Petlyakov Pe-2 Peshka

SERIES 110

Петляков Пе-2 Пешка

By Chuck

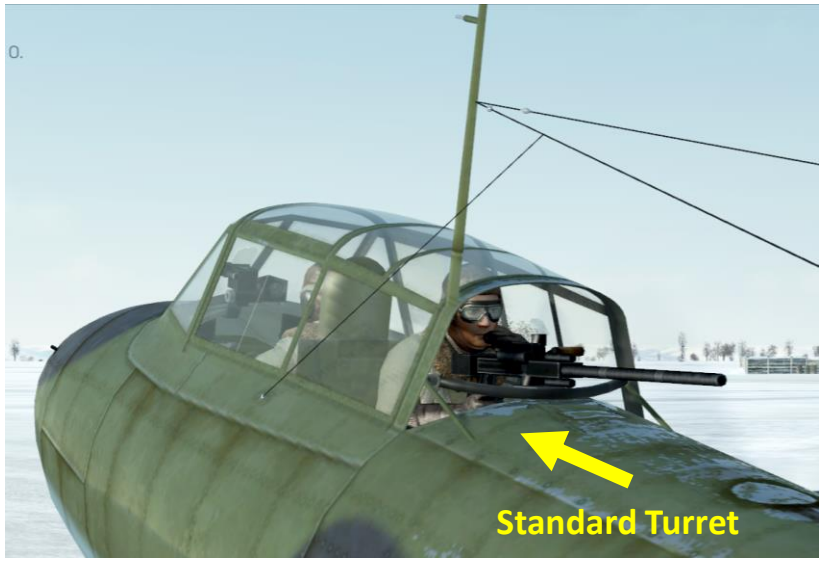
TABLE OF CONTENTS

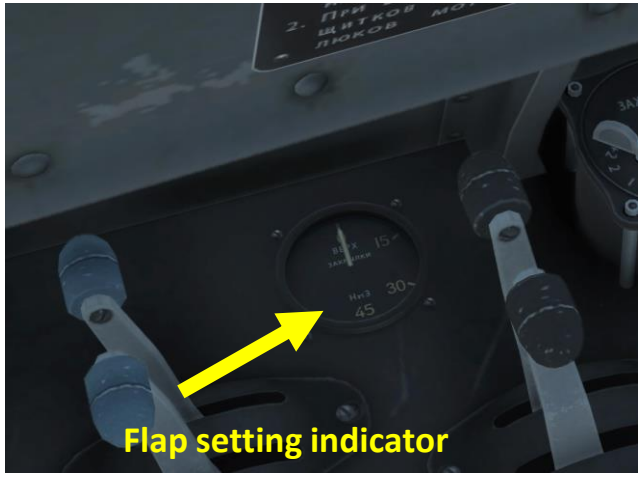
	(Unit)	LaGG-3	Yak-1	La-5	Il-2	Pe-2	Bf.109F4	Bf.109G2	Fw190A3	Ju-87	He-111
TEMPERATURES											
Water Rad Min Max	Deg C	80 100	80 100	- 	80 110	40 100	40 100	40 100	-	60 100-110	40 95
Oil Rad (OUTBOUND) Min Max	Deg C	40 100	40 100	55 75	70 115	-	40 80	40 80	40 110	30 105	35 95
Oil Rad (INBOUND) Min Max	Deg C	-	-	-	40 80	-	-	-	-	-	-
Cylinder Head Temp Min Max	Deg C	-	-	120 200	-	-	-	-	-	-	-
ENGINE SETTINGS											
Takeoff RPM	RPM	2700	2700	2400	2200	2700	2600	2500	2500	2500	2400
Takeoff Manifold Pressure	RU: mm Hg GER: ATA	1050	1050	1150	1150	1050	1.3	1.3	1.3	1.3	1.35
Climb RPM	RPM	2600	2650	2300	2050	2600	2600 30 min	2500	2400	2450 30 min	2300 30 min
Climb Manifold Pressure	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
Normal Operation/Cruise RPM	RPM	1700	1850	2300	1850	2200	2200	1900	2200	2100	2200
Normal Operation/Cruise Manifold Pressure	RU: mm Hg GER: ATA	1020	850	900	850	1020	1.0	1.0	1.1	1.2	1.10
Combat RPM	RPM	2650	2650	2400	2050	2600	2600	2500	2400	2250	2300
Combat Manifold Pressure	RU: mm Hg GER: ATA	1050	1050	1150	1050	1050	1.3	1.3	1.32	1.2	1.15
Emergency Power/ Boost RPM @ km	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
Emergency Power / Boost Manifold Pressure @ 1 km	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
Supercharger Stage 1 Operation Altitude	m	0 2000	0 2500	0 2000	-	0 2000	-	-	-	Auto/man modes	Auto/man modes
Supercharger Stage 2 Operation Altitude	m	2000+	2500+	2000+	-	2000+	-	-	-	Auto/man modes	Auto/man modes
*Landing Approach RPM	RPM	2600	2200	2400	1800	2700	1500	1500	-	2000	2300
*Landing Approach Manifold Pressure	RU: mm Hg GER: ATA	As required	600	As required	600	As required	0.6	0.6	-	0.6	As required
Notes				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											
Takeoff – Rotation	km/h	190	200	180	190	250	180	180	200	170	150
Optimal Climb Speed	km/h	270	260	250	250	240	280	280	270	230	N/A
Landing – Approach	km/h	200	180	200	200	200	180	180	190	190	200
Landing – Touchdown	km/h	170	150	170	150	160	160	160	150	150	140-150

