provides them with a number of unique advantages — and some serious pitfalls. Rotary Wing aircraft fall into two distinct groups: helical aerodynes and gyrocopters.

### • HELICAL AERODYNES

These use a powered rotor-wing and are thus able to remain aloft with no forward motion. This allows them to hover in place — they cannot stall so long as their engine remains operational — and to take-off and land without needing a runway. This makes them ideal for moving small quantities of equipment or troops, and for acting as spotters. If stationary they can also turn in-situ to any

**Missile Type Table**

MISSILE TYPE	SIZE	SPEED	FUEL	MAN.	ACC	DM	SPEC
RPV Air-Air	1	12	2	-4	-1	x10	AE: 1, Autopilot, Wire-guided
Seeker-head Air-Air	1	15	2	-4	-1	x8	AE: 1, Autopilot
Anti-ship	2	10	3	-5	-1	x15	Autopilot, Wire-Guided, Armor Piercing
Bunker Buster	2	10	2	-5	-1	x17	Autopilot, Wire-Guided, Armor-Crushing
Ground-Air	2	20	1	-5	-2	x25	Autopilot, Wire-Guided, Armor-Crushing



facing, and irrespective of their speed or Maneuver Score they have a Turn Radius of 0.

They are very vulnerable to engine damage or control surface hits, however. Any maneuver, engine or control surface damage requires the pilot to make a Piloting Skill test or else go out-of-control. Helical aerodynes cannot glide, but a pilot may attempt to land a crippled one using autorotation: using the aircraft's falling speed to accelerate its rotors and thus gain lift to avoid a crash. This technique requires a Piloting Skill test (Threshold 5) to avoid a crash.

### • GYROCOPTERS

Gyrocopters operate on a slightly different principal to helicopters; their lift rotors are unpowered, with the engine instead providing horizontal movement that in turn moves the rotors and provides lift. Gyrocopters cannot hover (they must spend 1 MP to move or else stall) and require a short (2 MU) area to takeoff and land. They remain useful as spotters and retain the maneuver advantages of helicopters. Unfortunately, they also retain their siblings vulnerability to engine and control surface damage.

### TAKEOFF AND LANDING

Often overlooked by non-pilots, the most dangerous part of piloting an aircraft — other than combat — is taking off and landing. At these points the aircraft is caught between two worlds, traveling too fast to operate on the ground and too slowly to fly. The slightest miscalculation can result in tragedy.

The Ground speeds listed for each aircraft represent the speeds at which they can safely taxi along the ground, usually between their hangars or blast pits and the runways. On the runway itself,

much higher speeds are needed to get airborne, and each plane may accelerate to up to four times its Ground Top Speed in a straight line and on relatively smooth ground. Any attempt to turn when the aircraft is past its Ground Top Speed and before the aircraft lifts off requires a Piloting Skill test against a Threshold of 4 plus the difference between the Ground Top Speed and the current speed. Success means the aircraft makes the turn; any other result means the undercarriage collapses and the aircraft takes damage as if it crash-landed. Likewise, if the aircraft exceeds 4x its Ground Top Speed when on land, even if in a straight line, a similar Piloting Skill roll is required (Threshold of 6+ the difference between the 4xGround Top Speed and the current speed).

To take off, an aircraft needs a runway two MUs long for every point of Stall speed. For example, a Spitfire (Stall Speed of 5) requires a runway 10 MU long. To land, the aircraft requires one MU of runway per point of stall speed.

### TRANSPORTING

In addition to paratroopers, an aircraft equipped with a rear ramp or other special drop bay can drop a variety of cargo. The difference is, cargo is dropped with unsteerable parachutes that fall mostly straight down (unless there is a wind). Cargo is assumed to have a "Parachuting Skill" of 1 for de-

viation purposes. Maximum speed and height is the same as for troopers (see page 58), though a minimum height of Altitude Level 5 is required for the parachutes to open. After landing, units are operational in a number of rounds equal to twice their Size (half the Size for airdroppable walker units).

Using the wind rules will move the landing site of airdropped cargo. For every two levels of altitude dropped, move the landing site one MU for each level of Wind Force, in the windward direction. Thus, cargo dropped from Altitude Level 20 in wind with a force of one will land 10 MUs downwind from the drop point, plus any deviation that might take place.

### • AIRLIFTING

For most aircraft, airlifting requires landing, opening cargo doors and getting people, aircraft and other materiel in as fast as possible before taking off again (at least one round to land, one round to get in, at least one round to take off, etc.). Some VTOL aircrafts have the Airlift Capable Perk, which enables them to pick up personnel and equipment without ever having to land.

First, the aircraft must remain stationary over the MU where the person/items to be picked up are situated; every two Air War rounds the plane can pick up one infantry squad or a single unit (one every round if the unit has the Airlift Ready perk). Then the aircraft simply flies away.

### Take-Off Example

*A Spitfire accelerates down the runway just as a German plane plants a HE bomb in the center of its path. The pilot attempts to miss the newly created crater by turning slightly to the left. The Spitfire is at a Speed 4 when this happens — 1 point beyond its Top Ground Speed, but also 1 point short of being able to take off. The pilot must thus make a roll against a Threshold of 5 (4 + 1) or else crash the aircraft. He rolls a 6 and successfully continues down the runway. Had he rolled a 4, the undercarriage would have collapsed and the Spitfire taken crashlanding damage.*



### • SLUNG LOADS

VTOLs can also carry cargo suspended under their main body. Large pieces are attached to hardpoints via strong cables while smaller items are placed in large nets. A slung load is considered "towed" by the aircraft for game purposes. No matter what the cargo is, it is considered unsuitable for towing, effectively doubling its weight.

## STRUCTURES

While aircraft usually fly high above ground structures, such buildings and constructions are often the target for air attack — or to be defended against the same. Important sites may be defended by Barrage Balloons, AA batteries and perhaps even fighter aircraft. For the purpose of *Luft Krieg*, large vehicles such as boats and trains are considered "structures."

Each structure has a Damage Capacity, reflecting its ability to withstand damage. Structures come in two forms: Normal and hardened.

### NORMAL STRUCTURES

Normal structures accumulate damage when they are hit, each damage point inflicted by the weapon reducing the Damage Capacity by one. Such buildings are considered unarmored for the purposes of Burst Fire. When a normal structure takes more damage than its Damage Capacity, it is destroyed.

### • HARDENED STRUCTURES

Designed to withstand damage, hardened structures shrug off many attacks, only succumbing to high-powered assaults. Such structures have a base Damage Capacity like normal buildings but sustain damage in the same man-

ner as aircraft: Damage under the Damage Capacity is ignored, while damage between the DC and 2xDC causes light damage, damage between the 2xDC and 3xDC causes heavy damage and damage over 3xDC destroys the struc-

ture. Whenever damage occurs, roll one die (add 1 for Heavy Damage) and consult the Structure damage table. The result of this die roll is also subtracted from the Structure's DC.

### Structure Damage Table

ROLL	DAMAGED AREA	RESULT
1	Occupants	The occupants of the structure are stunned (-1 Action). If there are no occupants, there is no effect.
2	Occupants	10% casualties. If there are no occupants, there is no effect.
3	Structure	Structure loses an additional 1d6 DC
4	Weapons	One weapon (determined randomly) mounted in the structure is destroyed. If no weapons are present, the structure loses an additional 2d6 DC.
5	Auxiliary Systems	Any sensors/communications gear mounted in the structure is destroyed. If no auxiliary equipment is present, the structure loses an additional 2d6 DC.
6	Roll Twice on this table*	-
7	Roll three times on this table*	-

### Sample Structures Table

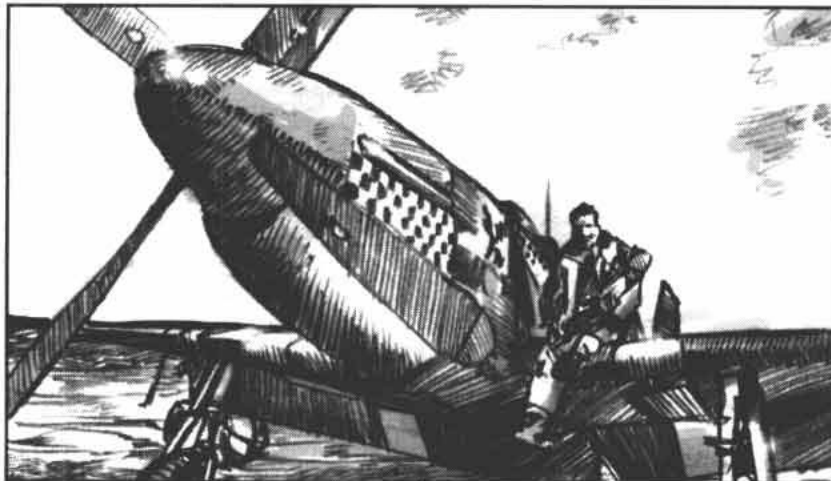
STRUCTURE	TYPE	DC	NOTES
Sandbag bunker	Normal	5	-
Concrete bunker	Hardened	10	-
Gun Emplacement	Normal	10	-
Pill Box	Hardened	15	-
House (Wooden)	Normal	8	-
House (Brick)	Normal	12	-
House (Stone)	Normal	15	-
Warehouse, small	Normal	25	-
Warehouse, large	Normal	50	-
Bridge, wooden (per span)	Normal	60	*
Bridge, stone (per span)	Normal	75	*
Bridge, metal (per span)	Hardened	30	*
Dam	Hardened	50	Large Target
Fishing boat	Normal	25	-
Small warship	Hardened	25	Large Target
Large warship	Hardened	30	Large Target
Sub pen	Hardened	45	Large Target
Road	Normal	5	Destruction removes Road benefits
Railway	Normal	7	-
Train (per carriage)	Normal	25	-

\*Any units on a destroyed bridge span are destroyed. If this span collapses, adjacent spans lose 1/2 their DC automatically.

## ADVANCED CREW RULES

Beyond the superscience and the aircraft themselves, the true heart of the conflict are the brave aircrew that risk life and limbs on a daily basis. Players may wish to incorporate a wider range of options into their games, or to add more detail and individuality to the crews of their fleet. The following advanced rules provide mechanisms for doing so, covering a number of special situations related to the human element of warfare.

All participants must agree on the advanced rules to be used; if no consensus is possible on a particular rule, do not use it. Though every effort has been made to cover all situations that may occur, there will be some not covered. If no agreement can be reached between the Players as to how to handle a situation, refer to *The Hand of Fate* (page 22).



### ACE PILOTS

Ace pilots, akin to Heroes in the ground wargame, can be very powerful and including them in a scenario can unbalance. A scenario might have rules governing the inclusion of Aces; if not, assume there should be a limit.

Limiting Aces can be accomplished by Threat Value, ratios between regular units and Aces, or just a cap on the total number of Aces (the latter depends on the scenario). One of these methods should always be used; choose the one that yields the lowest number of Aces possible (note that you can always field at least one Ace).

Aces cannot make up more than 10% of a Player's starting Threat Value, and armies cannot field more than one Aces unit for every nine "standard" units. This will keep Aces rare and exceptional, not 'a dime a dozen.

### • HEROIC ABILITIES

Aces can always use Tactical Command Points, even without a radio. They can also have several abilities that allow them to perform incredible feats.

**Crack Shot (2 points):** The Ace, with his steady aim, excellent eyesight and calm hand, can make incredible shots. If the

Ace operates a vehicle weapon, his attack rolls are modified by +1.

**Flying on Vapor (1 point):** The Ace's aircraft never seems to run out of fuel. Extend the plane's range by 1d6 x 20km.

**Inspirational (2 point):** All units able to communicate with the Ace receive a +1 to Morale Checks. If the Ace is a Commander, he receives an additional Command Point each combat turn.

**Last Man Standing (1 point):** In an aircraft crew, the Ace will always be the last to receive damage. Skip the Ace and apply damage to the next crewmember until the Ace is the last person left alive aboard.

**Luck of the Irish (3 points):** All rolls the Ace makes and fails may be rerolled once. Pushing one's luck and rolling a third time can be done, but it cancels this ability for the rest of the scenario.

**Sixth Sense (1 point):** The Ace always knows where the enemy is located. This means the Ace (and his aircraft) always gets a +1 to the Defense roll.

**Two Fisted (2 points):** The Ace is lightning fast and efficient. His aircraft gains an additional Action.

**Untiring/Fanatical (3 points):** Although described differently, the results are the same. An Untiring Ace is one that never tires; even with no food or sleep, he will fight on. A Fanatical Ace believes in the right of his fight or the wrong of his opponents so strongly that it drives the Ace to fight on, no matter the odds. A Ace with either of these abilities automatically win Morale tests.

**Von Richtoffen's Primer (2 points):** The Ace commander is either a natural tactician or has studied and learned from the best. In any case, he always gets a +1 to all Tactics rolls.





### Ace Example

*Example: Second Lieutenant Kurt Waldorff is a Veteran of the Battle of Britain and the defense of the Reich. He has taken everything the RAF have thrown at him and survived. He has an uncanny knack for knowing what the enemy will do next and countering their moves, simultaneously carrying out a superhuman series of actions and motivating his troops on and off the battlefield. Waldorff works hard and plays hard.*

Veteran Quality	2.25
Ace	1
Morale Multiplier (-1)	1.5
Inspirational	1
Sixth Sense	1
Two-fisted	2
Total	8.75

### • CREATING ACES

Select the Quality level of the Ace (see *Datacard*, page 78). Next, look at the Heroic Abilities on the previous page and write down those that go with the Ace's concept. Players may change the default Morale Threshold from the Quality of the unit to a different one. The Morale Threshold may be raised by one level or lowered by three (to a minimum Threshold of one). The chart covers the multipliers to use for raising or lowering the Morale Threshold.

### • FIGURING THE COST

The base cost of an Ace is the Quality level multiplier (see chart on page 25) plus one. Take that value and, if modifying the Morale Threshold, add the multiplier from the *Morale Threshold* table. Add to this the cost for the abilities the Ace has. The result becomes the new Quality modifier for the Ace.

If the Ace is part of an aircraft crew, average the Quality multiplier between the Ace and the other crewmembers.

### BAILING OUT

An aircraft will often take such a beating that it will no longer be airworthy. In such circumstances, the pilot or crew have little choice but to leap from the aircraft and trust that their parachutes will slow their descent. Ordinarily, bailing out costs an Action. If the aircraft is destroyed (e.g. via an Overkill result or a structural collapse), the crew are allowed one final attempt at saving themselves at no Action cost.

The difficulty of this bailout maneuver varies considerably depending on the circumstances and damage inflicted on the aircraft. The pilot/crew should make a Piloting skill roll and compare it to the Threshold (a base of 4, modified as in-

dicated in the Bailout Table). If successful, all the crew bailout and drift to earth. Each point by which the roll fails indicates that a crewmember fails to escape or is injured in the process. A fumble result indicates that the entire crew goes down with the aircraft.

Of course, if the crew bailout over the sea they are dependent on the Search and Rescue boats finding them in time. If they bail over enemy territory their Escape and Evasion (E&E) skills had better be up-to-date ...

### Bailout Table

SITUATION	MODIFIER
Aircraft straight and level	-1
Banking/Climbing	+1
Diving	+2
Out of Control†	+3
AIRCRAFT	MODIFIER
Equipped with Ejector seat(s)	-2
Difficult to Bail flaw	+2
Speed ≤ 10	0
Speed > 10	+1
Aircraft sustained No Damage	0
Aircraft sustained Light Damage	+1
Aircraft sustained Heavy Damage	+2
Aircraft Overkilled or struct. collapse*	+4
CREW	MODIFIER
Actions taken this turn	# of Action
Crew	+(Crew/2, round down)

*\*These damage results trigger an automatic bailout attempt at no Action cost.*

*†Rolled on the Control Loss table this turn.*



## MORALE

Morale is an important part of warfare. No commander can be truly sure of what his troops will do once under fire. Only totally fanatical or automated forces are immune to the effects of morale, and even the best pilot will hesitate to fly his aircraft into a maze of AA batteries.

The Morale rules deal more with command control rather than with rout. The rules are structured in a way that will allow Players to make their own choices when it comes to falling back and regrouping. Instead of affecting the crew's will to stay and fight, poor morale affects die rolls, thus forcing the commander to make some difficult choices. Will he push his troops, knowing that their efficiency is degraded, or will he allow them to fall back to regroup?

### • MORALE THRESHOLDS

Each aircraft, be it a single-seat fighter or bomber with numerous crew, has a Morale Threshold based on its Quality. In *Luft Krieg*, each plane has its own Morale Threshold, unlike in the ground warfare rules.

#### Morale Thresholds

TYPE	THRESHOLD	TV MULT.
Legendary	0	x2
Elite	1	x1.75
Veteran	2	x1.5
Qualified	3	x1
Rookie	4	x0.25

#### Morale Checks

EVENT	MODIFIER
Before the set-up phase	0
Single aircraft is destroyed	0
Aircraft breaks formation	+1
Per add. aircraft dest. in the turn	+1

### • FANATICAL UNITS

Some people believe so fervently in the cause they are fighting for that they are ready to die for it. They will lay down their lives without flinching if the situation demands it, and the thought that they may well die in the battle simply does not affect them. Such fanatical units are immune to the effects of Morale. If the Morale rules are used, such a unit doubles its Threat Value.

### • MORALE CHECKS

Before the game, each Player rolls against each unit's Morale Threshold to determine the initial Morale level of that aircraft. The number of dice is based on the experience level of the crew in each aircraft, just like a Skill. If roleplaying characters are used, this Skill roll is replaced by an attribute test against the Willpower attribute. If the roll fails, the threshold of all Morale Checks in the scenario are increased by 1. If the roll fumbles, the Threshold increases by 2.

The table below lists the events when a Morale check is required. Morale checks are rolled using the Leadership or Piloting Skill of the aircraft (whichever is higher). If the check fails, the unit suffers a -1 penalty to all die rolls, including future Morale checks. A fumble indicates a -2 penalty. A spare die is suggested to keep track of the die penalty caused by poor morale. As the aircraft gradually loses its will to fight, its combat performance is affected and starts to rapidly degrade. A commander may attempt to remove penalties caused by poor morale by rallying the unit. See *Rallying* for the rule.

Morale checks are made only in some specific situations, as listed in the Morale Checks table below. An aircraft is

counted as destroyed if it suffers an Overkill result, crashes into the ground or suffers an ammunition or fuel explosion. Non-combat eliminations (such as Overspeed disintegrations) do not count.

### • RALLYING

The penalties caused by failed Morale tests will soon prove crippling, but they can be removed by performing an Action called Rally. This is done by the unit commander, who must spend an Action to roll a new Morale check for a unit, this time using his Leadership skill. Only one Rally is attempted per Action, although multiple attempts are possible if sufficient Actions are available. If successful, the Morale level of the unit rises by one (i.e., a single -1 modifier is removed). A functioning Communication system is required to participate in the Rallying Action.

### • BREAKING FORMATION

If morale penalties reach -4, the aircraft will seek to flee the engagement, doing everything possible to reach nearest friendly map edge and leave the mapboard. Such units do not flee blindly but may take whatever actions are deemed vital to their survival, including combat and maneuvering to avoid combat.

If the penalties reach -6 the unit flees and must travel by the shortest route to the nearest friendly edge of the mapboard. Such units will attack any aircraft that obstruct their path but otherwise may not maneuver or take action, unless by doing so they would reduce the time and distance to escape the battlefield.



## • MISSION PRIORITIES

Not all missions have the same importance in the eyes of the soldiers. A simple reconnaissance flight will mean much less to the pilot than the defense of his homeland, and this will most certainly affect their morale and performance level. If the battle is being fought for something precious to soldier, he will place less importance on his own survival.

