

WarBirds 2019

Updates on Flight Models, Guns, and More!

June 2019

Version 4.33 R3 FL2069 05/09/2019

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---== UPDATE FL2069: AVENGERS - PACIFIC ENDGAME ==---

By: Robert, Grumpy & Bollok.

All made possible by: Bcamel (creator of the program used to model the airplanes), and Idunno (who has shared a vast amount of aerodynamical knowledge).

See the forum post for detailed performance graphs at:

<http://bhlanding.iient.com/warbirdsforum/viewtopic.php?f=8&t=553&p=4181#p4181>

--= TBF Avenger series =--

The Avengers have been fully remodeled and should now more closely match real ww2 performance. See further down for details.

--= Yakovlev series=--

The Yak-3, Yak-9D and Yak-9U have had their Oswald factor recalculated and improved (Wing efficiency factor which governs the liftco vs induced dragco ratio). They now retain their energy better which also slightly affects their sustained turn rate positively.

--= Lavochkin series =--

The La-5F, La-5FN, La-7 and La-7-3 have also had their Oswald factor recalculated and improved. They now retain their energy better which also slightly affects their sustained turn rate positively.

--= MiG-3 =--

The Mikoyan-Gurevich MiG-3 has had both its roll rate and Oswald factor reassessed and improved.

--= Macchi series =--

The C.200, C.202 S.III, C.202 S.VII and C.205 have all had their roll rate greatly improved. The C.202 S.III now rolls just slightly inferior to a Bf 109F-4, while the C.205 rolls just slightly inferior to a Bf 109G-6/RVI. All the Macchis have also had a minor improvement to their Oswald factor.

--= 1 minute WEP improvement =--

Planes with a 1 minute WEP limit were previously set to heat up from 74-144 degrees in exactly one minute (1.17 deg/sec). As such, depending on current engine temperature, the engine would often overheat within 30 seconds or even less. The 1 minute limit WEP's will now instead rise by 0.78 deg/sec, allowing for 1.5 minutes of WEP usage before overheat when fully cooled, and usually ~1 minute usage even after having run on military power for a while. This should also reduce the risk of accidentally overheating the engine.

* This improvement affects the:

J2M2, J2M3, N1K1, Ki-84, C.202 S.III, C.202 S.VII, C.205, Ju-87D, Ju-87G, Bf 110C-4, Bf 110G-2, Bf 109E-1, Bf 109E-3, Bf 109E-4Aa, Bf 109G-6, Bf 109G-6/RVI

--= P-38 Lightnings =--

* The P-38J can not carry rockets anymore, this wasn't an available loadout until the P-38L.

* the P-38L can now dive at a 40 mph higher speed before compression occurs, this thanks to better data found on the effect of the dive-flaps.

--= IL-2 =--

Slight correction to muzzle location of the guns.

---== THE TBF AVENGER SERIES FULL REHAUL ===---

The Grumman Avenger first made combat entry at the Battle of Midway 1942, and soon became one of the best American single engine carrier bombers of the Pacific War. As Grumman switched production to the F6F Hellcat, General Motors took over the production renaming the plane to "TBM". The TBF had a crew of three with both a .50 cal top turret and a .30 cal ventral gunner. The ventral gunner was also the radioman/bombardier and had a full arsenal of the most advanced radio equipment used in a single engine plane of WW2. The Avenger was rugged, large and handled like a truck. With 4x 500 lb bombs

the TBF-1C weighed in at 16425 lb. It's powerful 1700 hp Wright R-2600-8 engine and huge 490.02 square feet wing area meant that it had almost the hp/weight ratio and wingloading of a F4F-4 Wildcat though. This actually allows a clean Avenger to turn with many contemporary fighters except the nimbler ones. It's a handy defensive strategy, especially against the heavier late war fighters, although the Avenger is clearly inferior to fighters regarding top speed, climb rate and roll rate so should avoid dogfights if possible. The TBF's have a diverse set of loadouts and can also carry a large drop tank in the bomb bay for long range scouting missions.