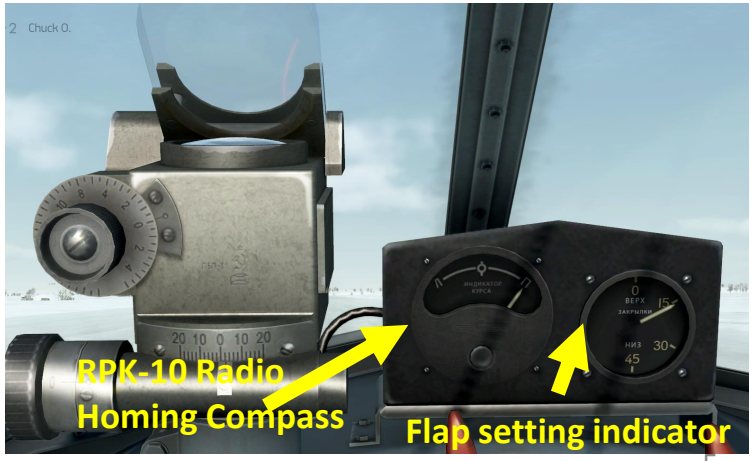
Exterior

The Pe-2 “Peshka” is available in two different versions in the game: the 87 Series and the 100 Series. The differences between these 2 marks are the addition of the “Blister Turret” for the 100 Series and small variations of gauge emplacements in the cockpit.