Missions can be classified as High, Medium or Low priority. High Priority missions are those that must simply not fail because the emotional cost attached to failure is too high. The defense of a home city is a good example of one such mission. Although this does not necessarily mean that the troops will fight to the death, they will stand their ground much longer. All Morale tests are made with a +2 modifier on the dice roll.

Medium Priority missions are the everyday military Actions. They are important, but not overly so. Most engagements will fall in this category: the troops know they must do their best, but if they fail only the battle is lost, not the war. There is no modifier attached to missions of this type. Low Priority missions are those that have little or no consequence to the direct survival of the force. Low Priority missions cause a -2 penalty on all Morale tests because the troopers are unwilling to lay down their lives for unimportant objectives and will actively seek to escape or avoid hostile forces.

### Morale Modification Table

MODIFICATION	MULTIPLIER
Raise by 1	x.5
Lower by 1	x1.5
Lower by 2	x1.75
Lower by 3	x2

## • FATIGUE

The fatigue level of the soldiers has a great influence on their combat performance. For record-keeping simplicity, units can be classified as either Fresh, Tired or Exhausted.

Fresh troops have just arrived at the airfield. They are in good shape, had a good night's sleep and are ready to face whatever the enemy will throw at them. All Morale checks are rolled with a +2 modifier. Tired troops have flown constant sorties for weeks, or have seen combat or other tense situations in the past few days. This is considered the default fatigue level and has no effect on Morale checks. Exhausted troops have been in Action for quite some time or have faced battles several times during the past few days. They are near the limits of their endurance and make very poor fighters. Exhausted troops have a -2 modifier on all Morale checks.

## PARATROOPS

Airdropping is another common military and civilian use for aircraft. Large aircraft can drop paratroopers, Gears, aircrafts, food, propaganda, etc., practically anywhere you can see the sky.

## • PARATROOPERS

Paratrooper squads are special infantry units trained in the Parachuting skill. They may deploy from any height between Altitude Levels 2 to 20, from aircraft with Speeds no greater than 20. The number of paratroopers that can jump from a plane in a given turn is equal to the aircraft's Size.

A paratrooper unit can choose to land anywhere within an area whose MU radius is equal to the aircraft's altitude level. A Morale test (Parachuting skill roll if using the RPG) versus a Threshold

equal to one-half of the altitude level (round up; maximum 9) is required to land at a precise point; otherwise, the Margin of Failure indicates how far the trooper(s) landed from their intended target, in MUs (direction is always downwind). Work out any collision with an obstacle present in the MU immediately.

The time required for the drop is equal to the sum of the altitude levels dropped and the number of MUs between the drop point and the landing area, divided by two, in rounds. It takes one round for a landed paratrooper to get ready for battle, and usually one more to rendezvous with the rest of his squad. (in Gear Krieg, consider the unit Pinned during the turn in which they rally).

If you are using wind rules, there are a few restrictions on parachuting. Parachuting is not possible with a Wind Force greater than 2; even then, a Wind Force of 2 will doom the paratrooper to death if he fumbles his Parachuting skill roll. A Wind Force of 1 or 2 will modify a paratrooper's possible landing area as follows: a Wind Force of 1 will halve the landing radius upwind and double it downwind. Landing at an angle to the wind, either fore or aft, will reduce the landing radius by 1/3 or leave it unchanged, respectively. With a Wind Force of 2, the radius upwind is reduced to zero, downwind it is tripled. The fore radius is reduced by 2/3, while the aft radius is halved. Parachutes weigh 15 kg and cost 1 TV.

## • PARAGLIDERS

Some soldiers utilize paragliders to descend onto the battlefield. These offer greater precision and control than regular parachutes but also require more skill. Paragliders use the same rules as parachuting save that the Threshold is increased by one. Paragliders ignore the



effects of Wind Force 1, and treat Wind Force 2 as force 1. If the event of a failure, they scatter only half the indicated distance (round down). Paragliders weigh 54kg and cost 3 TV.

### • ROCKET PACKS AND PERSONAL HELICOPTERS

German *Rocketruppen* and US troops equipped with Sikorsky personal helicopters have unparalleled mobility on the battlefield and in deploying from aircraft. They can deploy from transport aircraft automatically and may attempt to land anywhere on the mapboard. Unlike those using parachutes and paragliders, such troops are not obliged to drop two altitude levels per turn but may instead remain at the same altitude or even climb.

Normally, flight-capable troops remain near the ground and use jump shorts during a firefight. This is why, in the *Gear Krieg* ground wargame, considerations of fuel and piloting are ignored in favor of speed of gameplay. This does not mean these units are incapable of taking part in aerial battles — far from it.

These devices allow the troops to maneuver like aircraft. Rocket packs have a Flight Speed of 3/6, while personal helicopters have a Flight Speed of 2/4. Both have a Stall Speed of 0. Both cannot climb beyond Altitude Level 8. The main restriction on their actions is fuel; each has 50 points of fuel and expend 1 per MP spent at Combat speed, and 2 per MP spent at Top Speed. Rocket pack-equipped troops may spend 2 points to hover, while personal helicopters require only 1. If the unit runs out of fuel while in the air, it is eliminated. They are considered Small Targets in combat and have an Armor value of 2. Rocket packs and personal helicopters multiply a unit's TV by 3.

## HEX-MAP CONVERSION

Players may choose to use hex-covered maps instead of a freeform tabletop playing area. The hexagonal divisions make it easier to manage movement and to visualize firing arcs, albeit at the expense of some flexibility. Each hex corresponds to 1 MU; for game purposes is assumed to contain the same type of "terrain" (open sky, light clouds, etc) as indicated by the position of the dot in its center. Altitude continues to be represented by chits or a marker die.

The speed and erratic movement of aircraft limits the number of aircraft that can occupy a particular volume of space. Each hex can hold up to 20 Size points worth of units at the same altitude level. If this limit is exceeded at any point, the last unit entering the hex makes a Piloting Skill test (Threshold 4), adding the number of Size points over the limit. If the roll fails, the aircraft rams one of the planes, determined randomly. The surviving aircraft remain in the hex.

### MOVEMENT

All units must face one of the six side of the hexagon; they cannot face a corner. They may not turn to face a different hex-side unless allowed to do so by movement or a maneuver. By spending 1 MP, a unit may move into the hex in front of it. After moving forward a number of hexes equal to the aircraft's Turn Radius, it may turn 1 hex-side left or right. A pilot who sideslip moves his aircraft one hex to the left or right for every three hexes forward. The MP cost for changing altitude is as in the normal rules.

### COMBAT

Combat on a hex map is the same as on the tabletop, though the firing arcs, range and Line of Sight rules are modified slightly.

**Line of Sight:** determine the line of sight by tracing a line from the dot at the center of the attacker's hex to the dot at the center of the target's hex. Any hex entered by the line is considered to lie between the two units. If the LOS runs along the edge between two hexes, the defender may choose which of the two it enters. Any Obscurement along this line counts against LOS if both units are at the same Altitude Level.

If not, divide the range to the target by the difference in altitude between the two units (round down). Any Obscurement at the same altitude level of the firer counts if it is within this number of hexes.

**Attack and Defense Arcs:** these are not modified, though they follow the edges of the hexes on the map.

**Range:** this is measured from the attacker hex to that of the target by the shortest route, excluding that of the attacker but including that of the target. If combat occurs between units in the same hex, the range is considered to be Point Blank (0).

### Hex-map Obscurement Example

*For example, a Hurricane fires at a BF 109 8 hexes away and three altitude levels higher. Dividing 8 by 3 gives a result of 2.6, rounded down to 2. Any obscurement at the Hurricane's Altitude level and within 2 hexes counts against LOS.*





## WHITE ROSE, RED STAR

Lidiya hissed as the straps tightened across her chest. Yes, the Berezniak-Isnaev 1 was faster than her old Yakolev but it was uncomfortable. The cockpit was small — snug for her so she hated to think what her male colleagues thought of it — and had a safety harness that was more suited to an NKVD interrogation chamber than the cockpit of a VVS fighter. She wriggled to settle the straps, letting out a low growl as she did so. The technician looked down, worried. "Everything okay, comrade Litvyak?"

A wry smile crossing her lips and she nodded. "Fine, Inna. Just the usual pre-flight gripes." She'd had a tough time when she first joined the VVS — the egalitarian ideal of the Soviet Union didn't readily equate to equality of the sexes — but she'd proved her worth a number of times over. Her dozen kills and title of "Hero of the Soviet Union" confirmed that, combining with her looks to make her an ideal tool for the Propaganda Division. Sometimes she hated the attention, but if it gave others hope ...

She sighed and patted the postcard attached to her instrument panel — yellow roses — complementing the white lily painted on the fuselage of the BI-1 that gave her the nickname "Lilya." Inna passed Litvyak her flying helmet then, once the headwear was firmly in place, closed the canopy and latched it in place. Lidiya gave the technician a thumbs up, who in turn waved to the tractor driver. It lurched off down the runway, the fighter towed in its wake. In what seemed like seconds they were in place at the end of the runway and there was a clanking sound as the tractor unhitched. Inna tapped on the canopy, saluted then slid off the wing. Lidiya watched the technician withdraw then, sure Inna was at a safe distance, lifted a cover on the instrument panel and thumbed the button underneath.

The acceleration was sudden and vicious, kicking her back into the seat as the rocket engine ignited and drove the fighter down the runway. The slight crosswind caused the speeding aircraft to wobble and she struggled to hold the aircraft straight on the runway, knowing that a mistake now would be fatal. The fighter bounced once then climbed into the air. She pulled the nose up to 45-degrees and hit the toggle to retract the gear. High above, sunlight glinted off metal and she aimed the nose straight at it.

She crossed the intervening distance in a few moments, flashing past a flight of Ju-88s as she continued to climb. A pair of Gustavs peeled off to chase her but even the new variant of the 109 didn't have the legs to catch her and fell back. She ascended through 6,000 meters then pulled over in a loop and aimed back at the fascist formation. The Berezniak-Isnaev shuddered as it accelerated into the dive. Aiming wasn't going to be easy. "But then if it was easy they would've got someone else to fly this beast," she thought as she triggered the twin 20mm cannon.

In an instant she was through the bomber formation, pulling hard on the stick to slow the descent. She risked a glance backward and saw a smoking bomber peeling out of the formation. "One more for the Rodina!" she cried, pulling up into another power climb and hoping her fuel would hold out.

# ARMY LISTS

The following are simplified organizational charts for wargaming with *Luft Krieg* at the flight and squadron level. These are the principal operational units of the conflict and form the building blocks of larger formations (though such units are likely too big to play a major role in *Gear Krieg* games). More complete and detailed TO&Es (Tables of Organization & Equipment) for each army will be covered in later Army and Theater Books.

Of course, World War II was fought in wide variety of conditions and circumstances. As such these lists are at best an approximation of actual deployments; an RAF unit in North Africa would likely use different material to one in Europe, in turn distinct from deployments in India. The following Army Lists include some generalized color guidelines. The subject of camouflage is a book in its own right, so all of the possible schemes cannot be listed here (there are many such books available through libraries and book dealers). Future *Gear Krieg* books will cover the subjects of paint schemes and vehicle markings and uniforms in more detail.



## PRESENTATION

Each country's text begins with a general introduction that briefly sketches out its air forces. The introduction also lists reasons why Players would want to game with and collect miniatures for that particular air force.

This is followed by a Tactics and Morale section which is an examination of the tactical doctrine used by that country's air force — basically, how they fight. This ties in with the combat groups descriptions placed on the right-hand page of

each nation's entry. The units' default Morale rating is given here, though Players may increase the Morale rating of their units by paying the appropriate cost multiplier (see page 58).

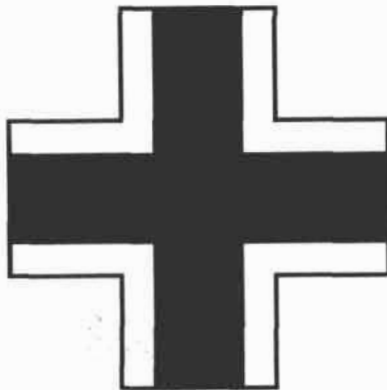
A discussion of the color schemes and a brief description of uniforms used by the air force is listed next. Because the subject is quite broad, this section is somewhat generic; any history book will supply thousands of alternate and squadron paint schemes for all countries involved in the conflict.

## Design Notes

*The average units presented here were the building blocks from which armies participating in the conflict were constructed. While it might be enjoyable to fight a battle with an entire force consisting of Me 262s with Elite crews, it won't be a credible force and more than likely no fun at all for either Player. Instead, players are encouraged to follow the "historical" guidelines and create balanced forces.*

*The air forces used far more designs, models and variants than can be listed here. The Data Annex contains some of these units, including their in-service dates, while future sourcebooks will add further units and detail more specific organizations. The lists presented in the following pages are intended as a guideline to enable Players to recreate actions from the period up to the end of 1942. Due to space considerations, only armies of the major combatants could be listed; other factions (France, Italy, etc) will be published at a later date.*

*Threat Values (TV) have been assigned to aircraft and it will be a relatively easy matter for Players to design their own battle scenarios by simply agreeing on a TV total for each side and purchasing units to add up to those points. Given the differences in arms and equipment available to each army, not to mention personal preferences and tactical styles, an interesting game is sure to result!*



## GERMANY

The Luftwaffe is the newest air force in Europe, having been secretly formed in the middle of the 1930s. Germany had been previously barred from creating such a force by the Treaty of Versailles that concluded the First World War. Because of this, however, it is also one of the most modern of all current armed forces, both in terms of training and equipment. Its pilots learned well from the Spanish Civil War, gaining knowledge of both independent operations and those in conjunction with their ground-based comrades. The speed, reach and firepower of the Luftwaffe has made it a vital part of the German Blitzkrieg strategy.

The Luftwaffe is, with the possible exception of the RAF, the most technologically advanced air force in the war. Their equipment is top notch and they have the expertise to use it effectively. Players may seek to use this to their advantage but will find themselves outnumbered (by the Russians, for example) or facing a foe with comparable equipment and motivation, such as the British. As the years progress, these disadvantages will multiply to make the German position difficult, despite ever more technological innovations.

## • TACTICS AND MANEUVERS

The Luftwaffe "wrote the handbook" on aerial warfare in the Modern Age, particularly regarding tactical ground support missions. Whereas in the Great War aircraft fought aircraft, with little impact on the ground conflict (at least compared to artillery and machine guns), a ground assault by the Wehrmacht without air support is unthinkable today.

The Luftwaffe can attack the enemy positions in advance of a ground assault, wreaking considerable damage and reducing enemy morale. More importantly, such strikes can target the defender's supplies and communication links, making it difficult to support units targeted by the German land offensive. By such concentrated application of force and "restricting" tactics, the German armed forces were able to puncture enemy defensive lines relatively easily in the first few months of the war, pouring into weakly defended rear areas and making the enemy position untenable.

German pilots are well trained and superbly motivated, staunch believers in the German cause (thanks to Nazi propaganda) and desiring to both recover their nation's dishonor after Versailles, and vindicate the Führer's policies. In many regards, the Luftwaffe pilots regard themselves as knights, jousting in the skies against valiant (at least on the Western Front) opponents. To many the Ostfront is nothing more than a practice ground, though they will soon come to rue that arrogance.

German pilots and air crews have a default Morale Threshold of 2 (Veteran) in fighters and 3 (Qualified) in bombers. Some elite flight units may have pilots and crews one point higher (e.g. Elite/Veteran).

## • COLOR SCHEME

The paint schemes used by the Luftwaffe are as varied as their aircraft designs and the theatres in which they operate. Furthermore, they evolve throughout the war, adapting to meet the needs of the Luftwaffe. Identifying every specific pattern would require a book in its own right (such volumes are available in most good military book stores) but there are four broad categories of patterning.

In Europe, dark green is the predominant color on the upper sections of the aircraft, either a solid mid-green tone or more often broken with a lighter shade of green or even an earth-brown. These colors are usually in large blocks but some camouflage schemes use intricate swirls or blocks of blended color.

Arctic/winter patterning also uses green as its base but breaks it with bands of white. Indeed, in the depths of winter white may become the predominant color, with green or black inclusions. As with the temperate schemes, the exact patterns vary wildly though winter camouflage favors a more intricate pattern.

Desert camouflage — as used by aircraft assigned to the Afrika and Orient Korps — uses browns as its principal color. Sandy brown is the most common and may be used as a single color, broken with lighter or darker shades, or in a "leopardskin" pattern.

Aircraft intended for high-altitude operations favor a flat gray paint scheme to better blend in with the sky. Similarly, many camouflage patterns paint the underside of the aircraft a pale blue to blend in with the sky when viewed from below.

# GERMAN FLIGHT UNITS

## Basic Flight Units

### Rotte



### Rotte

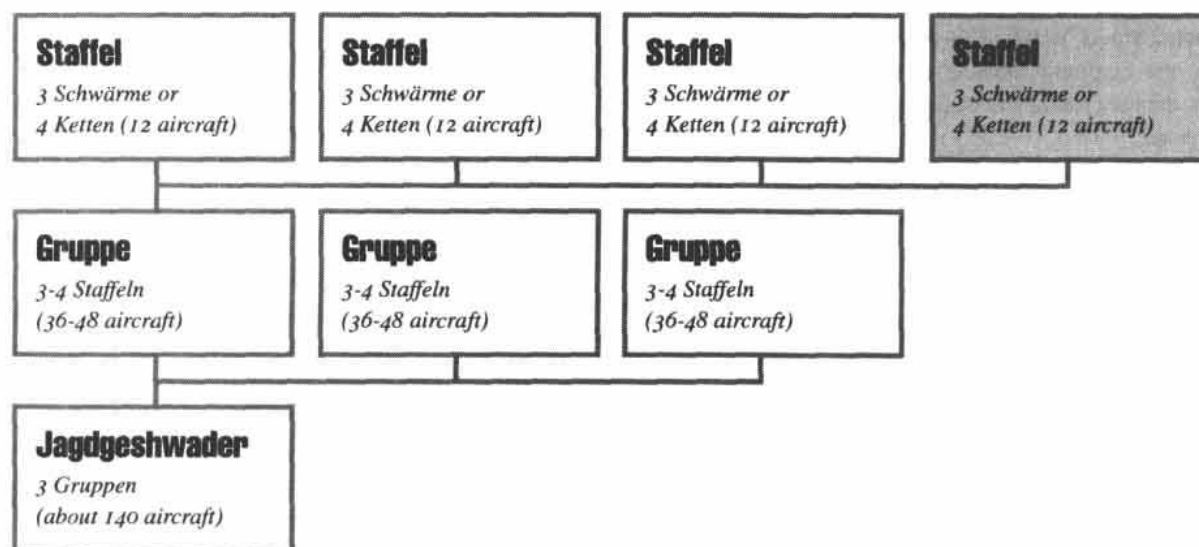


### Kette



### Schwärme

## Flight Groups Organization



## Typical Combat Groups

Fighter Schwärme (A)	4 x Bf 109
Fighter Schwärme (B)	4 x FW 190
Rocket Fighter Schwärme	4 x Me 163 or Ba 349 Natter
Heavy Fighter Schwärme (A)	4 x Ho 229
Heavy Fighter Schwärme (B)	4 x Me 262
Dive-Bomber Schwärme	4 x Ju 187 "Stuka 2"
Light Bomber Schwärme	4 x Arado Ar 340





## BRITISH COMMONWEALTH

The newest of the three British Armed forces, the Royal Air Force (RAF) was formed in 1918, right after the Great War. Though initially participating in many aerial experiments and firsts, the RAF dwindled throughout the 1930s and only when the European situation looked bleak did they rearm and update their equipment.