--= TBF-1 =--

Powered by the 1700 hp Wright R-2600-8 engine the TBF-1 is a very good single engine bomber for it's era and can be used successfully for both torpedoing ships, deploy sea mines, dive bombing, or level bombing from the bombardier view. It is armed with a single forward firing .30 cal machine gun that can be used for strafing if needed.

--= TBF-1C =--

The -1C made entry in 1943 and is very similar to the -1, but has an improved forward armament of two .50 cal machine guns. This makes it better for strafing purposes and also allows it a fair bite against enemy planes who underestimate the turn rate of an unladen Avenger (It also has a higher airspeed velocity than an unladen swallow). The TBF-1C can also use two wing drop tanks for long range bombing missions.

--= TBM-3 =--

*** Not yet in the game, might get released at a later date.***

The TBM-3 was built by General motors and made combat entry at the start of 1945. It has a 200 hp stronger Wright R-2600-20 engine as well as the option to carry rockets and a better bomb load. An important difference is also the new engine's better high altitude performance, allowing the TBM-3 a 32 000 ft ceiling as well as a better top speed up high. This enables the TBM-3 to ingress above 25 000 ft, where American escort fighters have a distinct speed advantage over the Japanese fighters.

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/Robert

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Version 4.33 R1 FL2068 05/09/2019

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Bug fix: Manned Ack rate of fire

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Version 4.32 R9 FL2068 04/19/2019

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Bug fix: Gunner rate of fire for a given weapon matches pilot

Offline damage/weapons will match current Online

Weapon changes by Robert:

I've set the NS-37 to 240, which gives 4.17 rps or 250 rpm.

The MG 81J to 40, which gives 25 rps or 1500 rpm.

The MG 81Z to 20, which gives 50 rps or 3000 rpm. (twin barreled, pretty much two MG 81J's fixed together).

I've also set the 7.62 mm MG 81J/Z projectile weights to the same weight of 0.80 as normal 7.62 mm's ammo. There's no reason the MG 81's ammo should be twice as heavy since they have the same damage values as other German 7.62 mm guns.

The M4 Cannon now does 40 dmg, up from 30.

The 3 inch RP-3 rocket now does 240 dmg with blast radius of 220. Up from 200 dmg - 200 radius.

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Version 4.32 R8 FL2068 03/22/2019

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---- UPDATE FL2068: ROLLING OVER RUSSIA ----

By: Robert, Grumpy & Bollok.

All made possible by: Bcamel (creator of the program used to model the airplanes), and Idunno (who has shared a vast amount of aerodynamical knowledge).

-- Lavochkin series --

The Lav's all have had their roll rate improved. According to German tests of a captured La-5, the Lavochkin could outroll the Bf 109. The Lavochkin flightmodels were currently way to sluggish in the roll and have now been set so that they can out roll the Bf 109. This change applies to the La-5F, La-5FN, La-7 & La-7-3.

--= Yakovlev series =--

The Yak's were also found to have a to sluggish roll rate. The Yak-3 can now roll fairly evenly with the Bf 109, while the Yak-9D and Yak-9U roll somewhat slower than the Yak-3 since they are larger and heavier. They all roll much better now than before though.

--= Fw 190 series =--

All Fw 190's have had their roll rate slightly improved since it was somewhat below ww2 trial data. The Fw 190's with four cannons in the wings now also roll slower than the versions with only two cannons in the wings.

--= Bf 109 series =--

Further fine-tuning of the elevator authority with increasing airspeed. At neutral elevator trim the Bf 109's can now on average pull 5.5+ G's at 300 mph, and 2.8 G's at 400 mph. This varies slightly between the Bf 109 versions depending on weight and model.

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Version 4.32 R8 FL2066,FL2067 03/12/2019

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---== UPDATE FL2067: TANK BUSTERS OF THE EASTERN FRONT ==---

By: Robert, Grumpy, Bollok, Jabo and Sleepy.

