

Ilyushin Ил-2 Sturmovik



MOD. 1942

Ильёшин Ил-2 Штурмовік



By Chuck

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	(Unit)	LaGG-3	Yak-1	La-5	Il-2	Pe-2	Bf.109F4	Bf.109G2	Fw190A3	Ju-87	He-111
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### TEMPERATURES

<b>Water Rad Min</b>	Deg C	80	80	-	80	40	40	40	-	60	40
<b>Max</b>		100	100		110	100	100	100		100-110	95
<b>Oil Rad (OUTBOUND) Min</b>	Deg C	40	40	55	70	-	40	40	40	30	35
<b>Max</b>		100	100	75	115		80	80	110	105	95
<b>Oil Rad (INBOUND) Min</b>	Deg C	-	-	-	40	-	-	-	-	-	-
<b>Max</b>					80						
<b>Cylinder Head Temp Min</b>	Deg C	-	-	120	-	-	-	-	-	-	-
<b>Max</b>				200							

### ENGINE SETTINGS

<b>Takeoff RPM</b>	RPM	2700	2700	2400	2200	2700	2600	2500	2500	2500	2400
<b>Takeoff Manifold Pressure</b>	RU: mm Hg GER: ATA	1050	1050	1150	1150	1050	1.3	1.3	1.3	1.3	1.35
<b>Climb RPM</b>	RPM	2600	2650	2300	2050	2600	2600 30 min	2500	2400	2450 30 min	2300 30 min
<b>Climb Manifold Pressure</b>	RU: mm Hg GER: ATA	1020	1050	1150	1050	1050	1.3 30 min	1.3	1.3	1.25 30 min	1.15 30 min
<b>Normal Operation/Cruise RPM</b>	RPM	1700	1850	2300	1850	2200	2200	1900	2200	2100	2200
<b>Normal Operation/Cruise Manifold Pressure</b>	RU: mm Hg GER: ATA	1020	850	900	850	1020	1.0	1.0	1.1	1.2	1.10
<b>Combat RPM</b>	RPM	2650	2650	2400	2050	2600	2600	2500	2400	2250	2300
<b>Combat Manifold Pressure</b>	RU: mm Hg GER: ATA	1050	1050	1150	1050	1050	1.3	1.3	1.32	1.2	1.15
<b>Emergency Power/ Boost RPM @ km</b>	RPM	2700	2700	2400 10 min max	2200	2700	2700 1 min max	2500	2600 7-8 min max	2600 1 min max	2400 1 min max
<b>Emergency Power / Boost Manifold Pressure @ 1 km</b>	RU: mm Hg GER: ATA	1050	1050	1150 10 min max	1150	1050	1.42 1 min max	1.3	1.42 7-8 min Max	1.4 1 min max	1.35 1 min max
<b>Supercharger Stage 1 Operation Altitude</b>	m	0 2000	0 2500	0 2000	-	0 2000	-	-	-	Auto/man modes	Auto/man modes
<b>Supercharger Stage 2 Operation Altitude</b>	m	2000+	2500+	2000+	-	2000+	-	-	-	Auto/man modes	Auto/man modes
<b>*Landing Approach RPM</b>	RPM	2600	2200	2400	1800	2700	1500	1500	-	2000	2300
<b>*Landing Approach Manifold Pressure</b>	RU: mm Hg GER: ATA	As required	600	As required	600	As required	0.6	0.6	-	0.6	As required
<b>Notes</b>				Open Oil Radiator at all times	Close Oil radiator in combat	Flaps 30 on Takeoff & 15 on Landing			Lock tailwheel on takeoff	No Abrupt Throttling	Eng. very sensitive to ata/rpm

### AIRSPEEDS

<b>Takeoff – Rotation</b>	km/h	190	200	180	190	250	180	180	200	170	150
<b>Optimal Climb Speed</b>	km/h	270	260	250	250	240	280	280	270	230	N/A
<b>Landing – Approach</b>	km/h	200	180	200	200	200	180	180	190	190	200
<b>Landing – Touchdown</b>	km/h	170	150	170	150	160	160	160	150	150	140-150

# History

IL★2 Chuck O.

The idea for a Soviet armored ground-attack aircraft dates to the early 1930s, when Dmitry Pavlovich Grigorovich designed TSh-1 and TSh-2 armored biplanes. However, Soviet engines at the time lacked the power needed to provide the heavy aircraft with good performance. In 1938, the Il-2 was designed by Sergey Ilyushin and his team at the Central Design Bureau.



The Il-2 is a single-engine, propeller-driven, low-wing monoplane of mixed construction with a crew of two (one in early versions), specially designed for assault operations. Its most notable feature was the inclusion of armor in an airframe load-bearing scheme. Armor plates replaced the frame and paneling throughout the nacelle and middle part of the fuselage, and an armored hull made of riveted homogeneous armor steel AB-1 secured the aircraft's engine, cockpit, water and oil radiators, and fuel tanks.

Thanks to the heavy armor protection, the Il-2 could take a great deal of punishment and proved difficult for both ground and aircraft fire to shoot down. One Il-2 in particular was reported to have returned safely to base despite receiving more than 600 direct hits and having all its control surfaces completely shredded as well as numerous holes in its main armor and other structural damage. Some enemy pilots favored aiming down into the cockpit and wing roots in diving attacks on the slow, low-flying Il-2 formations.

With 36,183 examples of the Il-2 produced during the war, and in combination with its successor, the Ilyushin Il-10, a total of 42,330 were built, making it the single most produced military aircraft design in all of aviation history.