In the early days of the war, British pilots struggled to learn the art of aerial combat in the face of their more experienced German adversaries, but following the withdrawal from Dunkirk found themselves as the frontline of defense against the German advance. The hardships of the Battle of France and the Battle of Britain that followed forged the RAF into a strong fighting machine, capable of holding off — and later taking the war back to — the Luftwaffe.

Though ostensibly British, the RAF incorporates pilots from throughout the Commonwealth — Australia, New Zealand and Canada — as well as from occupied allied countries such as Poland, France and Holland. The RAF also gives American volunteers an opportunity to fight in Europe prior to the USA's direct involvement, the three Eagle Squadrons fighting alongside

their Commonwealth and Allied comrades until 1942 when they are absorbed into the USAAF.

In the early war, the RAF are the only serious opposition to the Luftwaffe. Though starved of resources, the British pilots and aircrews are skilled and determined, knowing that they are the last bastion against fascism in Western Europe. Players choosing to play the British will find themselves outnumbered in most battles but have solid aircraft and superlative crews. Throughout the war they jockey with the Luftwaffe for technical and numerical superiority, a balance of power only upset by the arrival of their American allies in 1942.

### • TACTICS AND MANEUVERS

RAF tactics evolve considerably during the war. In the early stages of the conflict, they are on the defensive, forced to guard against German bomber raids and fighter sweeps. After their victory in the Battle of Britain the RAF's mission diversifies into three strands: defending British targets against the Luftwaffe, attacking German targets, and degrading the Luftwaffe's abilities. The former is aided by technology, radar allowing fighters to be vectored swiftly and efficiently against specific targets at day and night. Attacks against German targets take the form of massed bomber raids, occasionally escorted by fighters, against military and civilian targets in the Greater Reich. Indeed, such "terror tactics" were first used by the British in response to German attacks but have been taken up by both sides.

Efforts to reduce the effectiveness of the Luftwaffe take two broad forms. The first is fighter sweeps across occupied territories (usually France) engaging targets of opportunity. Called "Rhubarbs" (those sweeps involving a pair of air-

craft) or "Rodeos" (involving 1-3 squadrons), these simple sweeps are of mixed effectiveness, the Luftwaffe often ignoring them as of minimal importance. More significantly are the attacks known as "Circus." These involve several dozen squadrons and are built around a flight of bombers. Though small compared to the attacks on Germany itself, this bomber contingent is sufficient to goad the Luftwaffe into action or risk serious damage. Such engagements may involve hundreds of aircraft on each side, as fighter groups take on Jagdgeschwader.

RAF pilots and crews have a default Morale Threshold of 2 (Veteran) and consider most missions High Priority.

### • COLOR SCHEME

The RAF use five broad categories of camouflage, reflecting the theatres in which they operate. Most are subject to regional and unit adaptations, reflecting localized conditions, unit characteristics and evolution over time.

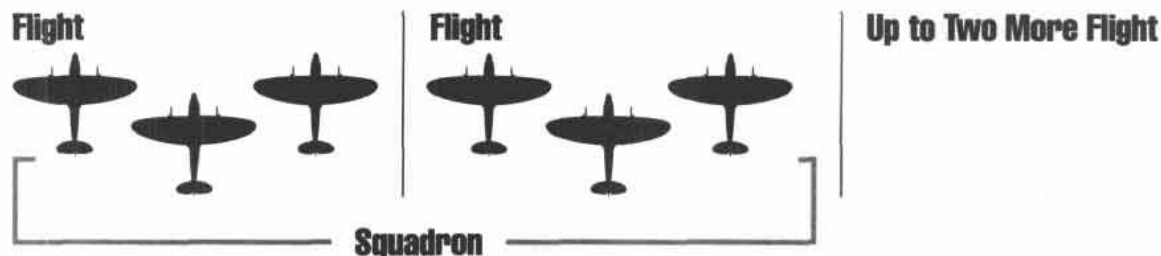
The most common is the European patterning, either of two-tone green or drab green and brown, though the specific tones and balance of the colors varies wildly. The Pacific and North African markings of the RAF are similar in concept to those used in Europe, but mix gray and green or sandy colors respectively. In all three cases, the undersides of the aircraft are painted a pale tone to blend in with the sky, usually gray in Europe and pale blue in the Pacific.

Naval aircraft use a light gray color scheme, usually without the complex patterning of land-based aircraft.

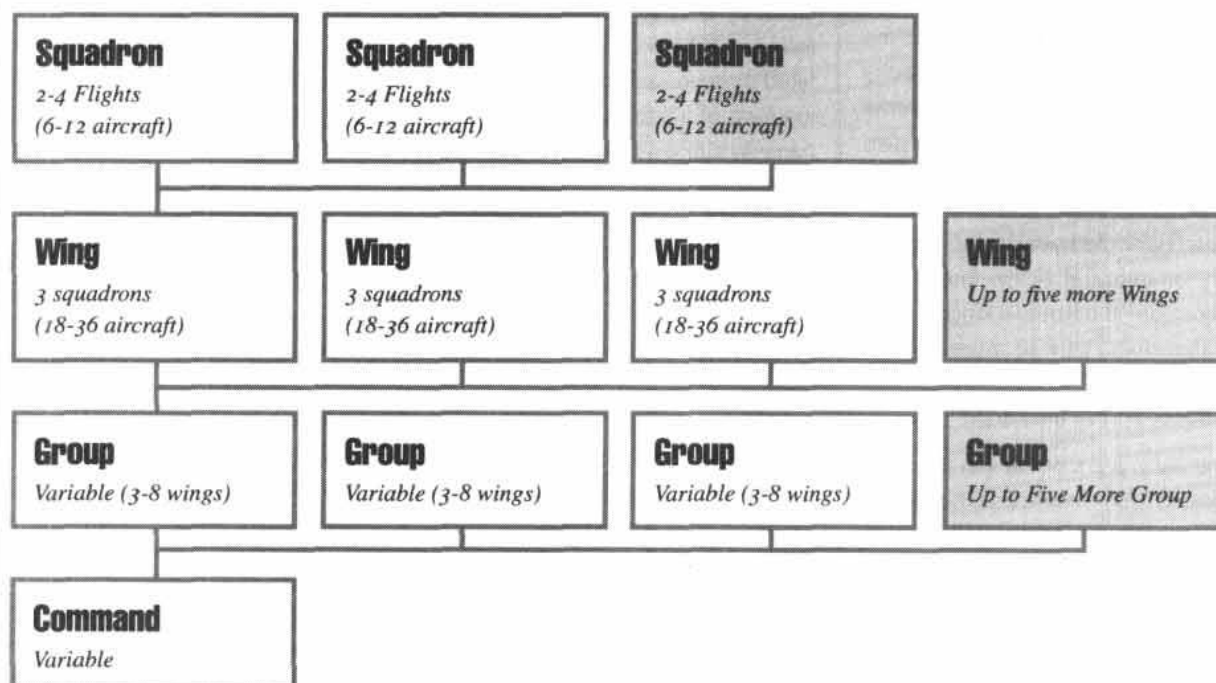
Finally, many night-fighters (notably Defiants and Beaufighters) utilize a matt black paint scheme to reduce the chances of visual detection.

# BRITISH FLIGHT UNITS

## Basic Flight Units



## Flight Groups Organization



## Typical Combat Groups

Fighter Flight (A)	3 x Hurricane
Fighter Flight (B)	3 x Spitfire
Heavy Fighter Flight (A)	3 x Beaufighter or Manx
Heavy Fighter Flight (B)	3 x Pioneer or Meteor
Dive Bomber Flight	3 x Tempest
Light Bomber Flight	3 x Mosquito or Blenheim
Heavy Bomber Flight	3 x Lancaster



## EMPIRE OF JAPAN

Japan wholeheartedly absorbed Western innovations into all arms of their military becoming one of the most advanced militaries in the world in the space of a few short decades. Its army and navy are among the most powerful in the world, but each refuses to give up its air assets. As a result, no independent air-arm exists, all aircraft instead belonging either to the Imperial Navy or Imperial Army. These two services are at perpetual loggerheads but this does little to impede their effectiveness in the Japanese expansion across the Pacific.

In the early years of the war the navy appeared to be winning the prestige war between the two services, with stunning victories at Pearl Harbor and against the British in Singapore and Malaya. Unfortunately, the "draw" in the Battle of the Coral Sea and the Imperial Navy's stunning defeat at the Battle of Midway effectively crippled the fleet air arm.

At the start of the war, the Japanese are the preeminent aerial power in the Pacific Theatre. Their mix of technology, skill and determination makes them ferocious opponents who wreak havoc on their enemies with cunning and audacity. They often have the advantage of numbers and skilled leadership though

individually their pilots are outclassed by the Americans and British. Later in the war, the Japanese are outflown and outgunned by the Americans, though they retain superiority over their Chinese and Russian adversaries.

### • TACTICS AND MANEUVERS

Like the Luftwaffe and the Spanish Civil War, the Japanese air forces gained experience in a host of minor conflicts in the 1920s and 1930s. Russia and China were the principal targets of such actions and when full-scale war with China erupted in 1937 both air arms played a major role. Though trained and aided by US pilots, the Chinese were little match for the Japanese and suffered major losses to air power, both in the form of troops and manufacturing capacity. China's size, however, worked against the Japanese, placing many targets out of practical reach of invaders. Furthermore, within the Japanese military, the navy had the better equipment and when their attention was turned to the Pacific, the army's older equipment struggled to take up the strain. Nonetheless, they persevered and made considerable progress against the Soviet Union with the opening of the Manchukuo Front.

Though both Britain and America utilize aircraft carriers, it was the Imperial Japanese Navy who first realized their potential, with devastating effect against Pearl Harbor in December 1941. Had they been able to reduce America's carrier-air capabilities, Japanese dominance over the Pacific would have been assured but instead the near-parity between the two powers forced the Japanese into a war of attrition that they couldn't win. This drove them to seek technological and methodological advantages over their larger foe. Aircraft

like the Shinden were the result of this process, but the Yokosuka Ohka (Cherry Blossom) kamikaze plane is the best known advance, formalizing the practice of suicidal sacrifice first noted in fanatical pilots at Pearl Harbor.

Japanese pilots and crews have a base Morale Threshold of 3 (Qualified) though some experienced units (mostly in the navy) are Veteran.

### • COLOR SCHEME

The Pacific Theatre covers a diverse array of landscapes and this is reflected in the range of color schemes utilized by the Japanese Air forces.

Dark green is the most common color, most often applied as a single block on the upper parts of the aircraft while the undersides of the wings, and sometimes the lower sections of the fuselage, are painted sky gray or left metallic. Army aircraft usually enhance this with additional color bands, either using a lighter shade of green or with earth colors ranging from sandy to dark brown. In some cases, the aircraft use a spotty mottling pattern — often green or dark gray on a base of sky gray — either to better blend them with underlying terrain or as part of a high-altitude camouflage scheme.

Many naval aircraft utilize an all-over sky gray coloration, intended to make them blend in with both sea and air. A few Imperial Army fighters also utilize a pale gray color scheme, particularly those deployed on islands such as Formosa, Hainan or Okinawa.

# JAPAN FLIGHT UNITS

## Basic Flight Units

### Shotai



### Shotai



### Shotai



### Chutai

## Navy Flight Groups Organization

### Chutai

3 Shotai  
(9 aircraft)

### Chutai

3 Shotai  
(9 aircraft)

### Chutai

3 Shotai  
(9 aircraft)

### Daitai

2-3 Chutai  
(18-27 aircraft)

### Daitai

2-3 Chutai  
(18-27 aircraft)

### Daitai

2-3 Chutai  
(18-27 aircraft)

### Kokutai

3 Daitai  
(54-81 aircraft)

## Army Flight Groups Organization

Shotai	3 Aircraft
Daitai	9-12 aircraft
Sentai	3 Daitai (27-36 aircraft)
Air brigade/Wing	4 Sentai (108-144 aircraft)
Air Division	2-3 wings (216-432 aircraft)
Air Army	2-3 Air Divisions (432-1296 aircraft)

## Typical Combat Groups

Fighter Shotai (Naval)	3 x A6M 'Zero'
Fighter Shotai (Army)	3 x Ki-61 'Tony'
Heavy Fighter Shotai (Army)	3 x Ki-45 'Nick'
Heavy Fighter Shotai (Navy)	3 x J7 Shinden
Dive-Bomber Shotai (Navy)	3 x D3A 'Val'
Light Bomber Shotai	3 x B5N 'Kate'
Heavy Bomber Shotai	3 x Ki-21 'Sally'





## URSS

At the commencement of what the Russians call the Great Patriotic War, the *Voyenno-Vozdushne Sily* (VVS, Soviet Air Force) had a gross numerical advantage over the Luftwaffe. Unfortunately, as demonstrated in the Winter War against Finland, these numbers mean little against a better-equipped and more determined foe. Like Germany, the USSR sent "volunteers" to Spain to support their allies, but Stalin's vicious purges in the late 1930s cost them much of this experience. As such, the VVS took a major beating in the early days of Operation Barbarossa. Fortunately, the Germans underestimated Soviet air strength and though tactically and technologically inferior to the invaders, the Russians continue to battle the invaders.

Though they gain the use of British and American aircraft via "lend-lease," the VVS is the weakest air force in the game. It lacks the qualitative or technological edges of other nations, reflecting the political and technological conservatism of Stalin's regime. Despite this, their numerical advantage and determination makes them an interesting faction to play, facing off against the sophisticated Germans or the determined Japanese. The late war sees the Russians make a number of technological

innovations — for example the use of rocket fighters and Tesla guns — but will never achieve technological parity with their opponents.

### • TACTICS AND MANEUVERS

At the start of the war, the VVS were still using the 3-aircraft "Vic" formation of the Great War, with individualism and innovation discouraged among the pilots by the ever-present commissars and informers. After the disasters of 1941, the VVS learned rapidly. As political constraints lessened, the Soviet pilots modified their formations to counter those of the Luftwaffe (and later Imperial Japanese Army), adopting the Zveno (4-fighter "link") in lieu of the Vic, granting them increased flexibility. Additionally, the quality of both pilots and aircraft increased in 1942 after a winter of relative respite while their opponents' resources came under increasing pressure as the fronts broadened. Resistance in the Rodina (Motherland) stiffened in 1942 and by 1943 the boot will be on the other foot.

Unlike the Western Front, where aerial battles took place at high altitude, the VVS fight at medium to low altitudes, engaging German ground attack operations and staging their own close air support missions. Multiple Russian aircraft often find themselves facing a smaller number of opponents and initially this is their only advantage against the foe. As their capabilities increase, the overconfidence of the Luftwaffe becomes the VVS' greatest advantage, with German pilots who hitherto expected to win against superior numbers finding themselves "ambushed" by the Russians.

Russian pilots and crews have a base Morale Threshold of 4 (Rookie) in 1941 or 3 (Qualified) in 1942 and later.

### • COLOR SCHEME

The color schemes employed by the VVS are even more chaotic than other nations thanks to a major shift in systems after the autumn of 1941, the new schemes running alongside their predecessors for a considerable period thanks to a gradual introduction through 1942 and 1943.

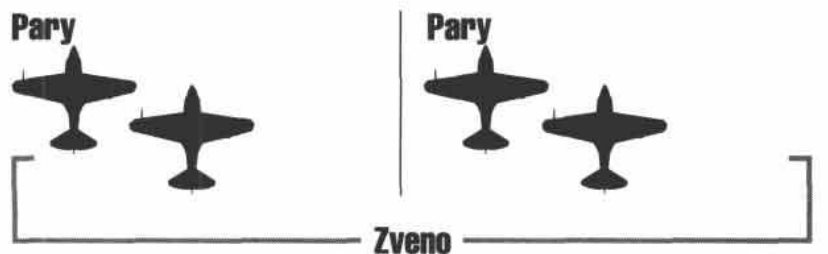
In the early stages of the war, Frontal (army) Aviation uses green on an aircraft's upper surfaces and blue on the lower. Bombers and transports often use this scheme as-is while fighters (and some bombers) commonly add a second dark green or tan disruptive pattern. Ground attack aircraft, such as the IL-2 "Sturmovik" favor black instead of the dark green as a second color.

In 1942, black-over-green patterning becomes the official standard for VVS fighters while black over dark green became the default for ground attack aircraft in the north. Some aircraft, notably the IL-2, use black alone.

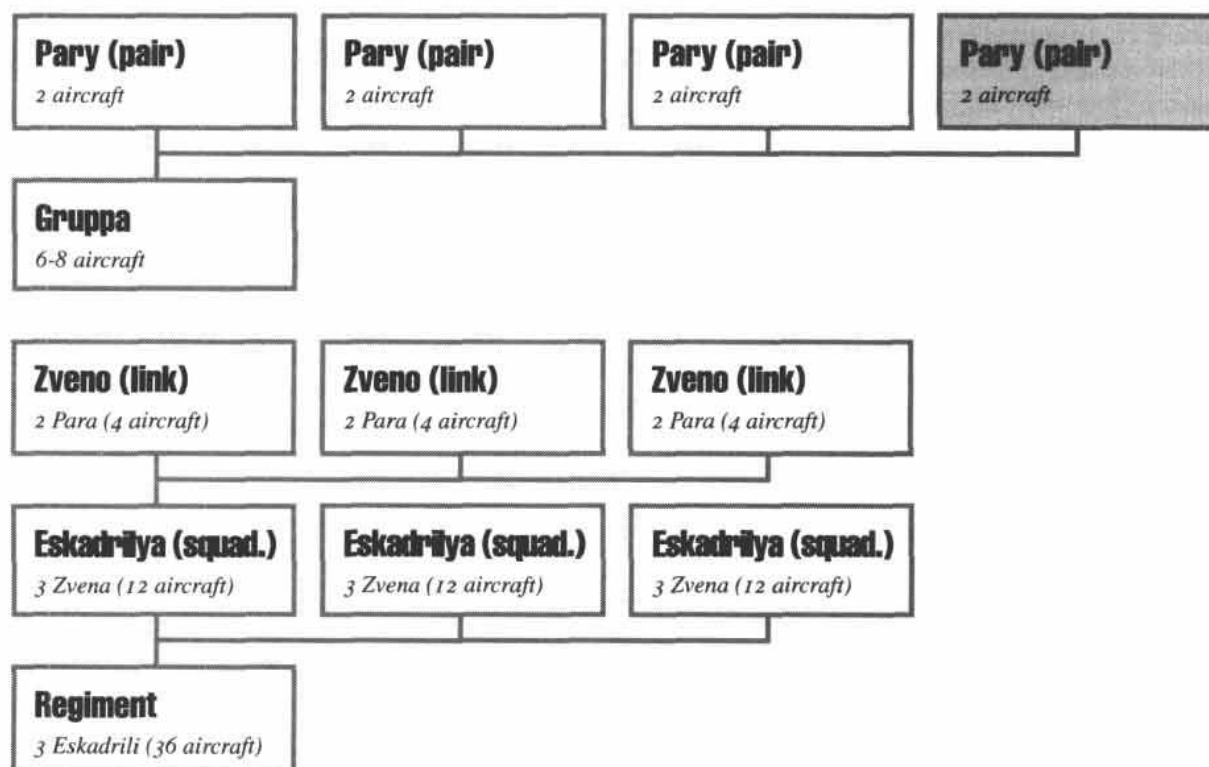
In the south, a sand base color is the norm, overlain by dark brown or black. Bombers of this period shift away from the solid green of the early war to the two-tone patterns hitherto used by fighters. Winter camouflage schemes also become more common after the change in styles, with solid white or blue-gray upper surfaces.