All made possible by: Bcamel (creator of the program used to model the airplanes), and Idunno (who has shared a vast amount of aerodynamical knowledge).

--= Ilyushin IL-2 Shturmovik =--

Full rehaul of the IL-2 dive bomber flightmodel. See further down for details.

--= Junkers Ju-87 Stuka series =--

Full rehaul of the Ju-87D-3 and Ju-87G-1 dive bomber flightmodels. See further down for details.

--= Messerschmitt Bf 109 series =--

The elevator heaviness with increasing airspeed has been found to be slightly to severely set. The Bf 109G should be able to pull around 5.5 G's at 310 mph IAS, but could currently only pull 4.5 G's at this speed. This is an issue for all Bf 109's. As such the elevator is now set to increase slightly less in heaviness so that Bf 109's can now pull ~5.5 G's at 310 mph IAS as they should, and will of course also have slightly more pitch control at higher speeds.

---== THE ILYUSHIN IL-2 SHTURMOVIK FULL REHAUL ===---

One of the most iconic Russian airplanes of ww2 was probably the IL-2 Shturmovik, often called "The flying infantryman". It was the most numerous built plane of Russia and was a specialized dive bomber, fielding the powerful Mikulin AM-38F engine which provided 1720 hp at sea level. It was very poor at high altitudes though and the IL-2 had a service ceiling of only 18000 ft (5500 m). The Shturmovik's whole center fuselage structure was made of armor, and the armor covered both the fuselage, engine and pilot, ranging between 5-12 mm thickness. The pilot was also protected by a 65 mm armored windshield. There were several occasions of German fighter pilots reporting their bullets bouncing off the Shturmovik. The German veteran pilots learnt to attack the IL-2 from down and under, destroying it by hitting the hydraulics system of the belly. Against ground targets only 20 mm cannons really posed a threat to the IL-2, and enemy fighters attacking from behind was a far greater concern. While the pilot was well protected, the rear gunner was more easily killed by enemy fire and the tail section was made of wood and more susceptible to damage. Often times rear gunners were recruited from the Gulag death-camp prisons. Roughly 10750 IL-2's were lost in action during 1941-1945. The Ilyushin IL-2 was on many occasions used in air-to-air to attack German bombers and Stukas. It was effective as a Stuka-killer since the defensive machine gun of the Ju-87 had trouble penetrating the thick armor of the IL-2 and the Shturmovik had a better power-to-weight ratio than the Ju-87 at low altitudes, allowing it to outturn the German dive bomber when down low. The job it was made for though was to support the Russian ground troops by attacking artillery positions and German tanks. The Russian accounts of German tanks destroyed by the IL-2 in battles were often greatly exaggerated, but the Shturmovik definitely made an important difference in the war and was the demise of many German tank crews.

---== THE JUNKERS JU-87 STUKA SERIES FULL REHAUL ===---

The Junkers Stuka dive bombers spread terror in the opening stages of ww2 by attacking ground targets with its dive sirens screaming and easily recognisable inverted gull wings. It was a very sturdily built plane able to sustain a high G-load and was generally quite easy to handle at all speeds. As long as it had fighter escort the Stuka was very good at its job. In the Battle of Britain though the Ju-87B's were often unescorted and fell prey to the British fighters, taking heavy losses when intercepted. The Ju-87D-3 that fought over the Eastern front was more heavily armored than previous versions and had the new Jumo

211-J engine, allowing for 1240 hp at 5000 ft, and with a short duration take off power of 1410 hp. It could also carry a much higher payload of 1800 kg (3968 lb) at overload conditions. At the Eastern front the Ju-87's often had escort and were very effective at killing tanks and other ground targets. Stukas even sunk several Russian battleships and cruisers. They racked up ground-kills for very few losses and the most decorated pilot of Germany was a Stuka pilot, Hans-Ulrich Rudel, accounted with the destruction of 519 Russian tanks and sinking the "Marat" battleship. As the tide of the war turned though Germany soon had a harder time providing adequate fighter escort for the Stukas, and their losses started to amount when faced alone against Russian fighters. The Ju-87's still kept busting many tanks, but now at a much higher cost. The Stukas have a very gentle stall behaviour, and are decently agile and can defend themselves as long as they have energy and altitude to sacrifice. They have a much better high altitude performance compared to the IL-2 Shturmovik. Once low n' slow though their low power-to-weight ratio means that they'll have a very hard time turn fighting and maneuvering. A positive trait is that the Ju-87D's/G's are well armored and can withstand more damage from the front than a normal fighter would.