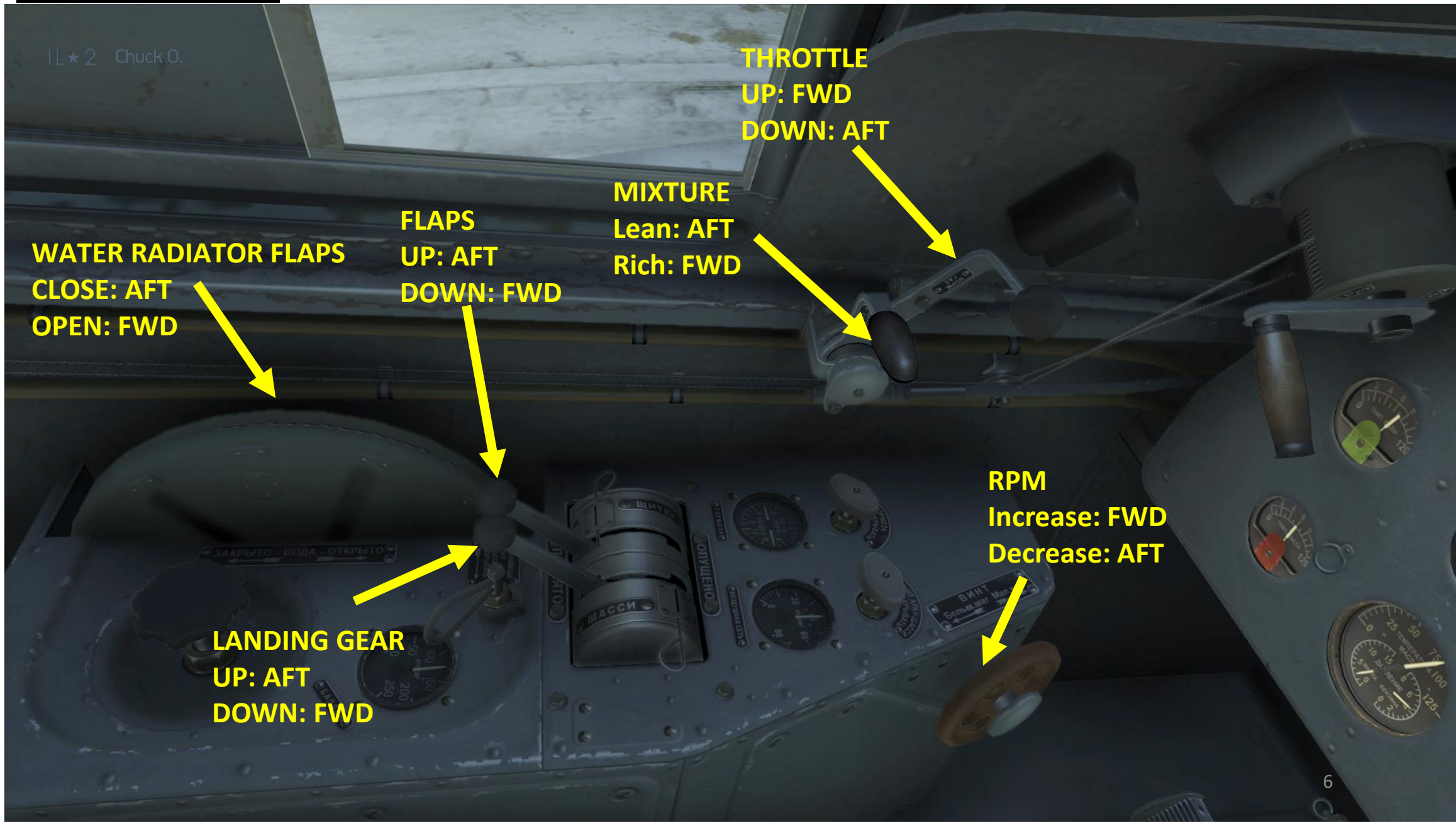
# PART I: THE AIRCRAFT

## The Cockpit



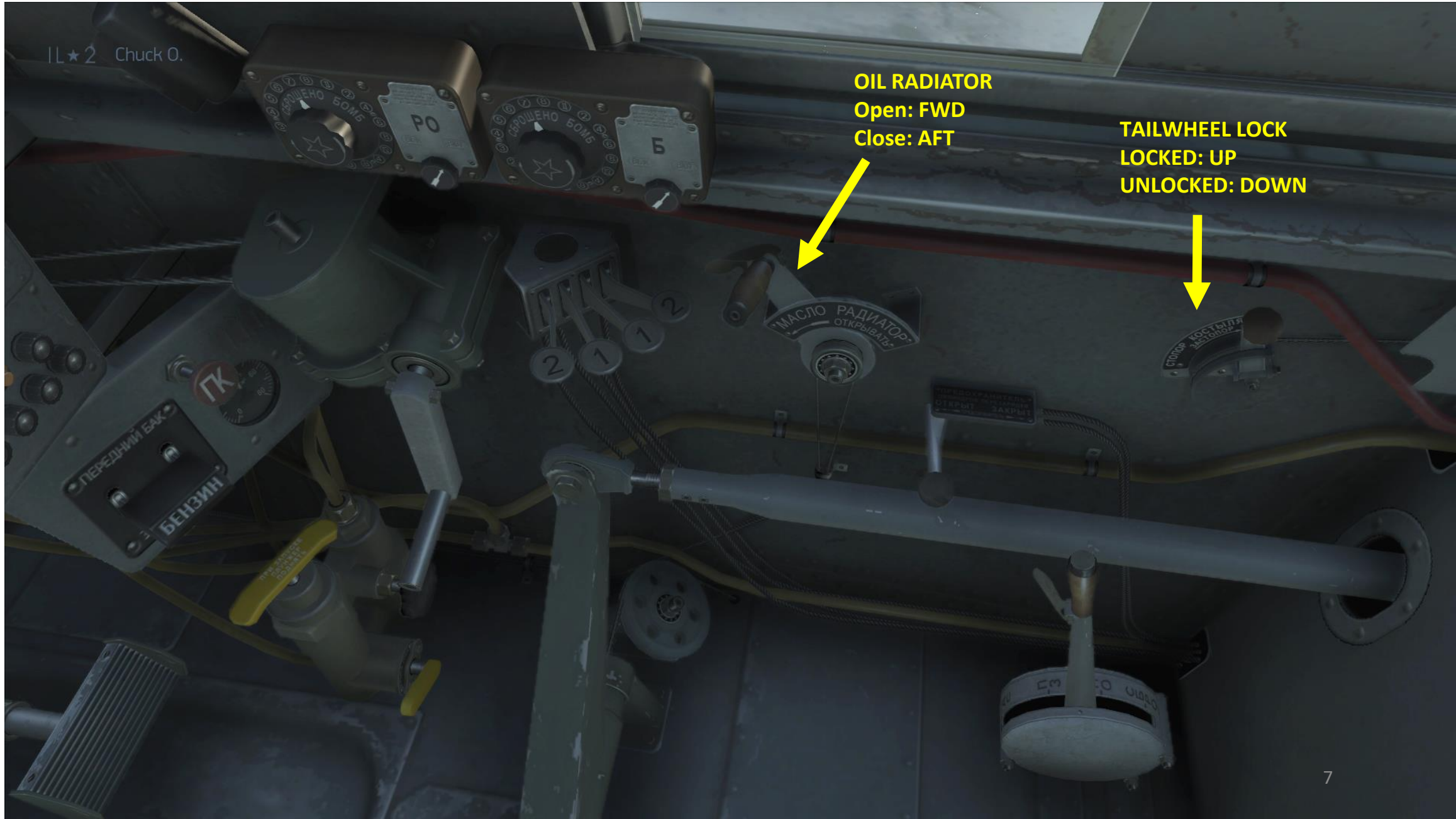