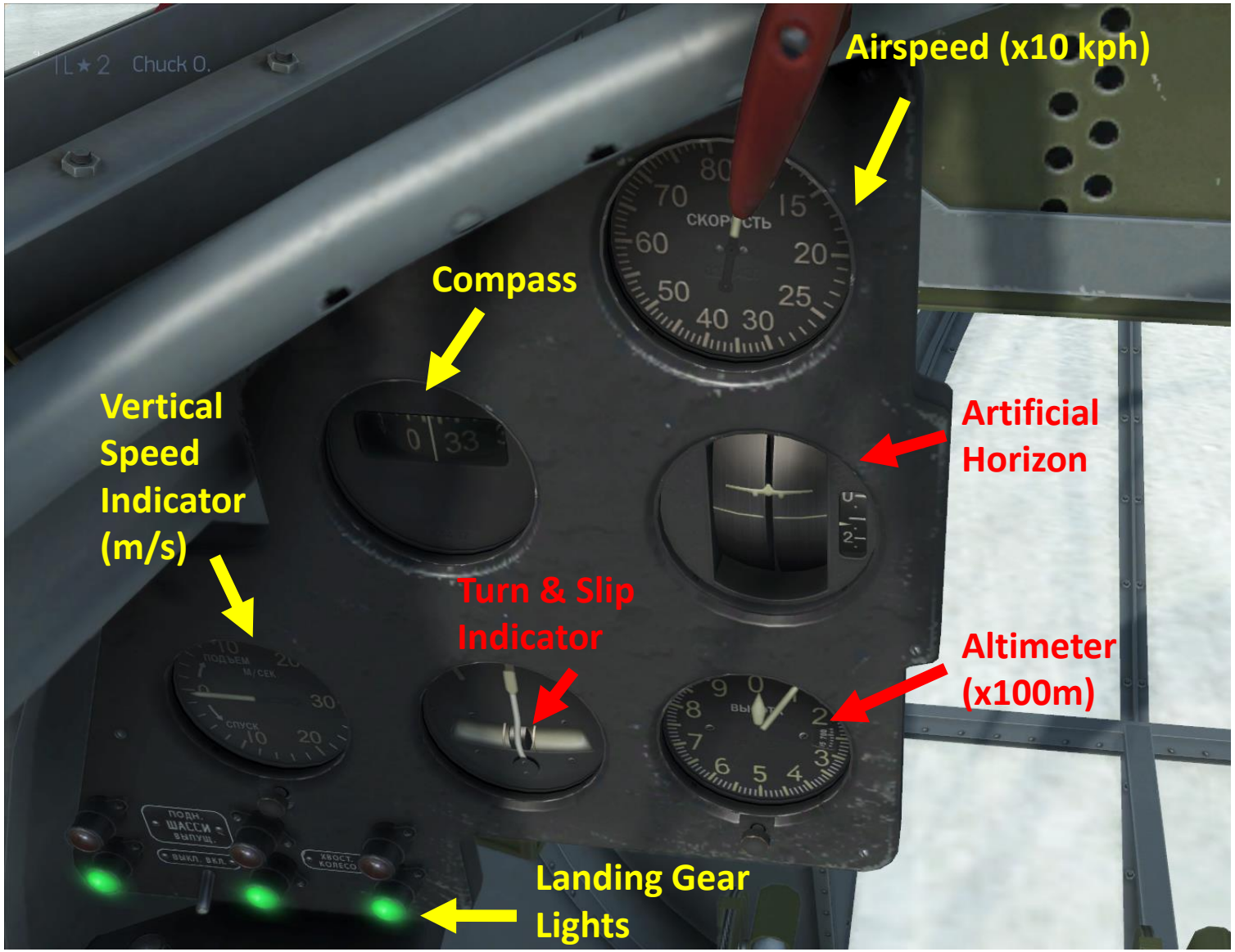
87 Series VS 100 Series





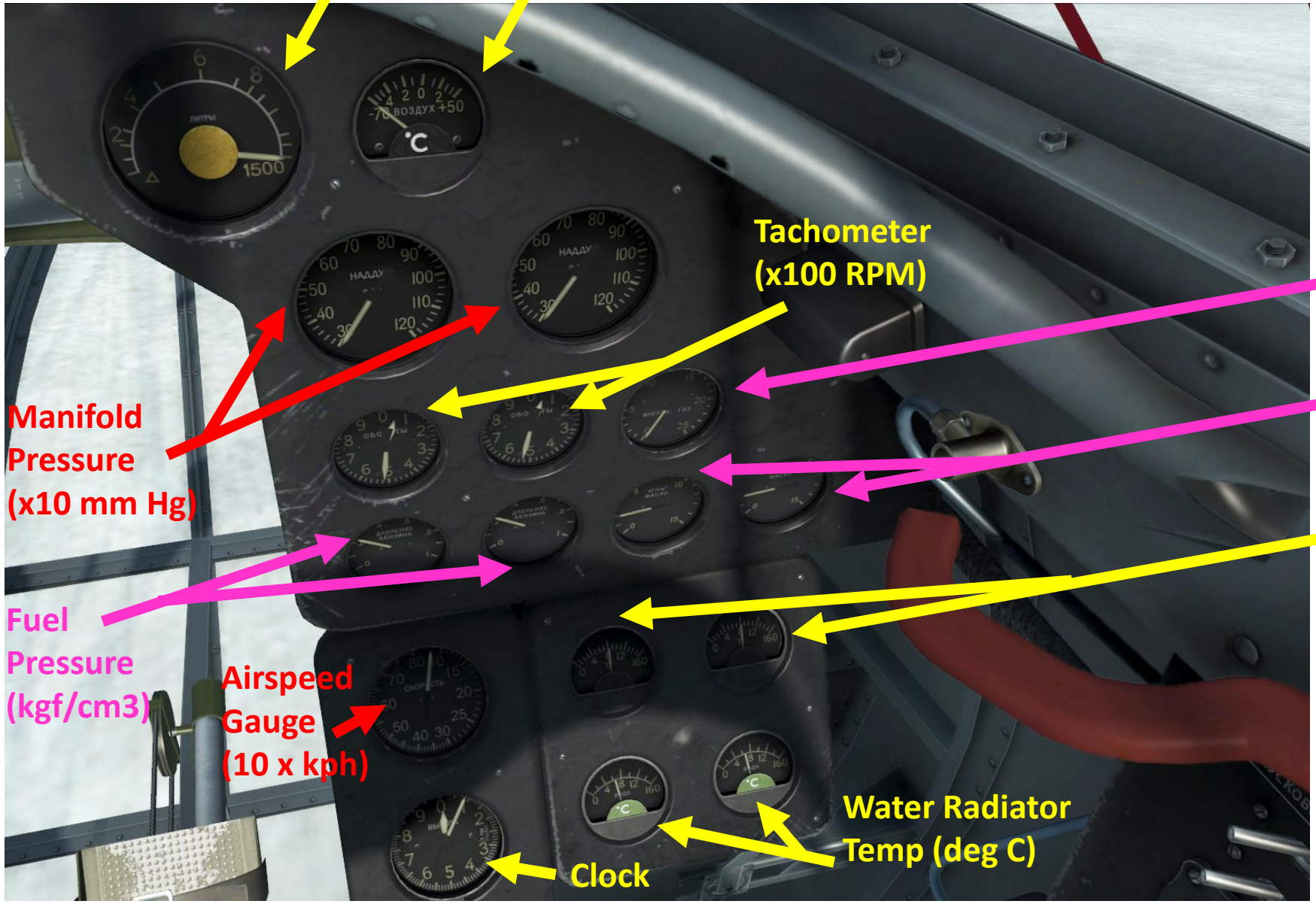


Cockpit

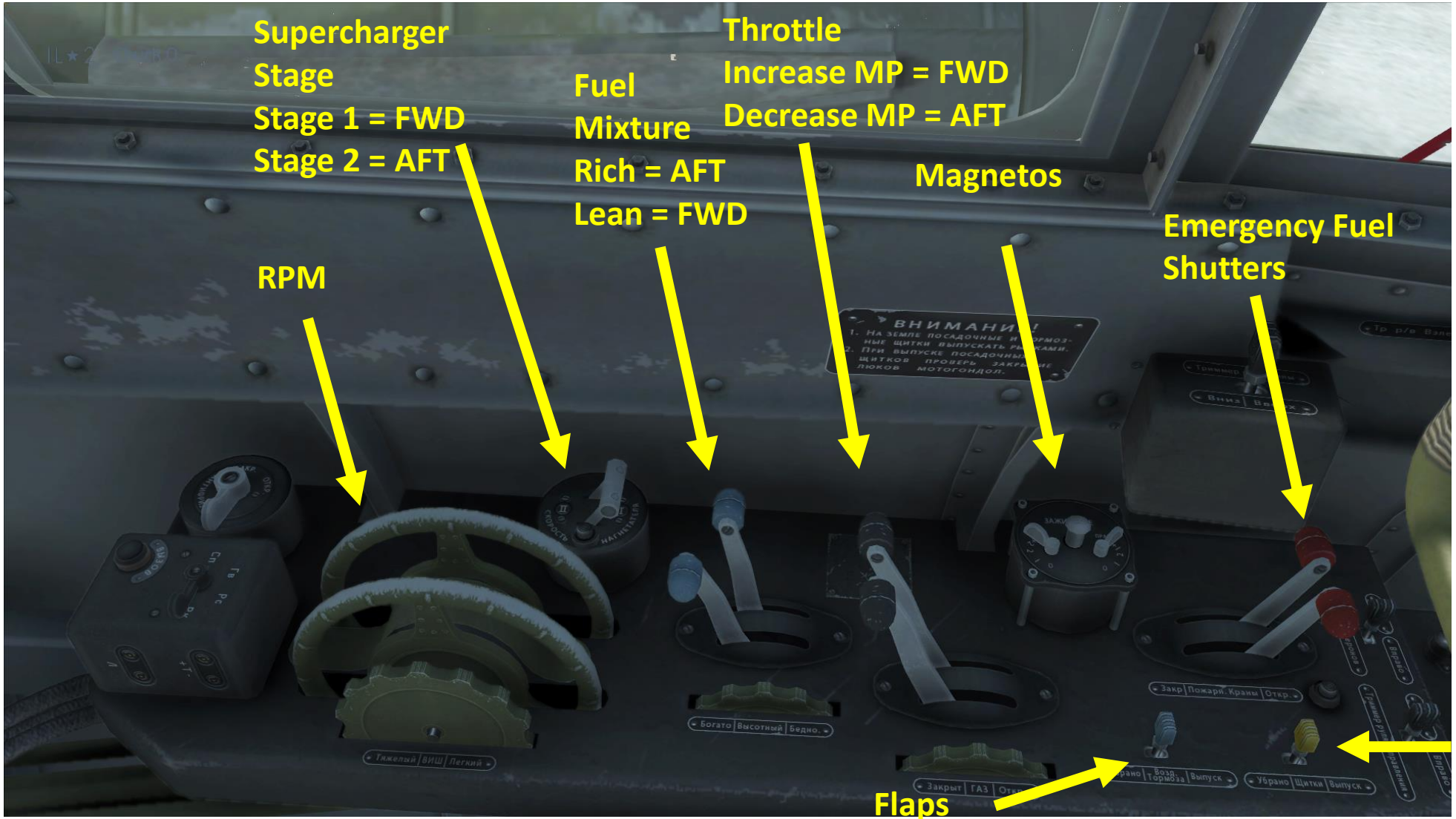

Airspeed (x10 kph)
Compass