--= The Ju-87D-3 =--

This version had upgraded armor and could carry a very high payload for a single engine plane. In overload conditions it could be armed with a single 1800 kg bomb or 1x 1000 kg bomb under the fuselage and 2x 500 lb bombs under the wings. It could also use drop tanks for long range missions. The climb rate in overload condition though is only 1.5-2.5 m/s (300-500 ft/min), but the extra payload can be well worth it once at the target.

--= The Ju-87G-1 =--

A development of the D-3, the Ju-87G-1 used two heavy 37 mm BK cannons with 12 rpg instead of bombs. This version fielded the same Jumo 211-J engine as the D-3, and was a very effective can opener against Russian armored ground vehicles.

---== UPDATE FL2066: TIFFIES ===---

By: Robert, Grumpy & Bollok

All made possible by: Bcamel (creator of the program used to model the airplanes), and Idunno (who has shared a vast amount of aerodynamical knowledge).

Detailed performance charts of the new Typhoons are available at the Warbirds Forum at:

<http://bhlanding.iement.com/warbirdsforum/viewtopic.php?f=8&t=486>

--= Hawker Typhoon Ib's =--

Full rehaul of the Hawker Typhoon Ib 1942 and 1944 flightmodels. See further down for details.

--= Vehicle info =--

The vehicle info has now been updated for all fighters. Which of the P-51D and Fw 190D-9 has the highest top speed? Can a Bf 109E-4 really outturn the Spitfire Mk.II? One can now find performance numbers for top speeds at various altitudes, stall speeds, climb time to 16400 ft, sustained turn rate at sea level, service ceiling etc in the updated vehicle info for all the ww2 fighters. All performance numbers are from meticulous tests of the flightmodels in Warbirds. The vehicle info is accessed from the Tower menu.

--= P-38 Lightning series =--

Manual elevator trim span slightly increased.

--= Macchi series =--

The Macchis had specifically designed uneven left vs right wing spans in order to counter the torque effects. As such the Torque effects for all Macchis have been somewhat reduced.

==== THE HAWKER TYPHOON IB SERIES FULL REHAUL ====

The Typhoon was nicknamed "Tiffie" by it's pilots. It is probably best known for it's ability of intercepting the Focke Wulf 190. The Napier Sabre IIa was very powerful for an inline engine and required a large air intake for RAM cooling. It was very effective at high speeds but couldn't produce as many horsepowers at low speeds where the air RAM cooling effect was distinctively reduced. An effect of this was that the Typhoon Ib was hampered in the climb, compared to the max power output of the Sabre IIa engine, although it still held quite a decent climb rate. The Hawker Typhoon was a heavy fighter at 11083 lb but the wings were very thick for ww2 standards, just like for the Hawker Hurricane. This allowed it a surprisingly good stall speed and turn rate for it's size. The drawback, just like for the Hurricane, was a higher drag profile which affected the top speed of the Tiffie. It also had a fairly slow roll rate. The high dragco issue became a larger problem as top speeds were increasing as the war progressed, but the Typhoon underwent several drag reducing changes, allowing it a top speed not to far from the fastest fighters of WW2. The Hawker company later produced the Hawker Tempest, which was designed with much thinner wings. The thick robust wings of the Typhoon allowed it to outturn other late war fighters of equal size. The Tiffie had a quite sudden stall though. The Typhoon was also able to carry a heavy payload and excelled as a fighter bomber, especially since it's engine was tooled for low altitudes. A low altitude environment is where the Tiffie is at it's best, and it's pilots should avoid to fight above 20000 ft if possible.