# PART I: THE AIRCRAFT

## Left Side



# PART I: THE AIRCRAFT

## Right Side



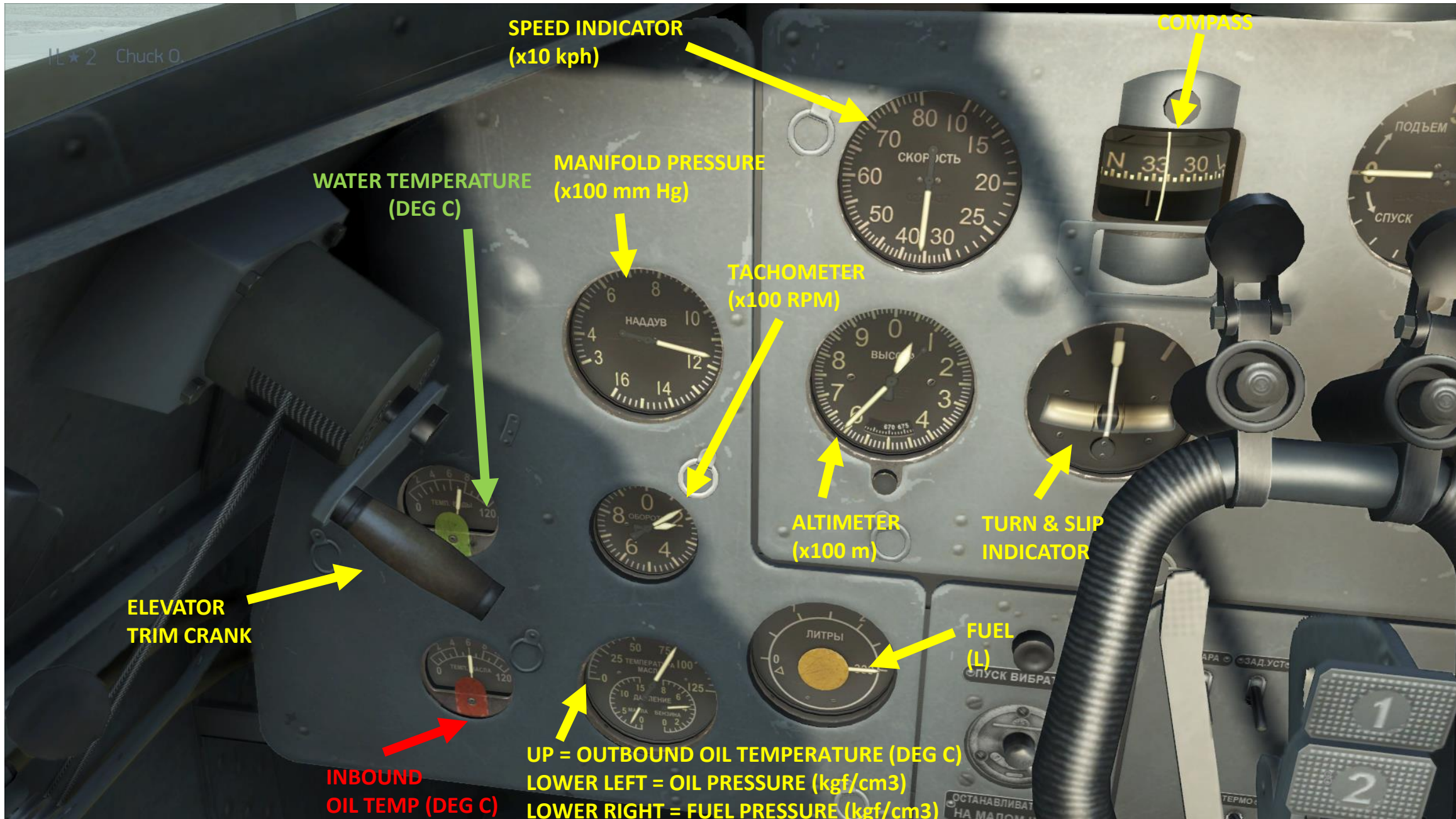
IL★2 Chuck O.