Vertical Speed Indicator (m/s)
Artificial Horizon
Turn & Slip Indicator
Altimeter (x100m)
Landing Gear Lights
UP
DOWN

Cockpit

*no need to monitor



Cockpit

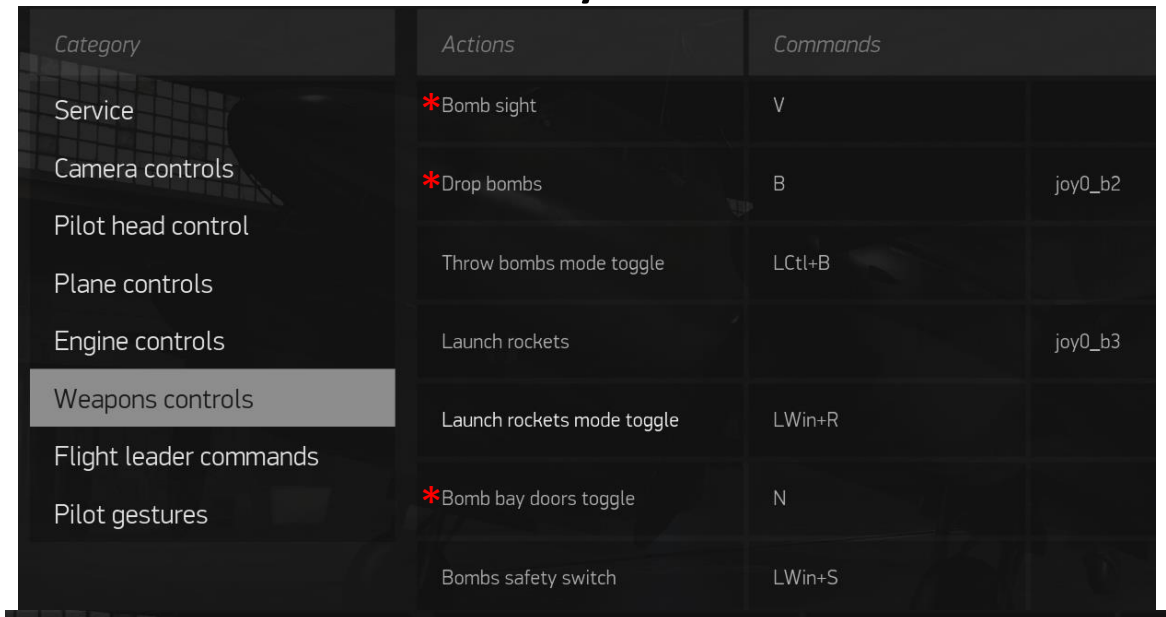

Supercharger
Stage
Stage 1 = FWD
Stage 2 = AFT
Fuel
Mixture
Rich = AFT
Lean = FWD
Throttle
Increase MP = FWD
Decrease MP = AFT
Magnetos
Emergency Fuel
Shutters
RPM
Dive Brake
Down = FWD
Up = AFT
Flaps
Down = FWD
Up = AFT