# URSS FLIGHT UNITS

## Basic Flight Units



## Flight Groups Organization



## Typical Combat Groups

Fighter Zvena (A)	4 x I-16	Rocket Fight Zvena	4 x BI-1
Fighter Zvena (B)	4 x Yak-1	Heavy Bomber Zvena (A)	4 x IL-4
Heavy Fighter Zvena	4 x MIG 3	Heavy Bomber Zvena (B)	4 x TU-2
Dive-Bomber Zvena	4 x IL-2 "Sturmovik"		



## UNITED STATES

Even before the Japanese Navy attacked Pearl Harbor, the USA was peripherally involved in the war, providing material to the British and Chinese, with American volunteers manning several squadrons of the RAF. Though the carriers *Lexington* and *Enterprise* escaped the devastation of the Japanese surprise attack, 65 percent of the USAAF (United States Army Air Force) strength in the islands was crippled or destroyed by the attack; the early months of 1942 would be a trying time for the USA. Nonetheless, America's unparalleled manufacturing capacity soon kicked in and US-built aircraft are deploying in Europe, Australia and the Pacific Islands.

Players choosing the Americans will find their forces undergo a rapid change as the war progresses. Though having large resources of men and material, they are largely untried at the end of 1941 and lack the technological and tactical edge of the RAF or the Luftwaffe. They soon make up for this, demonstrating their resolve both on and off the battlefield as their role in the war increases. They will reach technological parity with the RAF by the end of 1942, deploying their first jets, and quickly absorb the harsh lessons of war. By 1943, their resources will allow them to outstrip allies and enemies alike.

## • TACTICS AND MANEUVERS

1942 is America's first full year in the war and USAAF pilots initially lack the experience of their RAF companions. Their only pilots experienced in the European Theatre are those of the Eagle Squadrons who, though offering their services to the USAAF, refuse to be broken up and spread throughout the new American force.

Initially, the main US contribution to the air war in Europe is the B-17 bomber — US fighters with sufficient range to escort the bomber fleets don't arrive in theatre until 1943 — who immediately took a different tack to their RAF equivalents. Whereas the forces of RAF bomber command favor night attacks to minimize casualties, the USAAF prefer more accurate day operations. To reduce casualties, the massive B-17s operate in large formations, whose interlocking fire arcs make attacks expensive for the Luftwaffe. Nonetheless, losses among the American bomber force are substantial, and eventually unescorted missions will be abandoned.

In the Pacific, matters are more favorable for the USAAF and navy. Land-based B-17s and Marauders and carrier-based Dauntless dive-bombers and Devastator torpedo bombers wreak havoc on the Japanese, seeking revenge for Pearl Harbor. Unlike in Europe, carrier-based fighters — Buffaloes and Wildcats — are able to escort the attack aircraft though they are currently outclassed by the Japanese Zeros. Once the Imperial Navy carriers are eliminated after Midway, American carrier-air supremacy seems assured.

American pilots and crews have a base Morale Threshold of 3 (Qualified) in 1941/2 or 2 (Veteran) in 1943 and later.

## • COLOR SCHEME

American air forces are the most widely dispersed in World War II, rivaled only by the RAF, and the range of color schemes reflects this. There are considerable unit- and regional variations, as well as adaptations during the war.

Most common is a flat olive-drab pattern, favored by USAAF fighters and bombers. In some cases this may be overlain with a second (and occasionally third) shade of green or brown to break up the outline of the aircraft. The underside of these aircraft is usually painted sky-gray or pale blue. Later in the war, some bomber aircraft are delivered unpainted and either decorated by individual units or flown with only unit markings.

In the early-war naval aircraft utilized a light gray paint scheme though this gives way to a blue (upper surfaces) and white (undersides) scheme in 1943. Aircraft belonging to the Marines use an all-over blue paint scheme.

High altitude fighters use a pale-gray, low-visibility scheme, while night fighters like the P-61 used black.

# USA FLIGHT UNITS

## Basic Flight Units

### Element



### Section

### Flight



### Division

## Flight Groups Organization



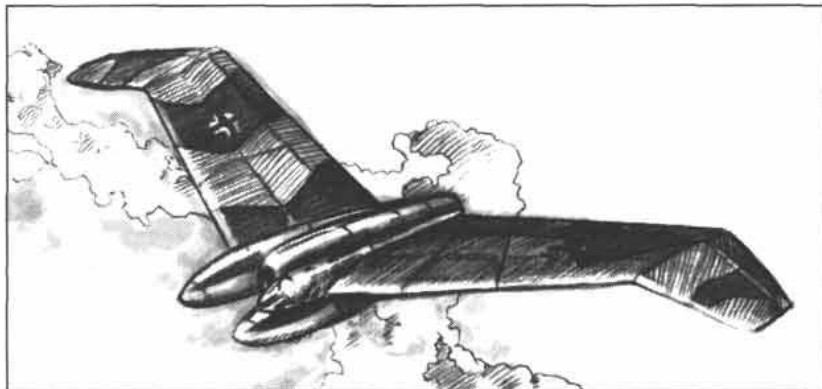
## Typical Combat Groups

Fighter Flight (A)	4 x P-51 Mustang	Interceptor Flight	3 x Ascender or 3 x Roughrider
Fighter Flight (B)	4 x FM2 Wildcat	Attack Flight	3 x P-61 Blackwidow
Heavy Fighter Flight (A)	4 x P-59 Airacomet	Light Bomber Flight	4 x B-25 Mitchell
Heavy Fighter Flight (B)	4 x P-38 Lightning	Heavy Bomber Flight	4 x B-17 Flying Fortress





## PERKS, FLAWS AND WEAPONRY



### PERKS

Many aircraft have special features, such as additional armor plates, ejection systems and cargo bays, that are not covered by the aircraft primary tactical and strategic statistics. These extra features are represented by Perks. Many Perks are primarily intended for background and roleplaying purposes and do not have significant tactical effects on the aircraft's overall combat performance.

Perks with the designation (AUX ) are defined as auxiliary systems for damage purposes.

Perks with the designation ( R ) have a rating. This rating is listed next to the Perk on the data card.

**Airdropable:** The aircraft is equipped with adaptors and hookups that allow it to be carried aloft by another aircraft (with the Host Perk) using the Piggyback rules (page 51).

**Airlift Winch (AUX R):** The aircraft is equipped with a rugged winch/cable system that enables it to airlift troops and/or cargo without having to land. The rating gives the maximum number of

troops that can be airlifted in a single Air War round, or the maximum Size of any airlifted cargo. This value cannot be greater than half the Size of the aircraft.

**Anti-Air:** The unit is specifically designed to attack aircraft. It does not double altitude when calculating the range to a target, nor do they double the appropriate Speed Modifier.

**Autopilot (AUX, R):** An aircraft with this Perk is able to follow a simple series of pre-programmed instructions. The Autopilot's rating is the number of commands that can be stored, which must be simple and unambiguous. For more details, see Autopilots (page 49).

**Automation (AUX, R):** Aircraft with this Perk have electronic and mechanical systems that stand in for human crew — weapon auto-loaders, auto-aim systems and the like. The rating of the system equals the number of crew it simulates, which may add to the number of actions available to an aircraft. There must, however, be at least one human crewmember for the Automation "crew" to have any effect.

**Backup Communications System:** The aircraft may ignore communications system damage effects of the first Auxiliary System Hit on the Systems Damage Table. All non-communication auxiliary systems take normal damage effects. The Perks effect can be restored by a normal repair if a technician works on the aircraft after combat.

**Cable Cutters:** This aircraft is equipped with cable-cutting apparatus designed to prevent it becoming entangled by Barrage Balloons (see page 50).

**Cargo Bay:** The aircraft has a cargo bay. Cargo bays are rated in terms of their volume in cubic meters.

**Catapult Hook (AUX):** This Perk enables any non-VTOL aircraft to take off from a carrier with the help of a catapult (which is included in the carrier's aircraft bay cost). This also enables any such aircraft to use the ship's short landing strip. Non-VTOL aircraft without this Perk can still take-off and land on a carrier ship, but must make a Piloting rolls vs. 7 and 8, respectively, or crash in the attempt. A crash-landing is treated as a ramming attack against the carrier for damage purposes.

**Chaff/Flare Dispenser (AUX, R):** Chaff (called "Window" by the RAF or "duffel" by the Luftwaffe) and Flare dispensers are used to confuse and defeat the radar and infrared guidance systems of incoming missiles. In game terms, each use of a Chaff/Flare Dispenser grants the aircraft a defense bonus versus missile and guided weapons. The dispenser's rating is added to the pilot's defense roll. If the result of the aircraft's modified defense roll is greater than the attacker's roll, the countermeasures have successfully misled the missile(s).

Use of a Chaff/Flare Dispenser does not cost an Action. There is no limit, other



than the dispenser's ammo load, to the number of chaffs or flares that can be used in one round, but only one shot is expended per defense roll.

**Diving Wings:** An aircraft with this Perk has distinctive wings that enhance its ability to pull out of a dive. Such planes have a +1 bonus on Piloting rolls to pull out of Dives, Stalls or uncontrolled falls.

**Fire Resistant:** The aircraft is made of fire-resistant materials and provides adequate heat protection for the crew. In game terms, halve the intensity of any flame attacks against the aircraft.

**Glider:** Fixed wing aircraft with this Perk possess the abilities of a thermal glider, and only lose one altitude level or speed MP when gliding. In addition, the pilot can make a Piloting roll vs. a Threshold of 5 to ride the thermal updrafts and actually gain altitude levels. The flyer gains a number of altitude levels equal to the Margin of Success, without losing speed.

**Host:** An aircraft with this Perk may carry a Parasite aircraft up to half their Size.

**Hostile Environment Protection:** The aircraft is specially designed for prolonged exposure to some hostile environmental conditions without detrimental effects. The Perk also protects the crew.

*Desert* aircraft can withstand extended exposure to arid conditions without needing special maintenance to avoid sand build-up. This includes air filters, modified heat exchangers and cloth coverings on delicate mechanisms.

*Extreme Cold* aircraft are designed to endure freezing cold temperatures, such as those found in arctic and antarctic regions, without freezing up or otherwise breaking down. Heaters, special lubricants and other modifications are part of this Perk.

**Improved Off-Road Ability:** The aircraft is designed to handle rough or rugged terrain even better than standard aircrafts. Such aircraft have large wheels or a very flexible suspension. Such aircraft may land/taxi on rough ground.

**Lighter-Than-Air:** Aircraft with this Perk use lighter-than-air gases to stay aloft. As this requires no movement points, Lighter-than-air craft do not fall when their movement systems are disabled or destroyed, though their horizontal movement will be determined by wind alone (see *Wind*, page 49). Lighter-than-air craft can gain or lose one altitude level per round without using any MPs.

Light Structural damage will cause a lighter-than-air craft to lose one altitude level per round, without the possibility of gaining them back. Heavy Structural damage will cause a two-level drop per round. Craft with this Perk are considered as VTOL craft for determining admissible Perks and flaws.

Lighter-than-Air craft are vulnerable to incendiary rounds and many also have the Highly Flammable flaw, reflecting their use of Hydrogen as a lifting gas.

**No Dead-Zone:** Cockpit design and/or the placement of observers and gunners means this aircraft does not have a LOS dead zone beneath it.

**Overloadable:** This aircraft may carry twice its normal bomb load. If it does so, its range is reduced to one-third normal.

**Oversize Load (R):** This aircraft may carry a load (usually a bomb) that is classed as Oversize. The rating indicates the number of oversize loads that may be carried, each massing up to 10,000kg.

**Passenger Seating (R):** The aircraft has extra seats for passengers. The passengers do not confer any extra Actions to

the aircraft, nor can they control it. Passengers cannot use the aircraft crew's escape system (if any); they must have their own.

**Power Boost (R):** Some aircraft can temporarily increase their engine power by injecting water or a water-methanol mix into the engine. Doing so (announced when the unit is activated) increases the aircraft's Top Speed by 1d6 MP. The rating indicates the number of times this power boost may be used in a game.

**RATOG:** Aircraft equipped with Rocket Assisted Take-Off Gear require only half the normal runway length to take off. Use of the RATOG unit expends the rocket pack. It cannot be used in flight.

**Reduced G-effect:** Aircraft with this Perk have been modified to reduce the strain of pulled Gs (acceleration) on its crew, either through special cockpits, seats or flight suits. The pilot has a +1 bonus whenever he has to make a roll as a result of G-effects (Piloting Skill in *Gear Krieg: Air*, FIT in the *Gear Krieg RPG*). See *G-Effects* on page 33 for more information.

**Refueling Equipment (AUX):** An aircraft with this Perk can be refueled while flying, or provide fuel to another aircraft while aloft. A refueling boom (cost 2) allows the aircraft to pass fuel to another aircraft from tanks in the cargo bay or the tankers own fuel tanks. A fuel intake (cost 1) allows the aircraft to load fuel while flying.

**Reinforced Armor (R):** The aircraft has one or more facings (arcs of attack) with better armor than the rest of the aircraft. When the aircraft is hit on a reinforced facing, add the Perk's rating to the base Armor rating of the aircraft.

**Reinforced Chassis:** The frame of the aircraft is designed to absorb considerable punishment. The aircraft may ig-



nore the first structure hit on the Systems Damage Table, but then loses this Perk. The Perk's effect can be restored by a normal repair if a technician works on the aircraft after combat.

**Reinforced Crew Compartment:** The crew compartment is layered with additional armor and fitted with crash-absorbing material. The aircraft may ignore the first crew hit on the Systems Damage Table, but then loses this Perk. The Perk's effect can be restored by a normal repair if a technician works on the aircraft after combat.

**Reinforced Location Armor (R):** One of the aircraft's location has better armor than the rest of the aircraft. When the aircraft is hit in a reinforced location, add the rating of this Perk to the base armor rating of the aircraft before determining damage.

**Searchlight (AUX):** The aircraft has a powerful lighting system, such as banks of headlights or a large wide angle spotlight. At night, treat the aircraft's F (or Rt, L, or Rr, depending on where the searchlight is mounted) firing arc as if it were in daylight, up to the searchlight's maximum range.

**Stratospheric Flight:** An aircraft with this Perk can climb past the usual ceiling of 12 km (altitude level 48), and into the stratosphere, up to a maximum ceiling of 50 km. It cannot be attacked by normal ground-based weapon systems at this altitude.

**Towing Gear:** An aircraft with this Perk can tow other aircraft or aerial targets as outlined on page 51.

**Variable Geometry (AUX):** By means of swinging wings, an aircraft with this Perk can alter its flight characteristics to match the conditions and speed. In the *extended* mode, the aircraft reduces its Stall Speed by two and can glide as a

normal aircraft but reduces its Combat Speed by 25% (reduce Top Speed accordingly). In *swept* mode, the aircraft uses its full Stall Speed and glides as per a supersonic aircraft but uses its full Combat Speeds and does not suffer any penalties for Supersonic travel (speed 40+), irrespective of whether it could reach such velocities without Overspeeding. Changing modes requires an action and damage to this system locks the wings in their current mode.

**Weapon Link:** This Perk allows multiple weapons to be linked to one fire control mechanism simultaneously. One Action is required to fire the weapon link. The link's Accuracy and Range are equal to the worst Accuracy and Range among the link's weapons. Each weapon attacks separately, but as soon as one weapon misses all the other weapons not yet fired automatically miss (but still use their ammunition). When a link is fired, all of the weapons in the link fire.

## FLAWS

Flaws are the opposite of Perks. Flaws represent defects in the aircraft. Sometimes these defects are planned into the aircraft as a cost cutting measure, at other times the defects are the result of design or production errors.

**Annoyance:** These includes weird noises, bad smells, false alarm signals, a cramped cockpit, etc. Often, this Flaw has little or no tactical effect, but is interesting since it individualizes the various aircraft designs.

**Brittle Armor:** Due to poor design or materiel, or both, the aircraft loses twice the normal amount of Armor when it is damaged. Light Damage hits remove two points of armor, and Heavy Damage hits remove four.

**Cannot Glide:** The aircraft has a very high aspect ratio (wing length/span), and cannot gain lift without thrust. Should the engines fail, or be cut off for any reason, the aircraft will automatically go in an uncontrollable fall.

**Defective Active Sensors (R):** Early sensor systems are primitive and prone to damage. The aircraft's sensor system has a tendency to go on the blink in a random manner. Defective Active Sensors are rated from 1 to 5. In combat, one die is rolled before attempting to obtain a line-of-sight through active sensors (see page 34). If the roll is equal to or less than the Rating, the Flaw's rating is a negative modifier to the sensor test.

**Defective Fire Control (R):** The aircraft's fire control system has a tendency to go on the blink in a random manner. Defective Fire Control is rated from 1 to 5. In combat, one die is rolled just before firing a weapon. If the roll is equal to or less than the Rating, the Flaw's rating is applied as a negative modifier to the attack.

**Difficult to Bail:** Whether due to cockpit design or the configuration of the aircraft, this design is difficult to escape from in an emergency. Increase the Difficulty Threshold of all bail-out attempts by 2.

**Exposed Auxiliary Systems:** The aircraft's auxiliary systems have little protection from combat damage. Whenever an Auxiliary Systems hit is rolled on the Systems Damage Table (see page 46), the damage is one stage worse (i.e. Light Damage becomes Heavy, and Heavy Damage destroys all auxiliary systems).

**Exposed Fire Control:** The aircraft's fire control mechanisms are inadequately protected and prone to damage or malfunctions. A +1 modifier is applied when rolling for damage on the Fire Control Damage Sub-table (see page 46).



**Exposed Crew Compartment:** The aircraft's crew compartment is open-topped or offers little protection, causing excessive crew casualties whenever the aircraft is hit. Whenever a Crew hit is rolled on the Systems Damage Table (see page 46), the damage is one stage worse (i.e. Light Damage becomes Heavy, and Heavy Damage eliminates the entire crew).

**Exposed Movement System:** The aircraft's movement systems have little protection from combat damage. Whenever a Movement Systems hit is rolled on the Systems Damage Table (see page 46), the damage is one stage worse (i.e. Light Damage becomes Heavy, and Heavy Damage disables all movement).

**Extreme Overheating:** The aircraft is prone to overheating in a highly dangerous manner. The aircraft will automatically suffer a random Light Damage hit if it does either of the following for two combat turns in a row: move and fire a weapon; fire three or more weapons. If it does either of these for three combat turns in a row, the aircraft suffers an automatic random Heavy Damage hit.

**Fragile Chassis:** The aircraft's chassis is overly fragile and is prone to damage. The weight of the aircraft is too great for the frame, weakening it, or it might just be a bad design. A +1 modifier is applied when rolling on the Structural Damage Sub-table (see page 46).

**Fuel Inefficient:** The aircraft consumes twice as much fuel while operating at Top Speed as it normally would. Its Deployment Range is reduced by 10 kilometers for every kilometer covered at Top Speed.

**Hazardous Ammo/Fuel Storage:** The aircraft's fuel tanks or ammunition bays are poorly designed. They are either placed in a prominent place, lightly ar-

mored, or both! A +2 modifier is added to Ammo/Fuel hit rolls when the Ammo/Fuel Hit result is obtained on the *Fire Control Damage* Sub-table (see page 46).

**Highly Flammable:** The aircraft incorporates flammable materials, or it is extremely susceptible to excessive heat. The Intensity of all incendiary attacks against the aircraft is doubled.