**OIL RADIATOR**  
Open: FWD  
Close: AFT

**TAILWHEEL LOCK**  
LOCKED: UP  
UNLOCKED: DOWN

# PART I: THE AIRCRAFT

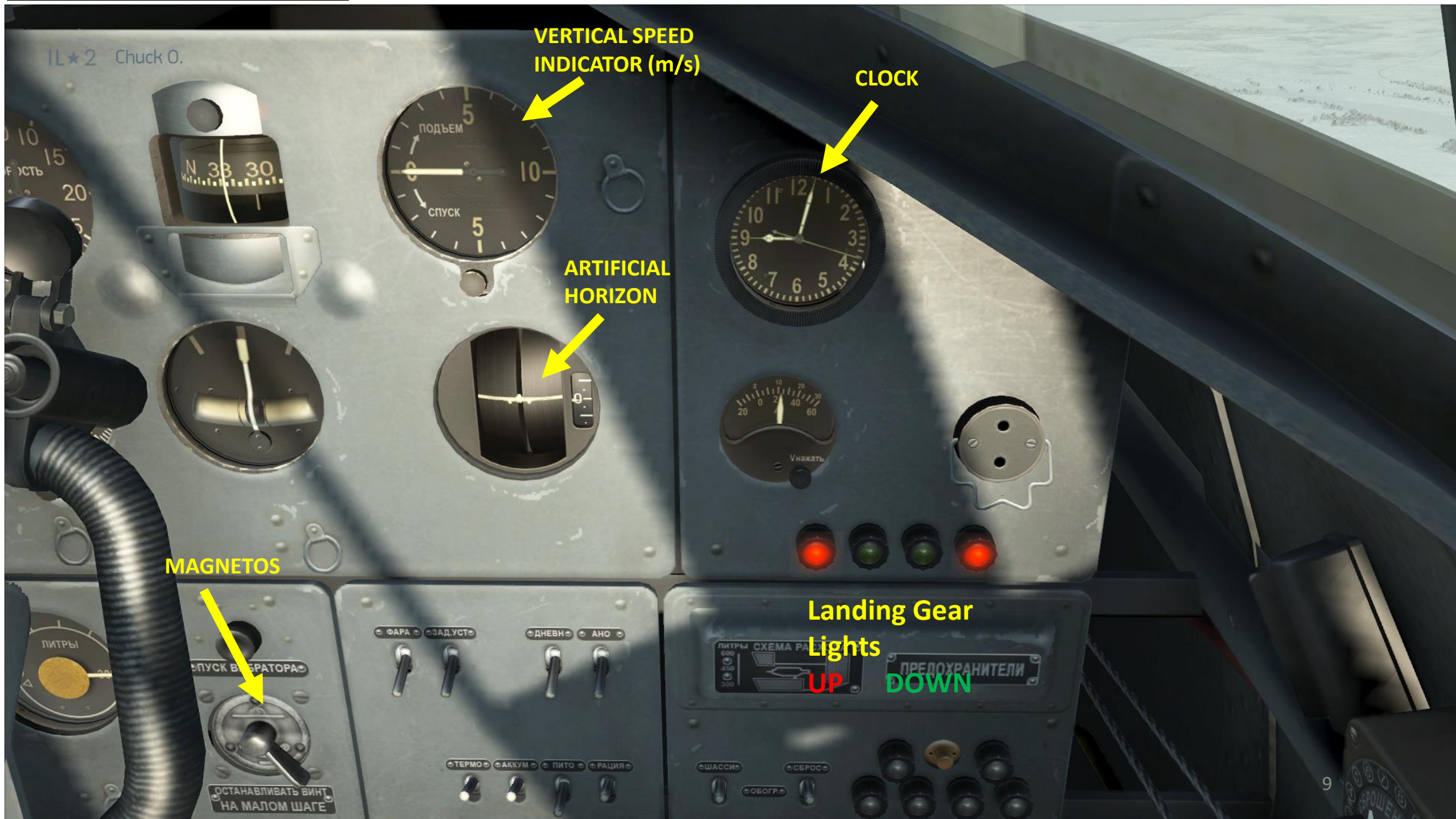
## Front Left





# PART I: THE AIRCRAFT

## Front Right



# Wings

MECHANICAL LANDING GEAR INDICATOR  
VISIBLE = GEAR DOWN  
RETRACTED = GEAR UP



TO SEE THE INDICATORS, YOU NEED TO  
OPEN YOUR CANOPY (RALT+C)