--= The 1942 version =--

The Hawker Typhoon Ib engine was initially restricted to +7 lbs of manifold pressure. At this setting the engine was capable of 2090 hp at 8500 ft, which still was a respectable power output for an inline engine. While the Fw 190A-4 is somewhat faster at WEP, The Focke Wulf can only run at WEP for 3 minutes, while the Tiffie can use +7 lbs boost for 60 minutes, which allows it to eventually run with the Fw 190A-4 while also being the better turn fighter. For a 1942 fighter though the Typhoon's sustained turn rate isn't impressive and the Tiffie pilot will usually do best with boom n' zoom tactics, depending on the opponent.

--= The 1944 version =--

This version of the Typhoon Ib was cleared for using WEP at +9 lbs manifold pressure, which allowed the Napier Sabre Ila engine to produce 2200 hp at 6000 ft. This alone resulted in an increase of ~11 mph top speed when below 17000 ft. Even more importantly the 1944 version had several drag reducing fixes, like shortened exhaust stacks, that resulted in an additional 18-20 mph increase in top speed. As such the 1944 version is ~30 mph faster than the 1942 version, depending on altitude. These improvements also have a positive effect on the sustained turn rate, giving the later Tiffie version a better power/weight and power/dragco ratio. As such the 1944 model Typhoon can hold a much better sustained turn rate than the 1942 version, and is one of the better turn fighters of the late war era. By 1944 the Typhoon could also be equipped with 2x 1000 lb bombs and 8x RP-3 rockets.

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Version 4.32 R8 01/29/2019

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Stutter/Pause during flight online bug fixed

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Version 4.32 R7 FL2065 01/03/2019

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---== UPDATE FL2065: COBRA KAI =---

By: Robert & Grumpy

All made possible by: Bcamel (creator of the program used to model the airplanes), and Idunno (who has shared a vast amount of aerodynamical knowledge).

Please visit the Warbirds forum for detailed performance diagrams on the new flightmodels at:

<http://bhlanding.iement.com/warbirdsforum/viewtopic.php?f=8&t=449&p=3583#p3583>

--= P-39 Airacobra series =--

Full rehaul of the P-39D, P-400 and P-39Q flightmodels. See further down for details.

--= J2M Raiden (Thunderbolt), "Jack" series =--

Full rehaul of the J2M2 and J2M3 flightmodels. See further down for details.

--= I-16 =--

The flightmodel is now set to use SAE system by default since the cockpit gauges do not use the metric system.

--= N1K1-J =--

Stall speed reduced by 2 mph, was discovered to be too high. Military power at Bst1 and WEP at Bst2 now have a maximum of 60 min and 15 min total usage per sortie (3600 sec and 900 sec). This to simulate the Methanol injection tank capacity. Bst1 and Bst2 are still limited to 30 min and 1 min stints respectively before engine overheat.

--= Ki-84 =--

Military power at Bst1 and WEP at Bst2 now have a maximum of 60 min and 15 min total usage per sortie (3600 sec and 900 sec). This to simulate the Methanol injection tank capacity. Bst1 and Bst2 are still limited to 30 min and 1 min stints respectively before engine overheat.

==== THE BELL P-39 AIRACOBRA SERIES FULL REHAUL =====

The Bell P-39 saw combat at nearly all fronts of the war. While the RAF and USAAF were not impressed with it due to its poor high altitude performance, owing to the lack of a supercharger, the Russians loved the Airacobra as an air-to-air fighter in the low altitude fighting environment of the Russian/German front. The P-39 is an unconventional fighter in that it has the Allison V-1710 engine installed behind the pilot. This allows for a quite narrow nose shape, causing lower drag than normal and allowing for a higher top speed. The armament is heavy with several machineguns and a massive 37 mm cannon in the nose. This cannon can bring down any fighter in a few hits but has a slow rate of fire, making it hard to hit a fast maneuvering target. The P-39 has a very good dive speed and can turn decently but should avoid a tail chase against nimbler early/mid war era opponents. The controls are