**Inefficient Controls:** The aircraft's control mechanisms are poorly organized, causing the crew to waste precious time in high stress situations. The number of crew Actions is reduced by one. This Flaw only affects aircraft with two or more crewmembers. If, because of casualties, the crew drops to one, this Flaw is disregarded.

**Instability:** The aircraft is hard to control at high speed or in difficult conditions (such as high winds). A -1 modifier is applied to all Piloting Skill tests made at Top Speed.

**Large Sensor Profile (R):** A design flaw has made the aircraft highly visible to sensors. This may be caused by a tall structure, a high infrared signature, noisy machinery or a significant radar trace. This Flaw's Rating is subtracted from the aircraft's Concealment value versus sensors.

**Maximum Ceiling (R):** An aircraft with this very common Flaw cannot climb past a certain altitude. The rating is subtracted, in kilometers, from a height of 12 km to give the aircraft's maximum ceiling. For example, an aircraft with a Maximum Ceiling rating of 4 cannot climb past  $(12 - 4 =) 8$  kilometers. A majority of aircraft have this Flaw, to different degrees; rotary-wing craft rarely have ceilings higher than 4 km (rating 8). Aircraft that can go higher than 12 km must have the Stratospheric Flight Perk, and cannot take the Maximum Ceiling Flaw.

**Maximum Climbing Angle (R):** Aircraft with this Flaw must advance a certain number of MUs before they can climb one altitude level; the rating of the Perk gives the number of MU. VTOL craft cannot take this Flaw.

**No Communication:** The aircraft is not equipped with any form of communication system. It cannot stay in contact with teammates over long distance and therefore cannot use Command Points unless it is within command distance (see page 28). The crew cannot act as a spotter for indirect fire, nor can it accomplish any Action requiring the presence of a communication system.

**No Engine:** The aircraft has been designed without an engine and must be towed or catapulted aloft. Planes with this flaw must glide once released and ignore movement hits.

**No Sensors:** The aircraft has no built-in electronic sensors of any kind and may only detect opponents visually. It may not use the sensor rules.

**Overheating:** The aircraft is prone to overheating in a dangerous manner. The aircraft will automatically suffer a Light Damage hit if it does any of the following for three combat turns in a row: move at Top Speed, move and fire a weapon, fire three or more weapons.

**Partially Exposed Crew:** Only part of the crew is protected by the aircraft's mass and armor. The other crewmen are riding in open-topped compartments and are exposed to enemy fire. The aircraft is considered to have the Exposed Crew Compartment Flaw until all exposed crewmembers have been eliminated. For example, an aircraft which has three crewmen in an enclosed cockpit and four gunners on open mounts will have the Exposed Crew Compartment Flaw until the four gunners are casualties.





**Poor Landing Gear:** Design or structural problems with the aircraft's landing gear increase the difficulty of any Piloting test Thresholds while taxiing, taking off or landing, by +1.

**Poor Visibility:** Because of the restricted field of view, the crew must subtract 2 from all its visual Detection rolls.

**Random Shutdown (R):** Whenever strained (each turn of combat where it moved at Top Speed) the aircraft must roll two dice against a Threshold equal to one plus the rating of this Flaw. If failed, the aircraft shuts down for a number of combat turns equal to the roll of one die. Such aircraft automatically go out of control and roll on the Loss of Control table.

**Requires Airstrip:** The Aircraft cannot land on rough or even smooth ground. An airstrip or straight portion of highway (in very good condition) is required for a safe landing. In any other case, the pilot must make a Piloting roll against a Threshold of 4 (for an exceptionally smooth and hard surface, like Clear terrain) to 10 (rough terrain w/rocks and shrubs) to avoid crash landing.

**Weak Facing:** The aircraft has a weak facing (arc of defense). This may be due to incomplete armor coverage, shoddy design, or plain bad material. When the aircraft is attacked on that side, its Armor is halved.

**Weak Point (R):** The aircraft has a weak point in the armor covering one of its locations. This may be due to incomplete armor coverage, shoddy design, or plain bad material. When a specific system/location is aimed at and successfully hit, the base Armor is reduced by the rating of this Flaw before applying damage.

## WEAPON CHARACTERISTICS

Some weapons have special qualities or qualities that affect their performance in the game.

**Adhesive (ADH):** This ammunition is designed to stick to the target before detonating. It places a -1 modifier on the attack roll, but, if successful, the warhead becomes attached to the target. If desired, it can be detached at any time by the attacker at the cost of one Action. To detach an adhesive warhead, the defender makes a Piloting Skill roll versus the attack's Margin of Success plus the DM of the weapon. If the defending aircraft has manipulator arms, a bonus equal to half the Rating of the largest arm (rounded up) is applied to the Piloting roll.

**Anti-Infantry (AI):** The weapon or warhead is specifically designed to attack infantry units and other man-sized targets. These weapons do not suffer the normal -2 modifier when attacking infantry.

**Area Effect (AE):** The weapon affects a large area around the target point. This can be due to an explosive effect or a large number of scattered sub-munitions. Area Effect weapons always have a minimum MoS of 1 versus everything in their radius, indiscriminate of friend or foe, even if the target(s) successfully defended. These weapons are rated in Area Effect (AE), followed by the radius of MUs of their blast area (radius 0 means only targets within 1 MU of the target point are affected).

Area Effect ammo delivers a high concussion blast and/or scatters lots of shrapnel around when it detonates. It gives the weapon an AE of 0, unless it already has an Area Effect, in which case it adds one to the AE radius.

**Armor-Piercing (AP):** The weapon is highly efficient when penetrating armor, concentrating all its energy on a single point. The aircraft's base Armor rating is halved to determine damage. If the attack is successful, the target does not lose any Armor points (the entry hole is too small to affect the Armor rating), but takes system damage as usual. Targets may not be Overkilled by Armor-Piercing weapons. Any extra damage past the Overkill Armor Threshold of the target is ignored for simplicity.

**Armor-Crushing (AC):** The weapon is highly efficient when destroying armor plating and structures, either because of sheer striking power or because of its nature. If the attack is successful, the target loses twice the usual Armor points (2 for Light Damage and 4 for Heavy Damage) in addition to the usual system damage. If the damage point total of the attack is equal or greater than half the target's Armor (but still under the base Armor), the target loses one Armor point with no additional effect.

**Attenuating Damage (AD):** The weapon loses a significant portion of its damage potential over distance. An AD number is subtracted from the Damage Multiplier for each range band beyond Short. For example, a x12 weapon with AD2 would be x10 at Medium, x8 at Long and x6 at Extreme range.

**Haywire (HW):** The weapon's attack form consists of or causes a massive electrical discharge that fries electronic components, damages sensitive systems and shocks crewmembers into unconsciousness or death. This discharge courses through its target, often causing multiple systems to fail simultaneously. In tactical terms, the weapon gets two rolls on the Systems Damage Table when it scores Light or Heavy Damage on an opponent.



**Illumination (ILL):** The weapon can release an intense burst of light which can be used to blind opponents in battle. A normal attack is rolled: if successful (i.e., at least Light damage), the target is blinded for a number of rounds equal to the Margin of Success, but may still use Active Sensors. If the weapon has an Area Effect or a Wide Angle, the illuminated area is counted as being in daylight.

**Incendiary (INC):** these are intended to burn their targets. Incendiary weapons do not do damage normally: instead, they cause a fire whose Intensity is equal to the weapon's Damage Multiplier plus the attack's Margin of Success. Incendiary ammunition is filled with an incendiary compound such as napalm or white phosphorus. It gives the weapon the Incendiary characteristic in addition to its normal damage.

**Link:** This allows multiple weapons to be linked to one fire control mechanism simultaneously. One Action is required to fire the linked weapons. The link's Accuracy and Range are equal to the worst Accuracy and Range among the link's weapons. Each weapon attacks separately, but as soon as one weapon misses all the other weapons not yet fired automatically miss (but still use their ammunition). When a link is fired, all of the weapons in the link fire.

**Minimum Range (MR):** The weapon is unable to fire at a target that is close to its position. It might be a mortar or an artillery piece that fires in a high arc. In game terms, the weapon suffers a -1 modifier for each MU that the target is closer than the weapons Minimum Range rating.

**Oversize:** The bomb is considered "oversized" and many only be carried by aircraft with the appropriate Perks (Oversize Load).

**Power-Hungry (PH):** The weapon requires an inordinate amount of power or attention before firing. The vehicle can do nothing else while preparing that single weapon for firing. A number of Actions equal to "PH" must be spent to fire the weapon, with any penalties for multiple Actions in a turn being applied cumulatively.

**Recoil:** The weapon has enormous recoil and causes major flight problems for aircraft that use it. When fired, the pilot of the aircraft must make a Piloting Skill test or else lose control of the aircraft.

**Slow (Slow):** The weapon needs time to recharge between shots, or reloading it is a complex operation. The weapon can only be fired once every R tactical turns.

**Slow Burn (SB):** these weapons are Incendiary weapons that cause the target to suffer the attack's effects for a number of combat rounds equal to the original Margin of Success of the attack. Damage is calculated using the original MoS, minus one for each additional turn after the first one. For example, a MoS 4 attack would use MoS 3 on the second turn to calculate damage, MoS 2 on the third and MoS 1 on the fourth and final turn. These effects are in addition to the Incendiary effects of the weapon.

**Wide Angle (WA):** The weapon's method of attack covers a wide area, attacking multiple targets at once. A single attack roll is made, but any unit within the affected area and within range must defend against it, friend and foe alike. At low altitude, solid terrain features like hills and structures will absorb part of direct fire wide-angle attacks, but in most cases a wide angle attack is uninterrupted.

An angle of 10 degrees will cover a path one MU wide along the entire length of the beam — not entirely accurate, but a good game representation. Players are welcome to use a true 10-degree angle if they so desire. A 60-degree angle has the same shape as a "Fixed" weapon arc (including the vertical spread as outlined above). The 180-degree angle is identical to the "Forward" (et al) arcs, while the 360-degree arc radiates out in all directions.



## GEAR KRIEG™

NORTH AMERICAN  
P-51 MUSTANG

Year in Service:	1941	Maneuver:	0	Armor:	6/12/18
Threat Value:	130	Fire Control:	-3	Movement:	Air 10/20, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	724 km
Crew:	1	Comm:	-2/100 km	Stall Speed:	5

## PERKS &amp; FLAWS

Maximum Ceiling (3), Reduced G-Effect

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning 0.5in	FF	1	2	4	8	0	x4	4	200	Link, ROF: +1

VARIANTS P51D, TV: 225 Year in Service: 1943

Change: Fire Control: 0, Range 1529 km, Movement Air 12/23, Size 6, Stall Speed 7

Add: Stratospheric Flight

Add Weapons:

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
MG53-2 (.5 in)	FF	1	2	4	8	0	x4	6	270	Link, ROF: +1

1000kg bombs (2, UW)

## GEAR KRIEG™

CURTISS P-55  
ASCENDER

Year in Service:	1941	Maneuver:	+1	Armor:	6/12/18
Threat Value:	160	Fire Control:	0	Movement:	Air 10/20, Grd 2/3
Size:	5	Sensors:	-1/75	Dep. Range:	600 km
Crew:	1	Comm:	-2/90 km	Stall Speed:	5

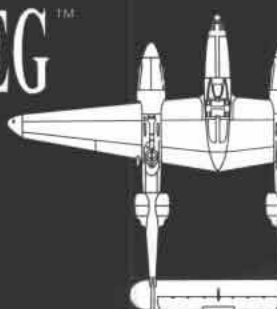
## PERKS &amp; FLAWS

Maximum Ceiling (2), Diving Wings, Difficult to Bail

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning 0.5in	FF	1	2	4	8	0	x4	4	200	Link, ROF: +1

## GEAR KRIEG™

LOCKHEED  
P-38 LIGHTNING

Year in Service:	1941	Maneuver:	-2	Armor:	8/16/24
Threat Value:	120	Fire Control:	-2	Movement:	Air 10/20, Grd 2/3
Size:	6	Sensors:	None	Dep. Range:	660 km
Crew:	1	Comm:	-2/90 km	Stall Speed:	6

## PERKS &amp; FLAWS

Maximum Ceiling (1), Reinforced Chassis

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning 0.5in	FF	1	2	4	8	0	x4	4	200 ea	Link, ROF: +1

37mm Oldsmobile FF 3 6 12 24 0 x7 1 60 ROF: +1

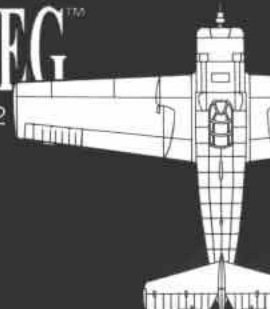
VARIANTS P38M, TV: 150 Year in Service: 1943

Change: Movement: Air 10/21, Size 7, Crew 2, Sensors: -1/12 km

Remove: Maximum Ceiling, No Sensors

Add: Stratospheric Flight, ECM (2)

## GEAR KRIEG™

GRUMMAN FM2  
WILDCAT

Year in Service:	1943	Maneuver:	0*	Armor:	7/14/21
Threat Value:	95	Fire Control:	-2	Movement:	Air 8/17, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	1448 km
Crew:	1	Comm:	-2/90 km	Stall Speed:	4

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

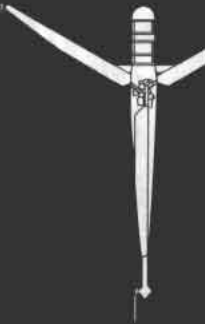
Maximum Ceiling (2), No Sensors

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning 0.5in	FF	1	2	4	8	0	x4	6	400 ea	Link, ROF: +1

Bombs 500kg (1, UW)

## GEAR KRIEG™

SIKORSKY R5  
HELICOPTER

Year in Service:	1942	Maneuver:	0	Armor:	3/6/9
Threat Value:	20	Fire Control:	-2	Movement:	Air 6/12, VTOL
Size:	4	Sensors:	None	Dep. Range:	0 km
Crew:	2	Comm:	-2/90 km	Stall Speed:	0

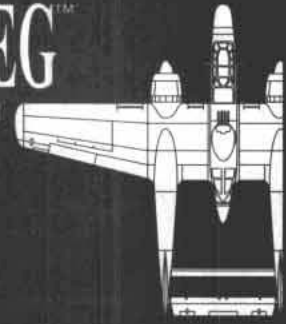
## PERKS &amp; FLAWS

Maximum Ceiling (8), Cannot Glide, Difficult to Bail, Exposed Movement System, VTOL

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning 0.3in	FF	1	2	4	8	0	x2	2	120 ea	Link, ROF: +2

## GEAR KRIEG™

NORTHROP P-61  
BLACK WIDOW

Year in Service:	1942	Maneuver:	-2	Armor:	9/18/27
Threat Value:	150	Fire Control:	-2	Movement:	Air 9/19, Grd 2/3
Size:	8	Sensors:	-1/120 km	Dep. Range:	805 km
Crew:	3	Comm:	-2/100 km	Stall Speed:	5

## PERKS &amp; FLAWS

Maximum Ceiling (3), Reinforced Crew Compartment

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm M2	FF	2	4	8	16	0	x8	4	100 ea	Link, ROF: +1

VARIANTS P61C, TV: 250 Year in Service: 1943

Change: Movement: Air 11/23, Size 9, Range 4500 km

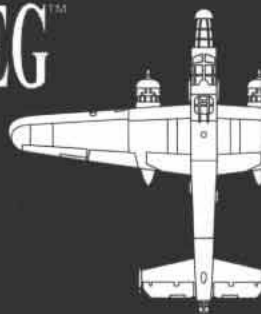
Remove: Maximum Ceiling

Add: Stratospheric Flight

Add: Dorsal Turret

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning 0.5in	DT	1	2	4	8	-1	x4	4	200 ea	Link, ROF: +1

## GEAR KRIEG™

B-25  
MITCHELL

Year in Service:	1940	Maneuver:	-2*	Armor:	11/22/33
Threat Value:	300	Fire Control:	-2	Movement:	Air 8/16, Grd 2/3
Size:	8	Sensors:	None	Dep. Range:	2414 km
Crew:	6	Comm:	-3/80km	Stall Speed:	4

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Maximum Ceiling (5), Maximum Climbing Angle (2)

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
0.3in	F	1	2	4	8	0	x2	1	300	ROF: +2
0.3in	R	1	2	4	8	0	x2	1	200	ROF: +2
0.3in	L	1	2	4	8	0	x2	1	200	ROF: +2
0.5in	DT	1	2	4	8	0	x4	2	220 ea	Link, ROF: +1
0.5in	VT	1	2	4	8	0	x4	2	220 ea	Link, ROF: +1

1361 kg Bombs (3, ROF 3)

## GEAR KRIEG™

BOEING B-17  
FLYING FORTRESS

Year in Service:	1939	Maneuver:	-3*	Armor:	15/30/45
Threat Value:	500	Fire Control:	-3	Movement:	Air 7/15, Grd 2/3
Size:	10	Sensors:	None	Dep. Range:	1770 km
Crew:	8	Comm:	-2/200 km	Stall Speed:	3

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Maximum Ceiling (2), Large Sensor Profile, Inefficient Controls, Overloadable, Maximum Climbing Angle (5)

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning 0.5in	F	1	2	4	8	0	x4	2	300 ea	Link, ROF: +1
Browning 0.5in	FF	1	2	4	8	0	x4	2	300 ea	Link, ROF: +1
Browning 0.5in	DT	1	2	4	8	0	x4	2	300 ea	Link, ROF: +1
Browning 0.5in	Rt	1	2	4	8	0	x4	2	300 ea	Link, ROF: +1
Browning 0.5in	VT	1	2	4	8	0	x4	2	300 ea	Link, ROF: +1
Browning 0.5in	R	1	2	4	8	-1	x4	1	300 ea	ROF: +1
Browning 0.5in	L	1	2	4	8	-1	x4	1	300 ea	ROF: +1

Bombs 2700kg (6, ROF 6)

VARIANTS B17F, TV: 525 Year in Service: 1942

Remove: Add: Sensors -1/10 km



## GEAR KRIEG™

BELL P-59  
AIRACOMET

Year in Service:	1942	Maneuver:	-1 (-2*)	Armor:	7/14/21
Threat Value:	100	Fire Control:	-2	Movement:	Air 11/22, Grd 2/3
Size:	6	Sensors:	None	Dep. Range:	724 km
Crew:	1	Comm:	-2/90 km	Stall Speed:	8

\*Jet penalty included vis-à-vis Turn Radius

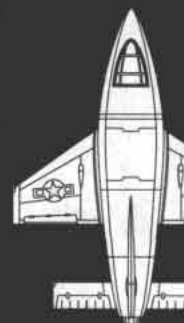
## PERKS &amp; FLAWS

Stratospheric Flight, Instability (High Speed), Chaff/Flare Dispenser (5), Jet

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
37mm Oldsmobile	FF	3	8	12	24	0	x7	1	60	ROF: +1
Browning 0.5in	FF	1	2	4	8	0	x4	3	200 ea	Link, ROF: +1

## GEAR KRIEG™

R3  
ROUGH RIDER

Year in Service:	1942	Maneuver:	-2 (-4)	Armor:	5/10/15
Threat Value:	40	Fire Control:	-2	Movement:	Air 15/30
Size:	4	Sensors:	None	Dep. Range:	200 km
Crew:	1	Comm:	-2/100 km	Stall Speed:	9

\*Rocket penalty included vis-à-vis Turn Radius

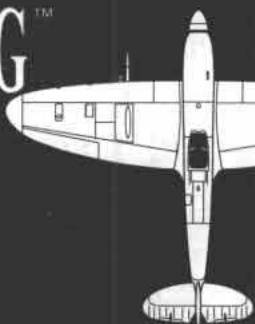
## PERKS &amp; FLAWS

Stratospheric Flight, Difficult to Bail, Rocket

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning 0.5in	FF	1	2	4	8	0	x4	2	150 ea	Link, ROF: +1