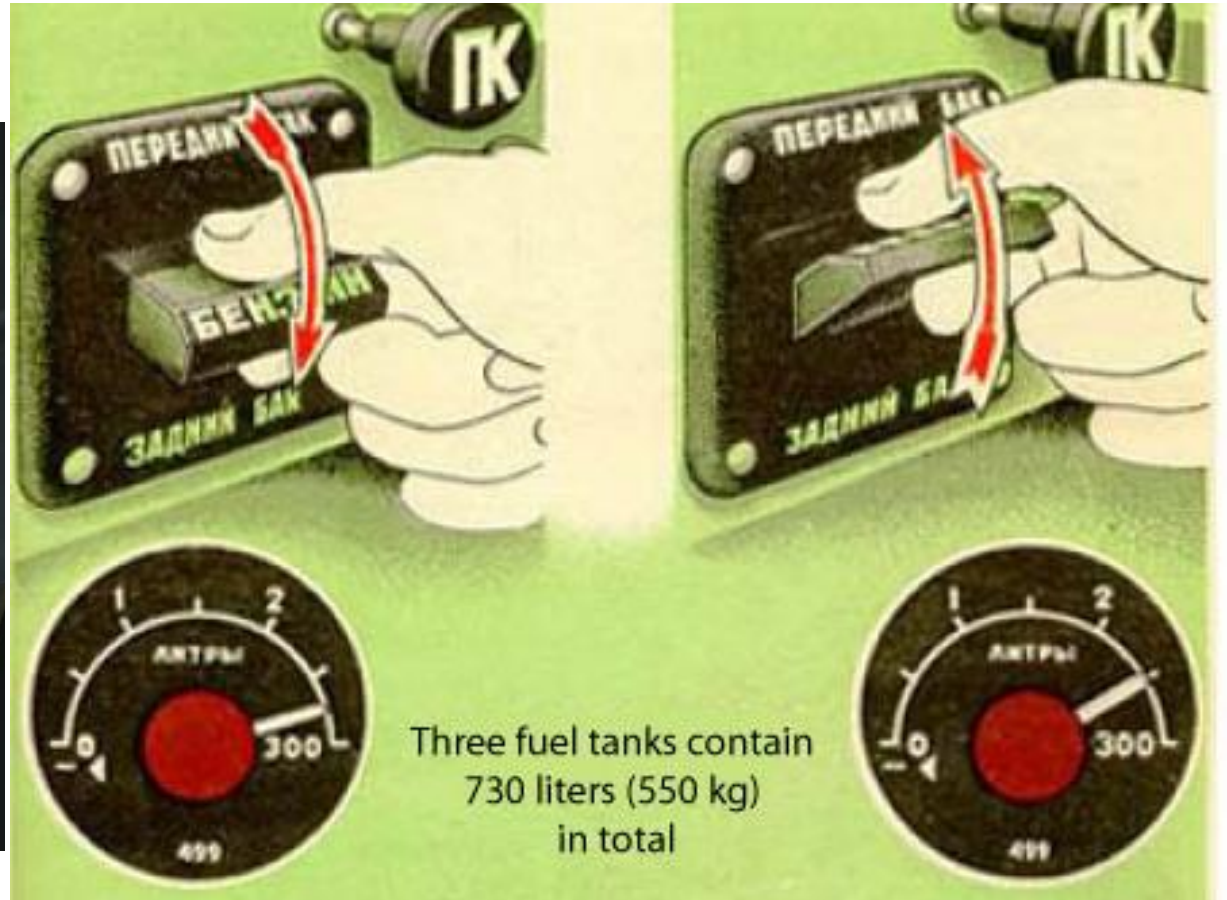
# Fuel Tanks



Fuel Selector Handle



Fuel Gauge (L)

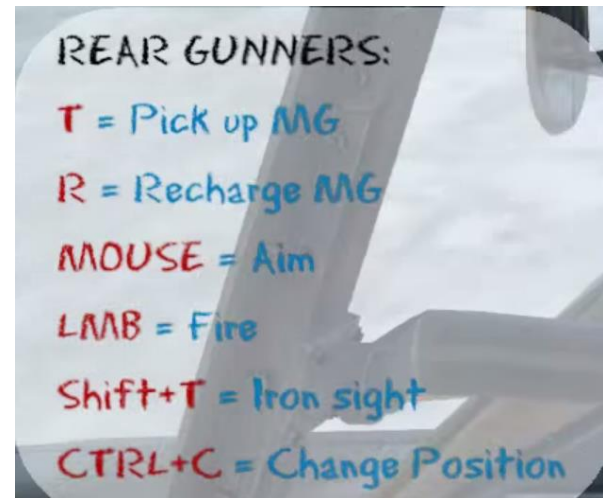


Three fuel tanks contain 730 liters (550 kg) in total

There is a total of three fuel tanks in the Il-2, with quantities which are indicated by a single fuel gauge. This gauge indicates the content of each tank based on the position of the tank selector switch. Unfortunately, this cool functionality is not modelled in the game and the fuel gauge is simply reset to another fuel tank once the previous one is empty.

## Turret Operation

- For the turret gunner, make sure that you give him the command to fire at will (Ralt + 1)
- Also, give him the command to fire at long range (Ralt + 9)
- Flying in close formation with other bombers maximizes your firepower.



# Important key bindings

- Make sure that you control your water and oil radiator flaps to keep your engine cool, while maintaining your airspeed. The Il-2 is a heavy plane and you can easily cook your engine if you are not careful.



**WATER RADIATOR  
CLOSED**



**WATER RADIATOR  
OPEN**



# PART II: THE CONTROLS

## Important key bindings

- The Il-2, like most Russian planes, has a brake system similar to what you would find in your car.
- In order to brake, you need to hold your wheel brake key while you give rudder input to steer your aircraft. Make sure you have adequate mixture, RPM and Manifold Pressure settings or your turn radius will suffer. These factors matter in a heavy plane like the Il-2 Sturmovik.