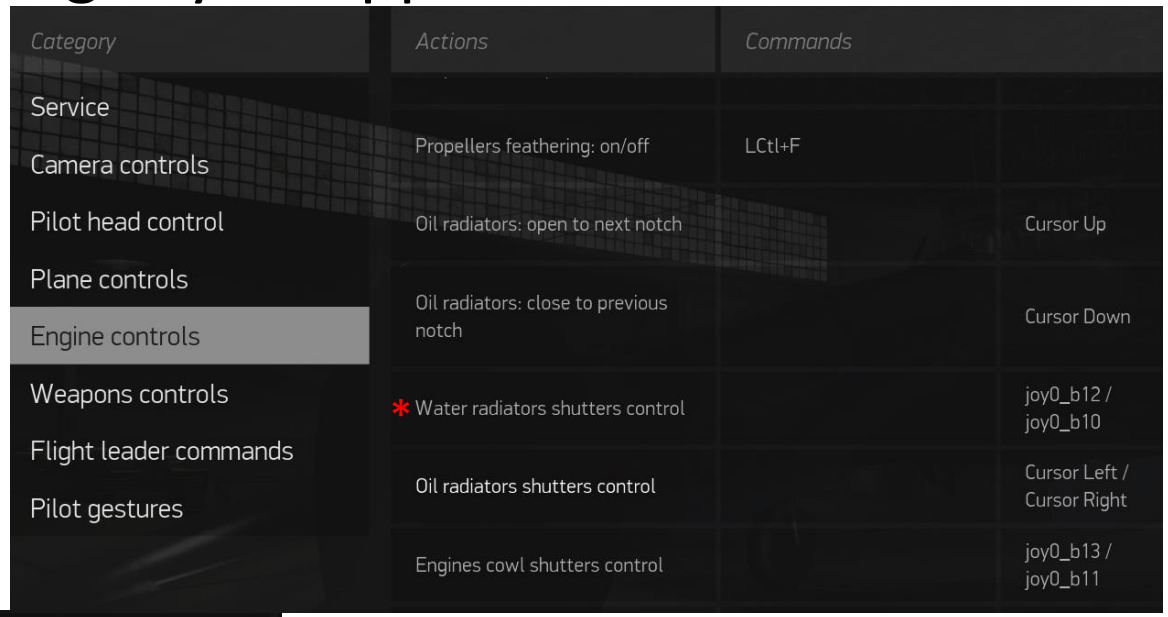
Cockpit

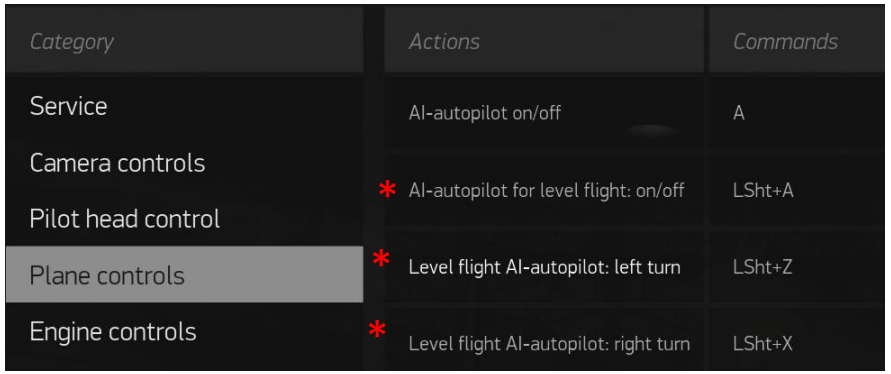
Note: There is no oil rad control on the Pe-2.