## GEAR KRIEG™

SUPERMARINE  
SPITFIRE

Year in Service:	1938	Maneuver:	+1	Armor:	6/12/18
Threat Value:	75	Fire Control:	-2	Movement:	Air 9/19, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	636 km
Crew:	1	Comm:	-3/100 km	Stall Speed:	5

## PERKS &amp; FLAWS

Maximum Ceiling (2), No Sensors

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning .303 MG	FF	1	2	4	8	0	x2	4	250 ea	Link, ROF: +2

## VARIANTS MK IA, TV: 125 Year in Service: 1940

Change: Movement Air 10/20, Fire Control -1

## Add Weapons:

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning .303 MG	FF	1	2	4	8	0	x2	4	250 ea	Link, ROF: +2

Bomb Load: 500kg (1, UW)

## VARIANTS MK IX (E), TV: 150 Year in Service: 1940

Change: Maneuver: 0, Range 698 km, Fire Control: -1, Movement: Air 11/21, Weapons:

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm	FF	2	4	8	16	0	x5	2	100 ea	Link, ROF: +2
Browning 0.5in	FF	1	2	4	8	0	x4	2	60 ea	Link, ROF: +1

Bomb Load: 500kg (1, UW)

## VARIANTS MK XIV (E), TV: 200 Year in Service: 1943

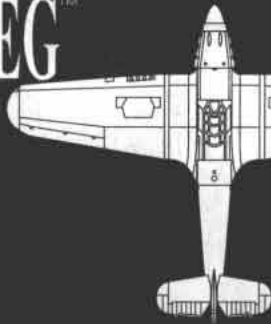
Change: Maneuver: 0, Range 740 km, Fire Control: -1, Movement: Air 12/24, Size: 6

Add: Chaff/Flare Dispenser (4), Reduced G-effect

## Change: Weapons:

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm	FF	2	4	8	16	0	x5	2	100 ea	Link, ROF: +1
Browning .303 MG	FF	1	2	4	8	0	x2	4	300 ea	Link, ROF: +2

## GEAR KRIEG™

HAWKER  
HURRICANE

Year in Service:	1937	Maneuver:	-1	Armor:	8/16/24
Threat Value:	110	Fire Control:	-1	Movement:	Air 8/17, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	740 km
Crew:	1	Comm:	-1/100 km	Stall Speed:	5

## PERKS &amp; FLAWS

Maximum Ceiling (2), No Sensors

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning .303 MG FF	1	2	4	8	0	x2	8	325 ea	Link, ROF: +2	

VARIANTS Sea Hurricane IIC, TV: 125 Year in Service: 1937

Change: Weapons:

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Hispano 20mm FF	2	4	8	16	0	x6	4	90 ea	Link, ROF: +1	

Bomb Load: 500kg (1, UW)

VARIANTS Hurricane IID, TV: 150 Year in Service: 1940

Change: Fire Control 0, Movement: Air 8/15

Change: Weapons:

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
40mm Vickers S	FF	3	6	9	12	0	x8	2	60 ea	Link, ROF: +1

## GEAR KRIEG™

DE HAVILLAND  
MOSQUITO

Year in Service:	1940	Maneuver:	-2	Armor:	7/14/21
Threat Value:	225	Fire Control:	-1	Movement:	Air 8/16, Grd 2/3
Size:	7	Sensors:	-1/75	Dep. Range:	3000 km
Crew:	2	Comm:	-2/100 km	Stall Speed:	4

## PERKS &amp; FLAWS

Maximum Ceiling (3), Fragile Chassis

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Hispano 20mm FF	2	4	8	16	0	x6	4	200 ea	Link, ROF: +1	
Browning .303 MG FF	1	2	4	8	0	x2	4	400 ea	Link, ROF: +2	

Bombs Load: 1000 kg (2)

VARIANTS MKNF XVII, TV: 250 Year in Service: 1942

Change: Movement: Air 9/19

Remove: Maximum Ceiling (3)

## GEAR KRIEG™

HAWKER  
TEMPEST

Year in Service:	1942	Maneuver:	-1	Armor:	7/14/21
Threat Value:	225	Fire Control:	-1	Movement:	Air 11/22, Grd 2/3
Size:	6	Sensors:	None	Dep. Range:	1190 km
Crew:	1	Comm:	-3/80 km	Stall Speed:	6

## PERKS &amp; FLAWS

Maximum Ceiling (1), Instability (High Speed), HEP (Desert), No Sensors

## WEAPONS

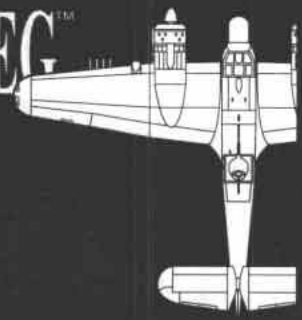
Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Hispano 20mm FF	2	4	8	16	0	x6	4	100 ea	Link, ROF: +1	
Rockets	FF	1	2	4	8	-1	x12	1	N/A	Rocket, ROF: +1

VARIANTS V-B, TV: 225 Year in Service: 1942

Remove: Rockets

Add: Bomb Load 1000 kg (2, UW)

## GEAR KRIEG™

BRISTOL  
BEAUFIGHTER

Year in Service:	1940	Maneuver:	-2*	Armor:	9/18/27
Threat Value:	225	Fire Control:	-1	Movement:	Air 8/16, Grd 2/3
Size:	8	Sensors:	None	Dep. Range:	2480 km
Crew:	2	Comm:	-2/80 km	Stall Speed:	4

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Maximum Ceiling (5), Instability (Landing), No Sensors

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Hispano 20mm FF	2	4	8	16	0	x6	4	100 ea	Link, ROF: +1	
Browning .303 MG FF	1	2	4	8	0	x2	1	300 ea	ROF: +2	

Torp Load: 500kg (1, UW)

## GEAR KRIEG™

HANDLEY PAGE  
HP-75 MANX

Year in Service:	1942	Maneuver:	0	Armor:	8/16/24
Threat Value:	180	Fire Control:	-1	Movement:	Air 8/17, Grd 2/3
Size:	6	Sensors:	None	Dep. Range:	1000 km
Crew:	1	Comm:	-2/60 km	Stall Speed:	5

## PERKS &amp; FLAWS

Maximum Ceiling (4), No Sensor

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Hispano 20mm	FF	2	4	8	16	0	x6	2	75 ea	Link, ROF: +1

## GEAR KRIEG™

BRISTOL  
BLENHEIM

Year in Service:	1936	Maneuver:	-2	Armor:	7/14/21
Threat Value:	150	Fire Control:	-2	Movement:	Air 7/14, Grd 2/3
Size:	6	Sensors:	None	Dep. Range:	1950 km
Crew:	3	Comm:	-3/100 km	Stall Speed:	4

## PERKS &amp; FLAWS

Maximum Ceiling (3), Maximum Climbing Angle (2)

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning .303 MG FF	1	2	4	8	0	x2	1		400 ea	ROF: +2
Browning .303 MG VF	1	2	4	8	0	x2	2		400 ea	Link, ROF: +2
Browning .303 MG DT	1	2	4	8	0	x2	3		400 ea	Link, ROF: +2

Bomb Load: 500kg (1)

VARIANTS IF, TV: 175 Year in Service: 1940

Change: Sensors: -1/80

Remove: No Sensors Flaw

Change: Movement: Air 9/18

## GEAR KRIEG™

AVRO 683  
LANCASTER

Year in Service:	1941	Maneuver:	-3*	Armor:	15/30/45
Threat Value:	450	Fire Control:	-3	Movement:	Air 8/15, Grd 1/2
Size:	10	Sensors:	-1/10 km	Dep. Range:	2671 km
Crew:	7	Comm:	-3/100 km	Stall Speed:	4

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Maximum Ceiling (5), Maximum Climbing Angle (5), Large Sensor Profile

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning .303 MG F	1	2	4	8	0	x2	2		600 ea	Link, ROF: +2
Browning .303 MG DT	1	2	4	8	0	x2	2		600 ea	Link, ROF: +2
Browning .303 MG Br	1	2	4	8	0	x2	4		600 ea	Link, ROF: +2

Bombs Load: 6450kg (13)

VARIANTS MK I(S), TV: 450 Year in Service: 1942

Add: Oversize Load (1), Change: Sensors: None, Remove: Normal Bomb load (13)

VARIANTS MK II, TV: 475 Year in Service: 1943

Add: Ventral Guns, No Dead Zone

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning .303 MG VT	1	2	4	8	0	x2	2		600 ea	Link, ROF: +2

VARIANTS MK V Experimental "Thunderstorm", TV: 450 Year in Service: 1943

Remove: Bomb Load

Add: Refueling Equipment

Add: Ventral Tesla Cannon

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Tesla Type III	VF	2	4	8	16	0	x6	1	15	HW, ADL, PH3

VARIANTS MK II-T, TV: 400 Year in Service: 1942

Remove: Bomb Load

Add: Refueling Equipment

Add: Cargo Bay (Fuel)

## GEAR KRIEG™

GLOSTER G40  
PIONEER

Year in Service:	1940	Maneuver:	-2 (-3*)	Armor:	6/12/18
Threat Value:	115	Fire Control:	-3	Movement:	Air 12/25, Grd 2/3
Size:	4	Sensors:	None	Dep. Range:	700 km
Crew:	1	Comm:	-2/80 km	Stall Speed:	7

\*Jet penalty included vis-à-vis Turn Radius

## PERKS &amp; FLAWS

Maximum Ceiling (2). Instability (High Speed). Jet. Fragile Chassis. No Sensors

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Hispano 20mm	FF	2	4	8	16	0	x6	4	80 ea	ROF: +1

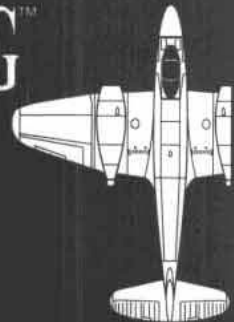
VARIANTS G40A, TV: 150 Year in Service: 1943

Change: Movement: Air 14/28, Size 5, Crew 2, Sensors -1/60km

Remove: No Sensors Flaw

Add: Defective Active Sensors (2). Refueling Equipment

## GEAR KRIEG™

GLOSTER G41  
METEOR

Year in Service:	1943	Maneuver:	-2 (-3*)	Armor:	7/14/21
Threat Value:	275	Fire Control:	0	Movement:	Air 11/21, Grd 2/3
Size:	6	Sensors:	None	Dep. Range:	1610 km
Crew:	1	Comm:	-2/100 km	Stall Speed:	8

\*Jet penalty included vis-à-vis Turn Radius

## PERKS &amp; FLAWS

Stratospheric Flight. Instability (High Speed). Jet. No Sensors

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Hispano 20mm	FF	2	4	8	16	0	x6	4	100 ea	Link, ROF: +1

VARIANTS G41C, TV: 300 Year in Service: 1943

Change: Movement: Air 12/25

Remove: No Sensors Flaw

Change: Sensors: -1/60

## GEAR KRIEG™

BLOCH  
MB-152

Year in Service:	1938	Maneuver:	-1	Armor:	7/14/21
Threat Value:	80	Fire Control:	-2	Movement:	Air 8/17, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	600 km
Crew:	1	Comm:	-2/80 km	Stall Speed:	4

## PERKS &amp; FLAWS

Maximum Ceiling (3). No Sensors

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Hispano 20mm	FF	2	4	8	16	0	x6	2	60 ea	Link, ROF: +1
7.5mm MAC MG	FF	1	2	4	8	0	x2	2	500 ea	Link, ROF: +2

VARIANTS C1A, TV: 80 Year in Service: 1939

Remove: Hispano 20mm

Change: 7.5mm MAC

## Weapons

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
7.5mm MAC MG	FF	1	2	4	8	0	x2	4	500 ea	Link, ROF: +2

## GEAR KRIEG™

DEWOITINE  
D520

Year in Service:	1938	Maneuver:	-1	Armor:	7/14/21
Threat Value:	90	Fire Control:	-1	Movement:	Air 8/17, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	1250 km
Crew:	1	Comm:	-2/100 km	Stall Speed:	4

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Maximum Ceiling (2). No Sensors

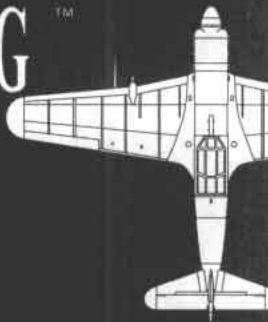
## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Hispano 20mm	FF	2	4	8	16	0	x6	1	60	ROF: +1
7.5mm MAC MG	FF	1	2	4	8	0	x2	4	500 ea	Link, ROF: +2



# GEAR KRIEG™

MORANE-SAULNIER  
MS406



Year in Service:	1935	Maneuver:	0	Armor:	6/12/18
Threat Value:	110	Fire Control:	-2	Movement:	Air 8/16, Grd 2/3
Size:	4	Sensors:	None	Dep. Range:	800 km
Crew:	1	Comm:	-2/80 km	Stall Speed:	4

## PERKS & FLAWS

Maximum Ceiling (3). No Sensors.

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Hisp.-Suiza 20mm	FF	2	4	8	16	0	x6	1	50	ROF: +1
7.5mm MAC MG	FF	1	2	4	8	0	x2	2	100 ea	Link, ROF: +2

# GEAR KRIEG™

SNECMA  
SE-500



Year in Service:	1941	Maneuver:	-2	Armor:	7/14/21
Threat Value:	250	Fire Control:	-2	Movement:	Air 10/20, Grd 2/3
Size:	6	Sensors:	None	Dep. Range:	1200 km
Crew:	3	Comm:	-2/100 km	Stall Speed:	5

## PERKS & FLAWS

Maximum Ceiling (3). Reinforced Crew Compartment

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Hisp.-Suiza 20mm	FF	2	4	8	16	0	x6	6	100 ea	Link, ROF: +1
Hisp.-Suiza 20mm	DR	2	4	8	16	0	x6	2	100 ea	Link, ROF: +1
EPG 20 mm	Rr	2	4	8	16	+1	x6	1	75	ROF: +1

VARIANTS SE-500B, TV: 275 Year in Service: 1942

Change: Crew: 4

Add: 1000kg Bombs (2. UW)

# GEAR KRIEG™

POLIKARPOV  
I-16



Year in Service:	1934	Maneuver:	-1	Armor:	5/10/15
Threat Value:	75	Fire Control:	-3	Movement:	Air 6/12, Grd 1/2
Size:	4	Sensors:	None	Dep. Range:	805 km
Crew:	1	Comm:	-3/60 km	Stall Speed:	3

## PERKS & FLAWS

Maximum Ceiling (4). Fragile Chassis. Exposed Crew Compartment

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
7.62 ShKAS	FF	1	2	4	8	0	x2	2	200 ea	ROF: +2

VARIANTS I-16-4: 90 Year in Service: 1935

Change: Movement: Air 7/15

VARIANTS I-16-24: 120 Year in Service: 1940

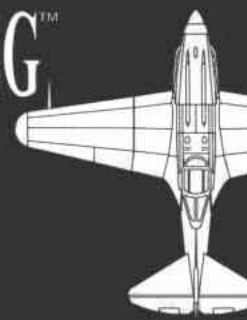
Change: Movement: Air 8/17, Range: 400 km

Change: Weapons

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm ShVAK	FF	2	4	8	16	0	x6	4	90 ea	Link, ROF: +1
RSB2 Rockets	FF	1	2	4	8	-1	x12	1	2	Rocket, ROF: +1

# GEAR KRIEG™

MIKOYAN  
MIG-1



Year in Service:	1940	Maneuver:	-2	Armor:	7/14/21
Threat Value:	100	Fire Control:	-2	Movement:	Air 10/20, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	731 km
Crew:	1	Comm:	-2/90 km	Stall Speed:	5

## PERKS & FLAWS

Maximum Ceiling (1). Instability (takeoff/landing)

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
12.7 mm BS	FF	1	2	4	8	0	x4	1	220 ea	Link, ROF: +1
7.62 ShKAS	FF	1	2	4	8	0	x2	2	200 ea	Link, ROF: +2
RSB2 Rockets	FF	1	2	4	8	-1	x12	1	6	Rocket, ROF: +1

VARIANTS MIG-3, TV: 120 Year in Service: 1943

Change: Maneuver: -1, Movement: Air 10/21, Range: 1250 km, 12.7 mm BS to #3

VARIANTS MIG-5, TV: 150 Year in Service: 1942

Change: Maneuver: 0, Armor: 8/16/24, Movement: Air 11/22, Range: 1250 km, ShKAS to #4

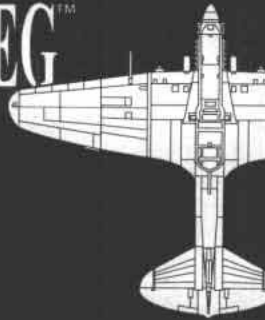
Remove: Maximum Ceiling, 12.7mm BS, Add: Stratospheric Flight

VARIANTS MIG-7, TV: 150 Year in Service: 1943

As MIG-5, except: Change: Maneuver: -1, Movement: Air 11/23, Add ShVAK

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm ShVAK	FF	2	4	8	16	0	x6	1	200 ea	ROF: +1

## GEAR KRIEG™

ILYUSHIN IL-2  
STURMOVIK

Year in Service:	1942	Maneuver:	-2*	Armor:	10/20/30
Threat Value:	140	Fire Control:	-1	Movement:	Air 8/13, Grd 2/3
Size:	6	Sensors:	None	Dep. Range:	765 km
Crew:	2	Comm:	-2/100 km	Stall Speed:	3

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Maximum Ceiling (5), Reinforced Crew Compartment, Reinforced Chassis

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
7.62 SHKAS	FF	1	2	4	8	0	x2	2	250 ea	Link, ROF: +2
23mm SHVAK	FF	2	4	8	16	0	x6	1	120	ROF: +1
12.7 mm BS	DR	1	2	4	8	0	x4	2	250 ea	Link, ROF: +1
RS&Z Rockets	FF	1	2	4	8	-1	x12	1	8	Rocket, ROF: +1

Bombs 1000kg (2: UW)

VARIANTS IL-21: 200 Year in Service: 1942

Change: Maneuver -1, Movement: Air 8/16, Crew 1

Remove: 12.7mm BS

## GEAR KRIEG™

BEREZNYAK-ISAYEV  
BI-1 ROCKET

Year in Service:	1943	Maneuver:	-2(-4*)	Armor:	6/12/18
Threat Value:	90	Fire Control:	-2	Movement:	Air 21/42 Grd 2/4
Size:	4	Sensors:	None	Dep. Range:	97 km
Crew:	1	Comm:	-2/50 km	Stall Speed:	10

\*Rocket Penalty included vis-à-vis Turn Radius

## PERKS &amp; FLAWS

Stratospheric Flight, Rocket, Instability (landing), Hazardous Fuel Storage

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm SHVAK	FF	2	4	8	16	0	x6	2	90 ea	Link, ROF: +1

## GEAR KRIEG™

MESSERSCHMITT  
BF 109

Year in Service:	1937	Maneuver:	-1	Armor:	6/12/18
Threat Value:	80	Fire Control:	-2	Movement:	Air 8/15, Grd 1/2
Size:	4	Sensors:	None	Dep. Range:	700 km
Crew:	1	Comm:	-2/90km	Stall Speed:	5