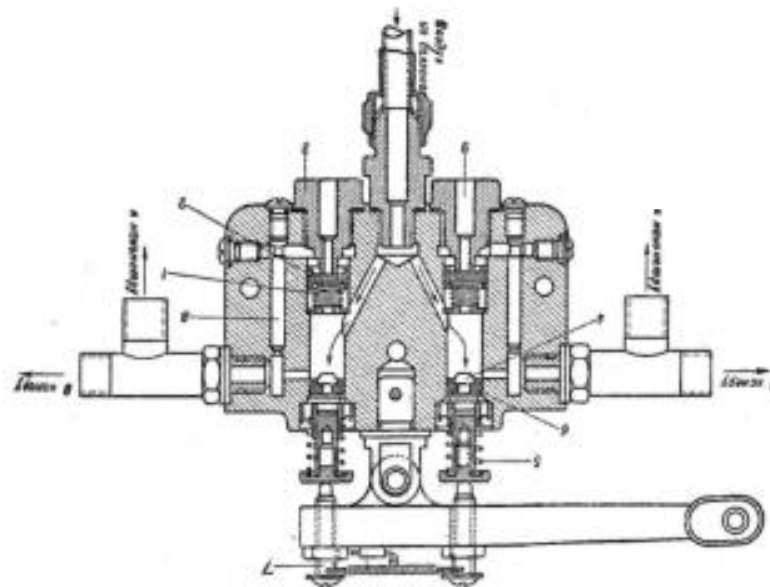
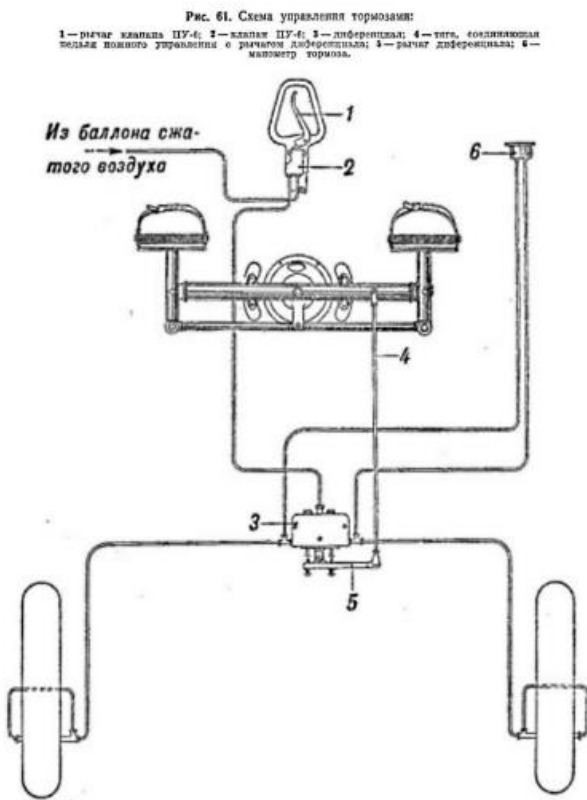
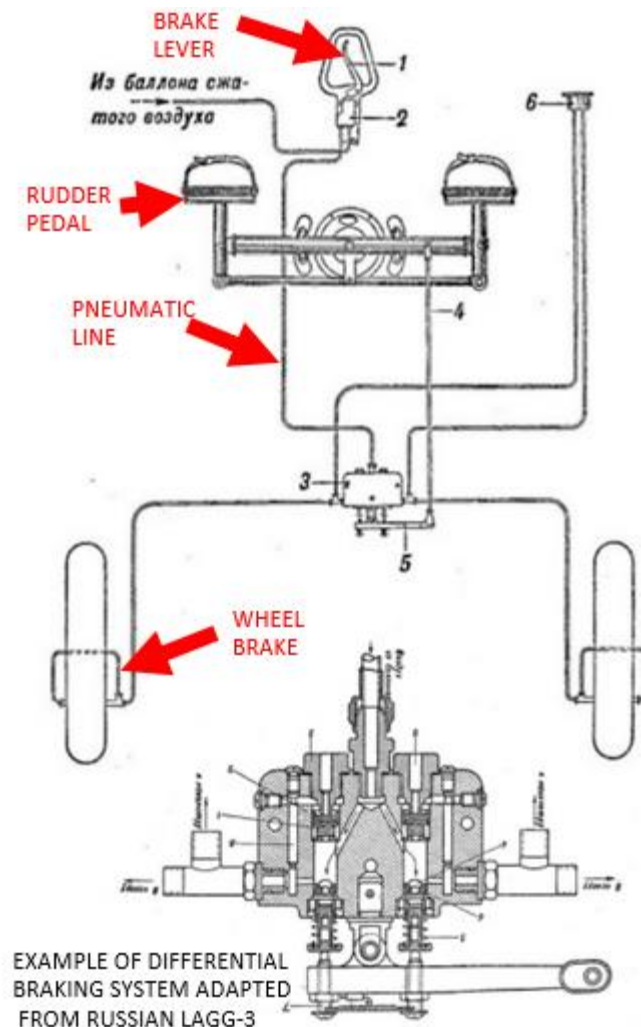


Рис. 62. Дифференциал пневматического управления тормозами:

—пружина предохранительного клапана; 2—магнита предохранительного клапана; —штуцер; 4—пiston поршня управляющего клапана; 5—пружина управляющего клапана; 6—магнита поршня; 7—толкатель; 8—канал, обеспечивающий тормоз с предохранительным клапаном; 9—отверстие штуцера предохранительного клапана.