Important key bindings

- Make sure that you have the following keys mapped somewhere. *







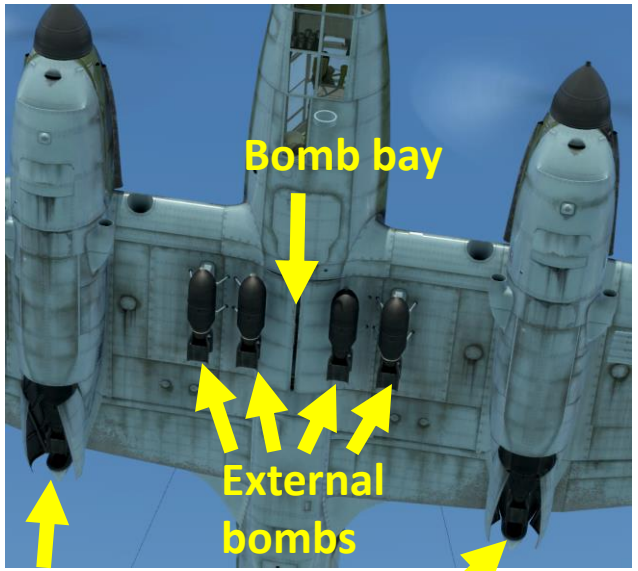
PART I: THE AIRCRAFT

Turret Operation

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

Bomb Bay Door Operation

- When you have a payload of more than 4 bombs (fixed under the fuselage), the remaining bombs are stocked in your inner bomb bay doors.
- If you try to open your bomb bay doors before the external bombs are dropped, your door will get stuck. The shutter doors will only open once the external bombs have been dropped.



Complex Engine Management

- Powered by two Klimov M-105 engines, which are also used on LaGG-3.
- Documentation is very sparse on Pe-2 operation. Operation values are deduced from LaGG-3 pilot's manual.
- Engine Temperature Limits
  - Min 40 deg C required for takeoff
  - Max 100 deg C for normal operation

Complex Engine Management

- **Takeoff**:
  - Rads fully open
  - Max RPM, Max Manifold Pressure (MP)
- **Climb**:
  - Optimal climb speed: 240 kph
  - 2600 RPM
  - 1050 mm Hg Manifold Pressure
- **Cruise**:
  - 2200 RPM
  - 1020 mm Hg
- **Combat**:
  - 2600 RPM
  - 1050 mm Hg
- **Supercharger** (increases Manifold Pressure @ higher altitudes)
  - Stage 1 below 2000 m altitude. Stage 2 over 2000 m.
  - Lshift + S to toggle supercharger stages

WHY A MISSION PLAN?

- Bombing missions require careful planning in order to be successful.
- If you fail to plan your mission properly, you most likely plan to fail.
- There is an infinity of variables, things that can go wrong during a bombing mission. However, some mistakes are avoidable and you can have control on some of these parameters.
- The best plan is not necessarily the shortest route to target. The best plan is often the most adaptable and flexible one.
- Sometimes, a bomber pilot will be forced to improvise. Always make sure that you have a plan B in case plan A goes wrong. Flexibility is the key.
- Getting shot down happens, and it is part of the game. Don’t take it personal and think of how (or if) you could have avoided your untimely death. Just think of how you can do better next time!