## PERKS &amp; FLAWS

Maximum Ceiling (5), Instability, Poor Landing Gear

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
7.62 MG17	FF	1	2	4	8	0	x2	3	500 ea	Link, ROF: +2

VARIANTS BF 109 E1 "Emil", TV: 125 Year in Service: 1939

Change: Fire Control -1, Movement: Air 9/38, Maximum Ceiling (2), MG 17 to #6

Add: 500kg bomb (1: UW)

VARIANTS BF 109F, TV: 125 Year in Service: 1940

Change: MG 17 to #2, Add MG FF

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm MG FF	FF	1	2	4	8	0	x6	3	60 ea	Link, ROF: +1

VARIANTS BF 109 G "Gustav", TV: 150 Year in Service: 1942

As E1, except:

Change: Armor 9/18/27, Maneuver: 0, Fire Control: 0, Size: 5, Maximum Ceiling (2), Movement: Air 11/21

Change: Comm: -2/100 km, Perks &amp; Flaws: Poor Landing Gear, Power Boost (2)

Remove: MG17

Add Weapons:

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
30mm mk108	FF	3	6	12	24	0	x6	1	80	ROF: +1
13mm MG131	FF	1	2	4	8	0	x4	2	250 ea	Link, ROF: +1
20mm MG151	FF	2	4	8	16	0	x6	2	100 ea	Link, ROF: +2

VARIANTS BF 109 W(Jet) "Werner", TV: 150 Year in Service: 1943

As BF109G, except:

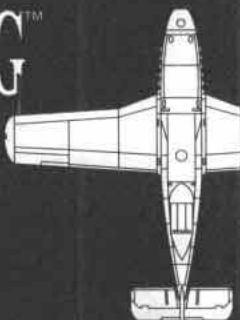
Change: Maneuver: -1 (-2\*), Fire Control: -1, Size: 6, Movement: Air 12/25

Remove: Maximum Ceiling (2), Power Boost

Add: Stratospheric Flight, Jet

\*Jet penalty included vis-à-vis Turn Radius

## GEAR KRIEG™

MESSERSCHMITT  
ME 209

Year in Service:	1940	Maneuver:	-2	Armor:	5/10/15
Threat Value:	100	Fire Control:	-1	Movement:	Air 12/25, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	800 km
Crew:	1	Comm:	-1/80 km	Stall Speed:	7

## PERKS &amp; FLAWS

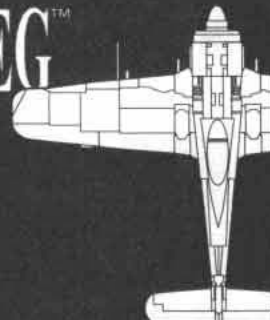
Maximum Ceiling (3), Power Boost (4), Autopilot (2)

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
13mm MG131	FF	1	2	4	8	0	x4	2	400ea	ROF: +1
20mm MG151	FF	2	4	8	16	0	x8	1	200	ROF: +1

500kg bomb (1, LW)

## GEAR KRIEG™

FOCKE-WULF  
FW 190

Year in Service:	194-	Maneuver:	0*	Armor:	8/16/24
Threat Value:	185	Fire Control:	-1	Movement:	Air 10/20, Grd 2/3
Size:	8	Sensors:	None	Dep. Range:	801 km
Crew:	1	Comm:	-2/80 km	Stall Speed:	7

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Maximum Ceiling (2), Diving Wings, Difficult to Ball

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Browning 0.5in	FF	1	2	4	8	0	x4	4	200	ROF: +2

VARIANTS FW 190 D9 "Dora 9", TV: 250 Year in Service: 1942

Change: Fire Control: 0, Movement: Air 11/23, Range: 1200 km, Add: Stratospheric Flight, Power Boost (4), Remove: Reduce MG151 to 82, Add: Mk 108

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
30mm Mk 108	FF	3	6	12	24	0	x8	1	200 ea	ROF: +1

VARIANTS TA 152 (FW 190 H1), TV: 275 Year in Service: 1943

As D9, except: Change: Movement: Air 12/25, Change: Weapons

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
30mm Mk 108	FF	3	6	12	24	0	x8	1	200 ea	ROF: +1
20mm MG151	FF	2	4	8	16	0	x8	4	200 ea	ROF: +1

500kg bomb (1, LW)

## GEAR KRIEG™

HORTEN  
HO 229

Year in Service:	1941	Maneuver:	-1 (-2*)	Armor:	8/16/24
Threat Value:	200	Fire Control:	0	Movement:	Air 16/32, Grd 2/3
Size:	7	Sensors:	-1/8 km	Dep. Range:	1899 km
Crew:	2	Comm:	-2/80 km	Stall Speed:	8

\*Jet penalty included vis-à-vis Turn Radius

## PERKS &amp; FLAWS

Stratospheric Flight, Difficult to Ball, Stealth (1)

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
30mm Mk108	FF	3	6	9	12	0	x8	4	120 ea	Link, ROF: +1

1500kg bomb (1, LW)

## GEAR KRIEG™

JU 187  
STUKA 2

Year in Service:	1942	Maneuver:	-2*	Armor:	8/16/24
Threat Value:	90	Fire Control:	-2	Movement:	Air 7/14, Grd 2/3
Size:	6	Sensors:	None	Dep. Range:	650 km
Crew:	2	Comm:	-2/100 km	Stall Speed:	4

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Maximum Ceiling (3), Diving Wings, Autopilot (1)

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm MG151/20	DR	2	4	8	16	0	x6	1	120	ROF: +1
13mm MG131	DR	1	2	4	8	0	x4	1	300	ROF: +1

1000kg Bombs (2, LW)

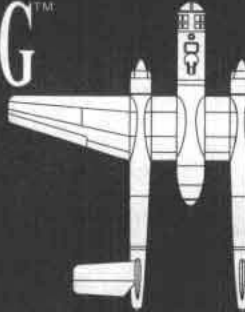
VARIANTS A2, TV: 125 Year in Service: 1943

Change: Range 575 km

Add: MG 131

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm MG151/20	FF	2	4	8	16	0	x8	2	120 ea	Link, ROF: +2

## GEAR KRIEG™

ARADO  
AR 340

Year in Service:	1942	Maneuver:	-2	Armor:	8/16/24
Threat Value:	200	Fire Control:	-2	Movement:	Air 9/19, Grd 2/3
Size:	8	Sensors:	-1/7 km	Dep. Range:	2589 km
Crew:	4	Comm:	-2/80 km	Stall Speed:	5

## PERKS &amp; FLAWS

Maximum Ceiling (6), Automation (1), Difficult to Bail, Large Sensor Profile

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm MG151/20	Rr	2	4	8	16	0	x6	3	200 ea	Link, ROF: +1
13mm MG131	DT	1	2	4	8	0	x4	1	450	ROF: +2
13mm MG131	VT	1	2	4	8	0	x4	1	450	ROF: +2

2000 kg Bombs (4, UW)

VARIANTS A340 B, TV: 225 Year in Service: 1942

Change: Movement: Air 10/20, Range: 3000

Add: Overloadable

## GEAR KRIEG™

MESSERSCHMITT  
ME 262

Year in Service:	1942	Maneuver:	-1 (-2*)	Armor:	6/12/18
Threat Value:	250	Fire Control:	0	Movement:	Air 14/28, Grd 1/2
Size:	5	Sensors:	None	Dep. Range:	1046 km
Crew:	1	Comm:	-2/100km	Stall Speed:	9

\*Jet penalty included vis-à-vis Turn Radius

## PERKS &amp; FLAWS

Hazardous Fuel Storage, Defective Fire Control (2), Poor Landing Gear, Random Shutdown (1), Maximum Ceiling (1), Jet

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
30mm Mk108	FF	3	6	12	24	0	x6	4	360 ea	Link, ROF: +1

VARIANTS A1b, TV: 275 Year in Service: 1942

Add: 50mm Rockets

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
50mm Rockets	FF	1	2	4	8	-1	x12	1	24	ROF: +1

VARIANTS A1b, TV: 275 Year in Service: 1942

Change: Movement: Air 13/26, Sensors: -1/20 km

VARIANTS B2a, TV: 275 Year in Service: 1943

Add: "Schräge Musik" assembly

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
30mm Mk 108	DT	3	6	12	24	0	x6	2	360 ea	ROF: +1

## GEAR KRIEG™

ME 163  
KOMET

Year in Service:	1943	Maneuver:	-2 (-3*)	Armor:	6/12/18
Threat Value:	60	Fire Control:	-2	Movement:	Air 15/31, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	105 km
Crew:	1	Comm:	-2/75 km	Stall Speed:	8

\*Jet penalty included vis-à-vis Turn Radius

## PERKS &amp; FLAWS

Maximum Ceiling (-4), Stratospheric Flight, Jet, Instability (Landing), Hazardous fuel storage

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
30mm mk108	FF	3	6	12	24	0	x6	4	60 ea	ROF: +1

VARIANTS RPV Komet, TV: 60 Year in Service: 1943

Change: Remove Crew, Comm: -1/75 km

Add: Autopilot, Automation (1)

## GEAR KRIEG™

HORTEN HO XX  
TRANSPORT

Year in Service:	1940	Maneuver:	-4*	Armor:	10/20/30
Threat Value:	190	Fire Control:	-3	Movement:	Air 8/16, Grd 2/3
Size:	8	Sensors:	None	Dep. Range:	2600 km
Crew:	5	Comm:	-2/80 km	Stall Speed:	5

## PERKS &amp; FLAWS

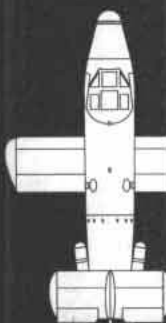
Maximum Ceiling (4), Large Sensor Profile (1), Cargo Bay (Size 7)

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm MG FF	FF	1	2	4	8	0	x6	2	80 ea	ROF: +1
7.92 MG15	Rr	1	2	4	8	-1	x2	2	400 ea	ROF: +2



## GEAR KRIEG™

BACHEM BA 349  
NATTER

Year in Service:	1943	Maneuver:	-1 (-3*)	Armor:	4/8/12
Threat Value:	55	Fire Control:	-3	Movement:	Air 16/33, Grd 1/2
Size:	4	Sensors:	None	Dep. Range:	50 km
Crew:	1	Comm:	-2/60 km	Stall Speed:	9

\*Rocket penalty included vis-à-vis turn Radius

## PERKS &amp; FLAWS

Maximum Ceiling (2), Rocket powered, Fragile, Ejector Seat, Hazardous Fuel Storage, No Sensors

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
73mm Rockets	FF	1	2	4	8	-1	x12	1	24	RDF: +1

## VARIANTS

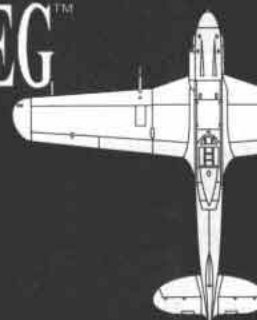
X1, TV: 75 Year in Service: 1943

Remove: Rockets

Add: 2x MG 151

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
30mm Mk108	D	3	6	9	12	0	x6	4	30	Link, RDF: +1

## GEAR KRIEG™

FIAT G50  
FRECCIA

Year in Service:	1937	Maneuver:	0	Armor:	7/14/21
Threat Value:	95	Fire Control:	-2	Movement:	Air 7/15, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	1000 km
Crew:	1	Comm:	-2/60 km	Stall Speed:	4

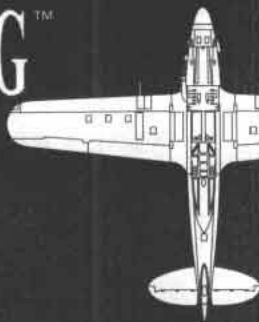
## PERKS &amp; FLAWS

Maximum Ceiling (3), Poor Visibility

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
12.7 Breda-SFAT	FF	1	2	4	8	0	x4	2	200 ea	Link, RDF: +1

## GEAR KRIEG™

MACHI C202  
FOLGORE

Year in Service:	1941	Maneuver:	0	Armor:	7/14/21
Threat Value:	105	Fire Control:	-2	Movement:	Air 9/19, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	1000 km
Crew:	1	Comm:	-2/75 km	Stall Speed:	xx

## PERKS &amp; FLAWS

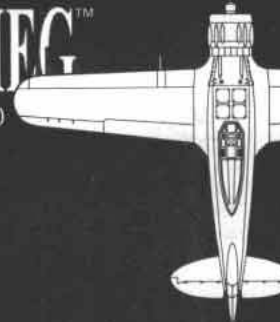
Maximum Ceiling (2), No Sensors

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
12.7 Breda-SFAT	FF	1	2	4	8	0	x4	2	200 ea	Link, RDF: +1
7.7 Breda-SFAT	FF	1	2	4	8	-1	x2	2	500 ea	Link, RDF: +2

Bombs 500kg (1, UW)

## GEAR KRIEG™

MACHI MC200  
SAETTA

Year in Service:	1939	Maneuver:	-2	Armor:	6/12/18
Threat Value:	70	Fire Control:	-2	Movement:	Air 8/16, Grd 2/3
Size:	4	Sensors:	None	Dep. Range:	570 km
Crew:	1	Comm:	-3/50 km	Stall Speed:	4

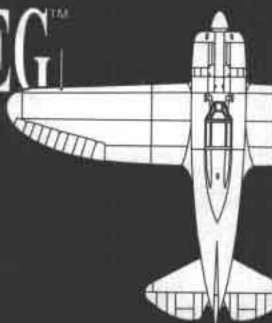
## PERKS &amp; FLAWS

Maximum Ceiling (4)

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
12.7 Breda-SFAT	FF	1	2	4	8	0	x4	2	200 ea	Link, RDF: +1
7.7 Breda-SFAT	FF	1	2	4	8	-1	x2	2	500 ea	Link, RDF: +2

## GEAR KRIEG™

REGIANE RE 2000  
FALCO

Year in Service:	1938	Maneuver:	0	Armor:	5/10/15
Threat Value:	90	Fire Control:	-2	Movement:	Air 8/17, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	949 km
Crew:	1	Comm:	-2/75 km	Stall Speed:	4

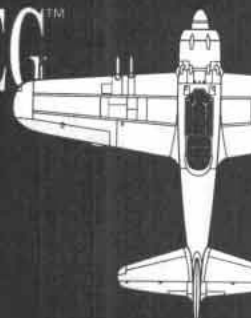
## PERKS &amp; FLAWS

Maximum Ceiling (1), Fragile Chassis

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
12.7 Breda-SEAT	FF	1	2	4	8	0	x4	2	200 ea	Link, ROF: +1
Bomb 500kg (1)										

## GEAR KRIEG™

MITSUBISHI A6M1  
ZERO-SEN "ZEKE"

Year in Service:	1940	Maneuver:	0	Armor:	6/12/18
Threat Value:	125	Fire Control:	-1	Movement:	Air 8/16, Grd 2/3
Size:	4	Sensors:	None	Dep. Range:	3122 km
Crew:	1	Comm:	-2/100 km	Stall Speed:	4

## PERKS &amp; FLAWS

Maximum Ceiling (2), Reinforced Chassis

## WEAPONS

20mm Type 99	FF	2	4	8	16	0	x6	2	60 ea	Link, ROF: +1
7.7 Type 97	FF	1	2	4	8	0	x2	2	100 ea	Link, ROF: +2

VARIANTS AGM2-N, TV: 150 Year in Service: 1941

Change: Movement: Air 7/14, Maximum Ceiling (3)

Add: Movement: Sea 2/3

## VARIANTS

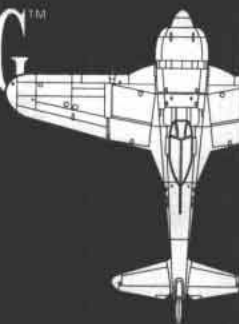
TV: 175 Year in Service: 1943

Change: Movement: Air 9/18, Size: 5, Range: 1930 km, Maximum Ceiling (1)

Change: Weapons

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm Type 99	FF	2	4	8	16	0	x8	2	80 ea	ROF: +2
13.2 mm	DM	1	2	4	8	0	x4	2	400 ea	ROF: +1

## GEAR KRIEG™

KI-44-I  
TOJO

Year in Service:	1940	Maneuver:	-2	Armor:	7/14/21
Threat Value:	90	Fire Control:	-2	Movement:	Air 9/19, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	901 km
Crew:	1	Comm:	-2/90 km	Stall Speed:	6

## PERKS &amp; FLAWS

Maximum Ceiling (1), Instability (landing)

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
12.7 mm	FF	1	2	4	8	0	x4	2	450 ea	Link, ROF: +1
7.7 Type 89	FF	1	2	4	8	0	x2	2	200 ea	Link, ROF: +2

VARIANTS KI-44-IIc, TV: 125 Year in Service: 1942

Change: Movement: Air 10/20, Range: 1700 km

Change: Weapons

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
12.7 mm	FF	1	2	4	8	0	x4	4	450 ea	Link, ROF: +1
Bombs 500kg (1, LW)										

## VARIANTS

KI-44-IIc, TV: 150 Year in Service: 1943

As II, except Change: 12.7mm to 82, Add: H031

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
40mm Ho-31	FF	3	6	12	24	0	x8	2	50ea	ROF: +1

## GEAR KRIEG™

MITSUBISHI J-7W1  
SHINDEN

Year in Service:	1942	Maneuver:	+1*	Armor:	7/14/21
Threat Value:	200	Fire Control:	0	Movement:	Air 12/24, Grd 2/3
Size:	6	Sensors:	-2/4 km	Dep. Range:	851 km
Crew:	1	Comm:	-2/80 km	Stall Speed:	6

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Maximum Ceiling (1), Reduced G-effect, Reinforced Crew Compartment

## WEAPONS

30mm	FF	3	6	12	24	0	x6	4	80 ea	ROF: +1
Bombs 500 kg (1)										

## VARIANTS

J7W2 "Shinden-Kai", TV: 250 Year in Service: 1943

Change: Movement: Air 17/35, Stall Speed 8, Range 650 km

Remove: Maximum Ceiling

Add: Stratospheric Flight, Jet

## GEAR KRIEG™

KAWASAKI  
KI-64 "ROB"

Year in Service:	1942	Maneuver:	0	Armor:	6/12/18
Threat Value:	130	Fire Control:	-1	Movement:	Air 11/23, Grd 2/3
Size:	6	Sensors:	None	Dep. Range:	1000 km
Crew:	1	Comm:	-2/100 km	Stall Speed:	6

## PERKS &amp; FLAWS

Fuel Inefficient

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm Ho-5	FF	2	4	8	16	0	x6	4	100 ea	Link, ROF: +1

VARIANTS KI-64-KAI, TV: 150 Year in Service: 1942

Change: Movement: Air 13/26, Stall Speed 7

## GEAR KRIEG™

TACHIKAWA  
KI-94

Year in Service:	1942	Maneuver:	-1*	Armor:	8/16/24
Threat Value:	160	Fire Control:	-12	Movement:	Air 13/26, Grd 2/3
Size:	7	Sensors:	None	Dep. Range:	800 km
Crew:	1	Comm:	-2/110 km	Stall Speed:	7

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Stratospheric Flight, Difficult to Bail

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
37mm Ho-203	FF	3	6	12	24	0	x7	2	75 ea	Link, ROF: +1
30mm Ho-105	FF	3	6	12	24	0	x6	2	100 ea	Link, ROF: +1

500kg Bombs (1, UW)