# PART III: TAKEOFF

- Taking off in the Il-2 is straightforward if you follow these steps for a cold engine start.
  - 1) Crack your throttle about 15 %
  - 2) Set your mixture to full rich
  - 3) Close your water and oil radiator flaps
  - 4) Set minimum RPM
  - 5) Ignite (“E” key by default)!
  - 6) Set your flaps in the UP position.

# PART III: TAKEOFF

- 7) Wait for your oil radiator temperatures to reach (40 INBOUND, 70 OUTBOUND) degrees C and your water radiator temperature to reach 80 degrees C.
- 8) Line yourself up on the runway and lock your tailwheel by pressing “LCtrl+G” and by pulling your stick back to keep your tailwheel down.
- 9) Fully open your water and oil radiator flaps.
- 10) Throttle up full power, max RPM. Correct heading with small rudder input.
- 11) As soon as you reach 130 kph, center the stick and level out to pick some speed.
- 12) When you reach 190 kph, rotate gently.
- 13) Once you are up in the air, pull your gear up and start climbing. Adjust RPM and manifold pressure accordingly (see engine management in part V).



# PART IV: LANDING

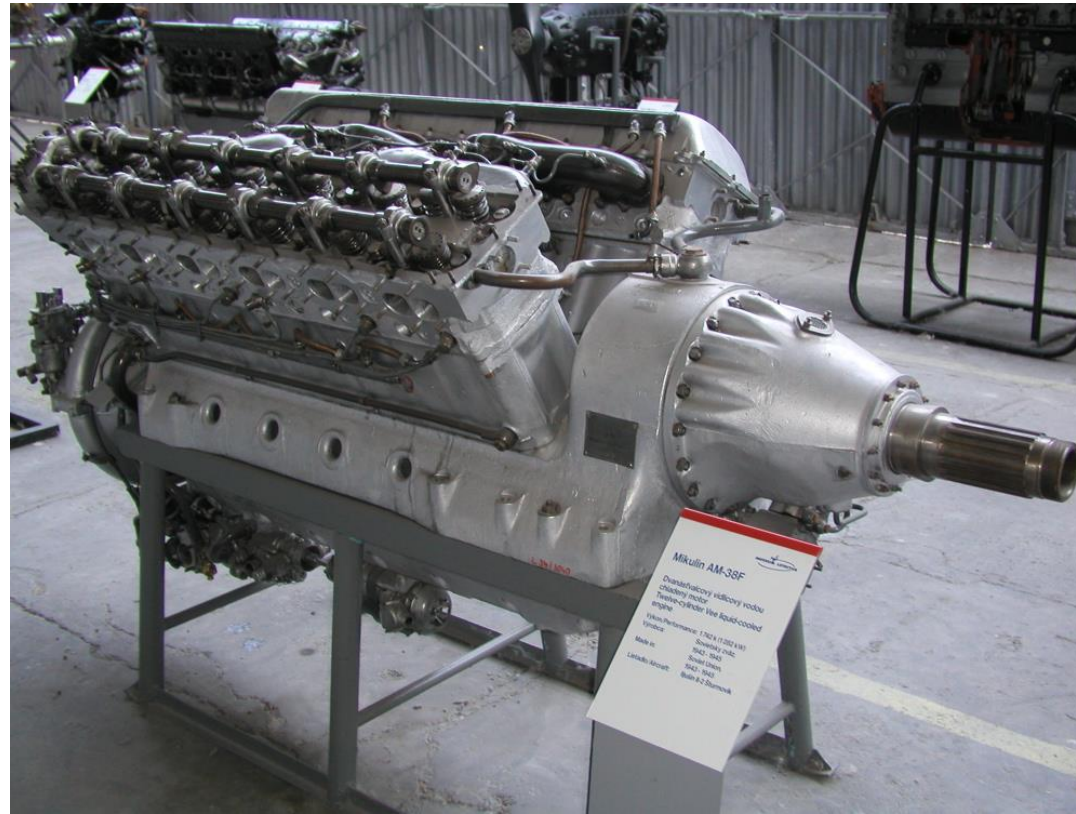
- 1) Deploy landing gear when going slower than 350 kph.
- 2) Deploy flaps when going slower than 210 kph.
- 3) Setting your RPM to 1800 and your manifold pressure to 600 mm Hg on approach is recommended. Adjust throttle as required to maintain approach speed at 200 kph.
- 4) Trim nose down as flaps generate extra lift.
- 5) Cut throttle when reaching runway and let yourself glide until you touch the ground naturally.
- 6) Touchdown at 150 kph.
- 7) Once on the ground, pull back on the stick to lock your tailwheel and tap your brakes.