responsive at all speeds, with only the roll rate suffering a bit at higher velocities. While being relatively heavy for it's era, like most American WW2 fighters, the Airacobra is well armored and can take more hits than normal planes of it's size. With the engine in the back it is quite vulnerable to engine damage though. The best traits of the Airacobras is that they are overall quite decent in most respects and have an impressive top speed at low altitudes for the dates they enter the war. The P-39 pilot should generally strive to bring the enemies below 10000 ft, keep a high speed boom n zoom approach, work with wingman tactics and avoid taking the fight at high altitudes.

--= P-39D =--

The P-39D entered combat in early 1942, powered by the Allison V-1710-35 engine with a maximum WEP 56" Hg output of 1470 hp at sea level. This fighter can run with a Fw 190A-1 below 5000 ft and is very competitive close to sea level, although it's engine chokes above 14000 ft and it gets outclassed by most fighters at high altitudes.

--= P-400 =--

The P-400 was the export version and is very similar to the P-39D but with a 20 mm cannon replacing the 37 mm cannon. The difference in armament makes it around 170 lb lighter than the USAAF version.

--= P-39Q =--

Delivery of the P-39Q to combat units started in late 1943 and this version has the Allison V-1710-85 engine, which is a bit weaker at low altitudes but has a 3000 ft higher FTH (full throttle height). Furthermore the P-39Q carries less fuel, 87 gal vs 120 gal, and as such is lighter than the P-39D. It also has several aerodynamical improvements which gives it a higher top speed than it's predecessors and this Airacobra version can run with most 1943-1944 fighters down low. For it's era it can turn quite well. Even though it's high altitude performance is slightly improved compared to the P-39D, the P-39Q rapidly loses power above 17000 ft.

---== THE MITSUBISHI J2M RAIDEN (THUNDERBOLT), "JACK" SERIES FULL REHAUL ==---

The Mitsubishi J2M2 entered combat in June 1944. It was a new more advanced fighter, designed by Jiro Horikoshi, the same man that earlier had designed the Mitsubishi A6M Zero. It was a formidable opponent when it arrived, but the Japanese army pilots were often fresh and lacked proper training, and the J2M Kasei 23a engine proved very difficult to maintain for the ground crews. The Japanese pilots were also outnumbered by more than 1:4 numbers at the time the J2M arrived and as potent as this fighter was, it had all the odds against it from the get go. That being said a fully functional J2M Raiden with a good pilot behind the stick is definitely a very competitive fighter, and fairly similar in performance to the Ki-84 and the N1K1. While American late war fighters will out run it, the Raiden

easily out turns and out climbs them. While it is a lightweight late war fighter, the stall speed is fairly high. The controls also become heavy with increasing airspeed. Thanks to its raw power/weight ratio though it is a great turner in a low n slow dogfight. The armament is also quite good and it can pack a punch. The J2M pilot really needs to save the WEP for crucial moments though, since the engine problems it suffered means the J2M will quickly overheat if run at to high manifold pressures. Most late war opponents will want to apply boom n zoom tactics against the J2M, while the Raiden pilot usually wants to make it a turn fight, depending on the opponent.

--= J2M2 =--

Powered by the Mitsubishi MK4R-A Kasei 23a engine, the Raiden has an impressive max output of 2000 hp at 6000 ft. This WEP output is however only available for 1 minute before the engine temperature gets to high, and at military power the engine will produce 1740 hp at 9200 ft. It is decently armed by 2x 7.7 mm MG's in the nose, and 2x 20 mm cannons in the wings. It also has pilot back armor and windscreen armor, allowing its pilot to engage bombers without having to worry about a single machinegun bullet hitting the cockpit.

--= J2M3 =--

Very similar to the previous version, but more heavily armed with 4x 20 mm cannons in the wings. This Raiden can pack a good punch and is effective against both fighters and bombers. The additional wing cannons do have a negative impact on the roll rate.