VARIANTS KI-94 Mk II, TV: 150 Year in Service: 1942

Change: Movement: Air 11/23, Size: 6, Range: 2100 km, Stall Speed: 6

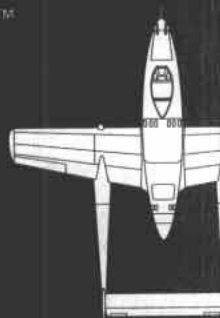
Remove: Difficult to Bail

## Change: Weapons

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
30mm Ho-105	FF	3	6	12	24	0	x6	2	90 ea	Link, ROF: +1
20mm Ho-5	FF	2	4	8	16	0	x6	2	100 ea	Link, ROF: +1

500kg Bomb (1, UW)

## GEAR KRIEG™

MANSYU  
KI-98

Year in Service:	1942	Maneuver:	0*	Armor:	7/14/21
Threat Value:	130	Fire Control:	-2	Movement:	Air 12/24, Grd 2/3
Size:	6	Sensors:	None	Dep. Range:	1000 km
Crew:	1	Comm:	-2/90 km	Stall Speed:	6

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Reduced G-effect, Difficult to Bail, Ejector Seat

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
37mm Ho-203	FF	3	6	12	24	0	x7	1	100	ROF: +1
20mm Ho-5	FF	2	4	8	16	0	x6	2	100 ea	Link, ROF: +1

1500kg Bombs (3, UW)

VARIANTS KI-98N TV: 140 Year in Service: 1943

Remove: No Sensors

Change: Sensors -1/8 km

Add: Defective Active Sensors (1)

## GEAR KRIEG™

AICHI D3A1  
"VAL"

Year in Service:	1936	Maneuver:	-2*	Armor:	8/12/18
Threat Value:	100	Fire Control:	-2	Movement:	Air 6/12, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	1820 km
Crew:	2	Comm:	-2/90 km	Stall Speed:	6

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Maximum Ceiling (3)

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
7.7 Type 97	FF	1	2	4	8	0	x2	2	500 ea	Link, ROF: +2
7.7 Type 97	DR	1	2	4	8	-1	x2	2	500 ea	Link, ROF: +2

Bombs 500kg (1, UW)

VARIANTS D3A2, TV: 125 Year in Service: 1941

Change: Movement: Air 7/15, Armor 7/14/21, Range 1560 km, Maximum Ceiling (2)

## GEAR KRIEG™

NAKAJIMA B5N1

"KATE"



Year in Service:	1937	Maneuver:	-2*	Armor:	7/14/21
Threat Value:	75	Fire Control:	-2	Movement:	Air 5/11, Grd 2/3
Size:	5	Sensors:	None	Dep. Range:	1099 km
Crew:	3	Comm:	-2/80 km	Stall Speed:	-3

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Maximum Ceiling (5), Exposed Auxiliary Systems

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
7.7 Type 89	DR	1	2	4	8	0	x2	1	500 ea	ROF: +2

Bombs 500kg (1,0W)

VARIANTS B5N2, TV: 100 Year in Service: 1939

Change: Movement: Air 6/12, Range: 980 km

Change Weapons

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
7.7 Type 89	FF	1	2	4	8	0	x2	2	500 ea	Link, ROF: +2
7.7 Type 89	DR	1	2	4	8	0	x2	2	500 ea	Link, ROF: +2

Bombs 1000kg (2,0W)

## GEAR KRIEG™

MITSUBISHI KI-21

"SALLY"



Year in Service:	1939	Maneuver:	-2*	Armor:	10/20/30
Threat Value:	200	Fire Control:	-3	Movement:	Air 7/14, Grd 1/2
Size:	6	Sensors:	None	Dep. Range:	2700 km
Crew:	7	Comm:	-2/100 km	Stall Speed:	4

\*Bomb-load penalty not included

## PERKS &amp; FLAWS

Maximum Ceiling (1), Maximum Climbing Angle (3)

## WEAPONS

7.7 Type 80	FF	1	2	4	8	0	x2	2	200 ea	Link, ROF: +2
7.7 Type 80	DR	1	2	4	8	0	x2	2	200 ea	Link, ROF: +2
7.7 Type 80	Rr	1	2	4	8	0	x2	1	200	ROF: +2

Bombs 1000kg (2)

VARIANTS KI-21 Mk II: 250 Year in Service: 1940

Change: Movement: Air 10/20, Perks &amp; Flaws: Maximum Ceiling (1)

Remove: DR weapon

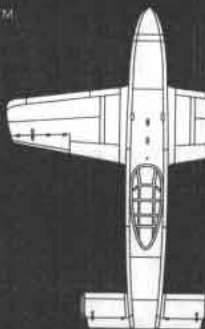
Add: Dorsal Turret

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
12.7 mm	DT	1	2	4	8	0	x4	4	450 ea	Link, ROF: +1

## GEAR KRIEG™

YOKOSUKA MXY-7

MODEL 11 OHKA "BAKA"



Year in Service:	1942	Maneuver:	-2 (-4*)	Armor:	5/10/15
Threat Value:	40	Fire Control:	-3	Movement:	Air 14/28
Size:	4	Sensors:	None	Dep. Range:	90 km
Crew:	1	Comm:	None	Stall Speed:	9

\*Rocket Penalty included vis-a-vis Turn Radius

## PERKS &amp; FLAWS

Maximum Ceiling (4), Rocket, No Communications, Hazardous Fuel Storage

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Warhead	FF	-	-	-	-	0	x15	1	-	Impact fused

VARIANTS Model 22, TV: 35 Year in Service: 1943

Change: Movement: Air 8/16

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Warhead	FF	-	-	-	-	0	x12	1	-	Impact fused

VARIANTS Model 13, TV: 70 Year in Service: 1943

As Model 11, except:

Change: Movement: Air 11/22

Remove: Rocket

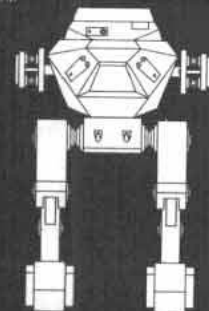
Add: Jet

Change: Dep. Range 250 km

## GEAR KRIEG™

PZKPF V AUSF X

"STURMVALKURIE"



Year in Service:	1941	Maneuver:	-1	Armor:	8/16/24
Threat Value:	110	Fire Control:	-1	Movement:	Walk 3/6
Size:	7	Sensors:	None	Dep. Range:	40 km
Crew:	2	Comm:	-2/10 km		

## PERKS &amp; FLAWS

Anti-Air, 2 x Battle Arms (5), Inefficient Controls, Poor Towing

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
20mm AA	DT	2	4	8	16	0	x6	4	120ea	Link, ROF: +2, AE: 1



# GEAR KRIEG™

LIGHT AA BATTERY  
(20MM OERLIKON/  
FLAKVIERLING)

Year in Service:	1939	Maneuver:	-	Armor:	3/6/9
Threat Value:	300	Fire Control:	0	Movement:	-
Size:	4	Sensors:	None	Dep. Range:	-
Crew:	4	Comm:	None		

## PERKS & FLAWS

Anti-Air

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Light AA	DT	1	2	4	8	0	x8	4	200 ea	Link, ROF+2, AE:1

# GEAR KRIEG™

HEAVY AA BATTERY  
(QUAD 40MM, 88MM)

Year in Service:	1939	Maneuver:	-	Armor:	4/8/12
Threat Value:	400	Fire Control:	0	Movement:	-
Size:	5	Sensors:	None	Dep. Range:	-
Crew:	4	Comm:	None		

## PERKS & FLAWS

Anti-Air

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Heavy AA	DT	2	4	8	12	0	x10	4	60 ea	Link, AE: 3

# GEAR KRIEG™

ROCKET AA BATTERY  
(W-5 "WASSERFALL,"  
F55 "FEUERLILIE")

Year in Service:	1942	Maneuver:	-	Armor:	2/4/6
Threat Value:	500	Fire Control:	0	Movement:	-
Size:	5	Sensors:	None	Dep. Range:	-
Crew:	4	Comm:	None		

## PERKS & FLAWS

Anti-Air

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Ground-Air Missile	DT	3	8	12	24	-2	x25	1	5	*

\*Auto-pilot, Wire-Guided, Armor-Crushing, AE: 1

# GEAR KRIEG™

CHAIN AND CHUTE  
LAUNCHER

Year in Service:	1940	Maneuver:	-	Armor:	2/4/6
Threat Value:	200	Fire Control:	+1	Movement:	-
Size:	4	Sensors:	None	Dep. Range:	-
Crew:	4	Comm:	None		

## PERKS & FLAWS

Anti-Air

## WEAPONS

Name	Arc	S	M	L	Ex	Acc	DM	#	Ammo	Spec
Chain Gun	DT	1	2	4	8	0	Spec.*	1	5	AE:1

\*A unit in the AE of a Chain Gun burst must make a Piloting Skill test or else fly into the chain with the same effects as a Barrage Balloon (see page 50).

**Altitude Loss Table**

# OF TURNS	DROP
1	5
2	10
3	15
4+	20

*# of Turns is the # of turns the aircraft has remained stalled.*

*Drop is the number of altitude levels lost during the turn. The maximum number of altitude levels lost in one turn is 20.*

**Terrain Table**

TERRAIN	OBSCUREMENT
Clear Skies	0*
Light Cloud	0.5
Heavy Cloud	1
Storm Cloud	2

*\* If Clear Skies is the only terrain/ weather between the target and the spotter, its effective Obscurement is -2 (it's hard to hide in an open sky)*

**Tailing**

- Have the target aircraft in its Front Arc
- Be in the Rear Arc of the target aircraft
- Be within 2 MU of the target
- Be at the same altitude level as the target
- Neither aircraft must have moved this turn

**Using Command Points**

- Extra Action (no penalty)
- Defensive maneuvering (+2 to single defense roll)
- Activate a unit out of sequence (if it hasn't been activated already)

**Turn Summary Table**

STEP ONE:	DECLARATION PHASE
Both sides declare any extra Actions and evasive maneuvers.	
STEP TWO:	INITIATIVE PHASE
Each side rolls a test based on their commander's Leadership Skill.	
STEP THREE:	ACTIVATION PHASE
Move any or all units in one combat group.	
Once every unit has acted, the other side activates one combat group.	
STEP FOUR:	MISCELLANEOUS EVENTS PHASE
Bombing attacks are resolved.	
Initiative Command points go back to zero.	
Any Action not spent at this point is lost.	

*Repeat Steps 1 to 4 until the battle is resolved or pre-planned objectives are met. A combat group may only be activated once per combat turn.*

**Detection Threshold Modifiers**

APPLIED TO ATTACKER'S ROLL	
Sensor Bonus	variable, by default 0
APPLIED TO (CONCEALMENT) THRESHOLD	
Stealth Bonus	variable, by default 0
Movement Penalty	-1 per 5 MUs moved by target (round down)
Combat Penalty	-1 per weapon fired by target this turn

**Aircraft Loss of Control table**

DIE ROLL	EFFECT
1	Nothing more than a good scare. (Pilot loses 1 Action.)
2	Aircraft Sideslips, as per maneuver. Roll randomly for left or right.
3	Aircraft Skids (turns 60-degrees, but keeps going in the same direction) for a number of MUs equal to the roll of one die. Roll randomly for left or right if necessary. If the aircraft runs out of MPs during the skid, it must make them up by beginning the next movement phase with the remainder of the skid.
4	Aircraft suffers Light Structural Damage.
5	Aircraft loses a number of altitude levels equal to the roll of one die.
6-7	Aircraft Stalls.
8-9	Aircraft suffers Light Structural Damage and Stalls.
10	Aircraft suffers Heavy Structural Damage.
11	Aircraft Suffers Heavy Structural Damage and Stalls.
12+	Aircraft falls into an uncontrollable spin. It suffers Heavy Structural Damage and will plummet to the ground and crash unless the pilot makes a Piloting roll vs. a Threshold of 10.

**G-Effects**

Whenever an aircraft spends more than 10 MP in one go, the pilot immediately make a Piloting Skill test against a Threshold of (3+ number of MP spent over 10), +1 for an Inverse loop. If the roll succeeds the pilot continues to act normally. If failed, the MoF is a penalty to Piloting Skill tests for the turn. If Fumbled, all further Piloting tests for the turn fail automatically.

## Special Maneuvers

**SIDESLIPPING:** For every 3 MUs of forward motion, the plane can move sideways up to 1 MU left or right. Facing does not change. There is no test or MP cost.

**ROLLING:** Rolling adds +1 to Defense tests and -1 to all Attack tests. Piloting Threshold is 4; if failed, roll on the *Aircraft Control Loss Table*. Requires one Action, but no MP.

**FULL LOOP:** MP cost is Turn Radius x 6 (min. of 6); Piloting Threshold is Turn Radius +1 (min. 3). The aircraft ends its movement within a distance and altitude of its starting point equal to the TR, in MUs.

**HALF LOOP:** MP cost is Turn Radius x 3 (min. 3); Piloting Threshold is Turn Radius +1 (min. 3). Heading is changed by 180°, and altitude must be changed by at least the Turn Radius x 1.5, up to twice the TR.

If failed, roll on the *Aircraft Control Loss Table* (page 33), adding +1 for a Half Loop, +2 for a Full Loop and +3 for an Inverse Loop.

A Tailed aircraft may loop to break the tail. Tail tests are outlined on page 27; the target adds half the Loop's Turn Radius (round down) to its break roll.

**GLIDING:** Lose any combination of 2 points of either speed (in MPs) or altitude per turn. If speed falls below Stall Speed, aircraft immediately stall. Gliding aircraft can use the Diving maneuver to gain speed.

Supersonic planes (Top speeds of 40+) must lose any combination of 3 points of speed or altitude, with a minimum altitude level loss of one. Glider Perk have to lose one Altitude Level or MP of speed per turn.

**DIVING:** Spend MPs equal to full Combat speed or more. Loses that number of Altitude levels, plus the number of levels indicated in the Altitude Loss table.

Pulling out is a Piloting test against a Threshold of 4. A failed test means the aircraft begins to fall as if stalling. A Fumble requires a roll on the *Aircraft Control Loss Table*; apply its effects in addition to the normal effects of a failed Piloting roll, unless they're redundant or contradictory.

The pilot of an aircraft pulling out of a dive can choose any facing he wants; see *Stalling*. The speed pulling out of a dive is equal to the amount of Altitude Levels dropped in the last round of the dive. The aircraft may temporarily exceed its Top Speed.

## Attack And Defense Modifiers

### ATTACK ROLL MODIFIERS:

•	Fire Control Rating
•	Weapon Accuracy Rating
•	Range Modifier
•	Attacker Movement Modifier
•	Obscurement Penalty

### DEFENSE ROLL MODIFIERS:

•	Maneuver Rating
•	Defender Movement Modifier
•	Arc of Attack Modifier

### POSSIBLE OUTCOMES:

If Attackers total is > Defender's	HIT
If Attacker's total is ≤ Defender's	MISS

## Attack Modifiers

### RANGE MODIFIER

Short (from 1 MU to base range)	0
Medium (from previous to two (2) times base range)	-1
Long (from previous to four (4) times base range)	-2
Extreme (from previous to eight (8) times base range)	-3
Target Tailed this turn	+1

### OBSCUREMENT MODIFIERS

Clear Skies	0	Light Cloud	0.5 (round down)
Heavy Cloud	1	Storm Cloud	2

### MOVEMENT MODIFIERS

Stationary	+2	Half Combat Speed or less	+1
Combat Speed	+0	Top Speed	-3

### MISCELLANEOUS MODIFIER

Target is infantry	-2
--------------------	----

## Defense Modifiers

•	Maneuver value		
•	Target Speed Modifiers		
MUS MOVED	DEFENSE MODIFIER	MUS MOVED	DEFENSE MODIFIER
0	-3	7-9	+1
1-2	-2	10-19	+2
3-4	-1	20-99	+3
5-6	+0	Tailed by attacker this turn	-1

### DEFENSE ARC MODIFIERS

If attack is in the defender's Front	0
If attack is from defender's Rear Flank or Above	-1
If attack is from defender's Rear or Below	-2

**Systems Damage Table: Light Damage**

ROLL	DAMAGED SYSTEM	RESULT
1	Fire Control	Roll on Sub-table A
2	Structure	Roll on Sub-table B
3	Crew	Crew stunned (-1 Action for 1 turn)
4	Movement*	-1 Movement Point
5	Auxiliary Systems	-1 to 1d6 Auxiliary Systems
6		Roll Twice on this table**.

**Systems Damage Table: Heavy Damage**

ROLL	DAMAGED SYSTEM	RESULT
1	Fire Control	Roll on Sub-table A and add +1
2	Structure	Roll on Sub-table B and add +1
3	Crew	Crew killed; 10% casualties, min. 1
4	Movement*	1/2 remaining MP (round down) & -2 Maneuver
5	Auxiliary Systems	1d6 Auxiliary System destroyed
6	Roll Twice on this table**	-

\*Choose Flight or Ground movement / \*\* If the attack was a called shot, the attacker hits his target location (as effects 1 to 5 on table, depending on target).

**Subtable A: Fire Control Damage**

DIE ROLL	EFFECT
1	-1 Accuracy to a single Weapon
2	-2 Accuracy to a single Weapon
3	-1 Accuracy to all Weapons
4	Single Weapon destroyed
5	Fire Control system destroyed (-5 to all attacks)
6	Roll Twice on this table
7	Ammunition/Fuel Hit (roll 1d6)
1-3	Ammo Storage and Fuel Tank Ruptured (aircraft cannot move or fire weapons)
4-6	Chain Reaction! Ammo and Fuel Explodes! (Aircraft Destroyed and all Crew Killed)

**Subtable B: Structural Damage**

DIE ROLL	EFFECT
1	Engine damage; -1 Flight Movement Point
2	Engine damage; 1/2 remaining Flight MPs (round down)
3	Control surface damage; -1 to Maneuver
4	Control surface damage; -2 to Maneuver
5	Control failure; -3 to Maneuver and aircraft goes out-of-control
6	Catastrophic crew compartment failure: 75% casualties, minimum 1
7	Complete structural failure; aircraft is destroyed; crew can attempt to bail out

**Ramming Speed**

RAM. DIREC.	IMPACT SPEED
Head On	Attacker + Defender
Side	Attacker Speed
Rear	Attacker - Defender

**Impact Speed Modifiers**

IMPACT SPEED	DAMAGE MOD.
1-2	-2
3-4	-1
5-6	+0
7-9	+1
10-19	+2
20-99	+3

**Bailout Table**

SITUATION	MODIFIER
Aircraft straight and level	-1
Banking/Climbing	+1
Diving	+2
Out of Control†	+3
AIRCRAFT	MODIFIER
Equipped with Ejector seat(s)	-2
Difficult to Bail flaw	+2
Speed ≤ 10	0
Speed > 10	+1
Aircraft sustained No Damage	0
Aircraft sustained Light Damage	+1
Aircraft sustained Heavy Damage	+2
Aircraft Overkilled or struct. collapse*	+4
CREW	MODIFIER
Actions taken this turn	# of Action
Crew	+(Crew/2, round down)

\*These damage results trigger an automatic bailout attempt at no Action cost.

†Rolled on the Control Loss table this turn.

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


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P51 MUSTANG			P51 MUSTANG			SUPERMARINE SPITFIRE		
								
SUPERMARINE SPITFIRE			SUPERMARINE SPITFIRE			SUPERMARINE SPITFIRE		
								
ZERO			ZERO			ZERO		
								
ZERO			Command Point			Command Point		
			Command Point			Command Point		
			Command Point			Command Point		
			Command Point			Command Point		

			SNAP FIRE
			
			
			TOP SPEED
			
			
			TAILED
			
			
			INCENDIARY
			
			
			STUNNED
			
			
			OVERSPEED
			
			
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