## Powerplant

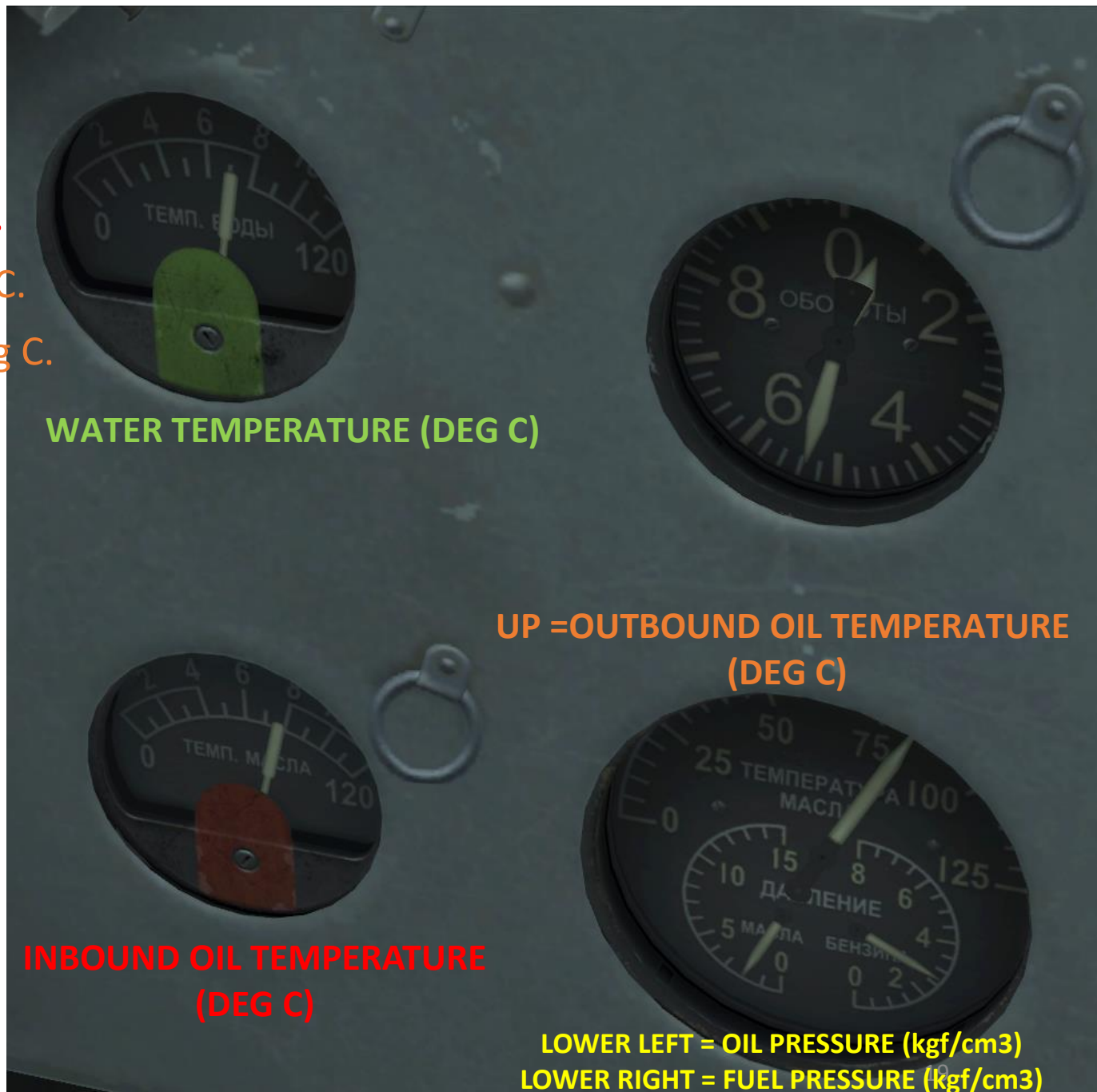
The Il-2 is powered by the **Mikulin AM-38**. It is a V-12 liquid-cooled piston engine designed by Aleksandr Aleksandrovich Mikulin and was equipped with a floatless carburettor and a booster. The AM-35 1,370 hp (1,022 kW) engine, which was originally planned for the Il-2, proved too weak and was replaced by the 1,680 hp (1,254 kW) AM-38 before the aircraft entered production.

Mikulin introduced variable-blade control for superchargers, two-speed superchargers, high-pressure supercharging, and air cooling ahead of the carburetors. Later on, he also developed the first Soviet turbocompressor and a variable-pitch propeller.



# Operating Limits

- Min INBOUND oil temperature: 40 deg C.
- Max INBOUND oil temperature: 80 deg C.
- Min OUTBOUND oil temperature: 70 deg C.
- Max OUTBOUND oil temperature: 115 deg C.
- Min water temperature: 80 deg C.
- Max water temperature: 110 deg C.



## Recommended Settings

- **Pro Tip:** Progressively lean your mixture as you gain altitude in order to gain maximal power.
- **Takeoff**
  - Water and Oil rads fully open
  - Max RPM, Max Manifold Pressure (MP)
- **Climb**
  - Optimal climb speed: 250 kph
  - 2050 RPM
  - 1050 mm Hg Manifold Pressure
- **Normal Operation (Cruise)**
  - 1850 RPM
  - 850 mm Hg
- **Combat**
  - 2050 RPM
  - 1050 mm Hg
  - Oil radiator closed



## PART VI: AIRCRAFT PERFORMANCE

- Range: 800 km (max fuel)  
600 km (max payload)
- Fuel Max Capacity: 730L
- Endurance: ~90 min (1h30)
- Operational ceiling: 5500 m
- Optimal Climb Speed: 260 kph
- Best Climb Rate: 625 m/min  
(unloaded)
- Note: Your fuel loadout will impact your aircraft's performance, but also your water and oil radiator flaps, your trim, the air temperature and many other factors. Keeping your speed up without blowing your engine will require a heavy workload that will diminish with practice and experience. Performance data often being subject to many factors (test conditions, state of aircraft (captured vs factory fresh), etc.), these numbers are to be taken with a grain of salt. Just like today, aircraft performance can and will vary between the real values and the values that you get on paper.