PART II: MISSION PLAN

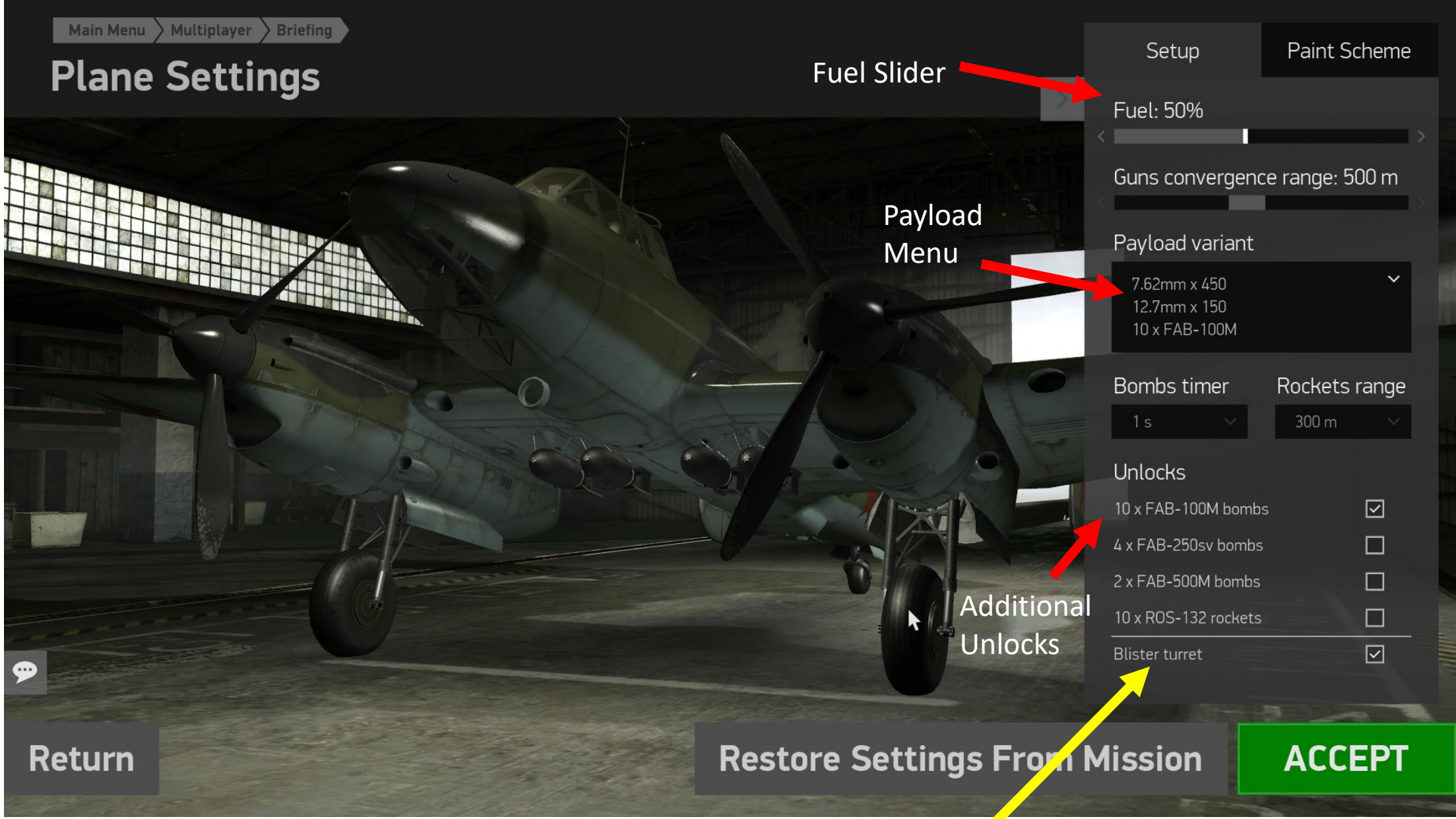
HOW TO PLAN A MISSION

- When planning a mission, you don't have to do it alone. Consult your fellow wingmen and even fighter escorts to give you intel that will help you shape your flight route accordingly to avoid patrolling enemy fighters and potential danger zones.
- Before you even takeoff, you need to know what you are going to do and how you are going to do it. Typical high-altitude bombing missions are used to knock out enemy airfields, factories or targets clumped up in a relatively small area. For smaller individual targets, you are better off dive bombing as high-altitude bombing is not as precise.
- Make sure you communicate your position, status and intentions to your teammates. You might be surprised how many people are craving to wing up with you or even escort you to your targets. Fighter jocks can also be team players, believe it or not.

WHAT TO PLAN FOR

- Your aircraft performance will be altered by mainly 2 factors: your bomb loadout and your fuel quantity (in %). Typical bomb runs are achieved with 50 % fuel. Why? Because they influence your aircraft's weight. (And people are just too lazy to calculate what they really need.) The heavier you are, the slower you will climb and the more vulnerable you will be.
- Russian bombs are designated by their weight in kg. For instance, each FAB-100M weighs 100 kg, FAB-250sv weighs 250 kg and FAB-500M weighs 500 kg.
- Different bomb loadouts all have the same weight (for the Pe-2), as each loadout has a total weight of 1000 kg. Your choice of bombs will depend on how spread out you want your blast area to be.
- In my experience, choosing 10 x FAB-100M allows for more flexibility.

PART II: MISSION PLAN



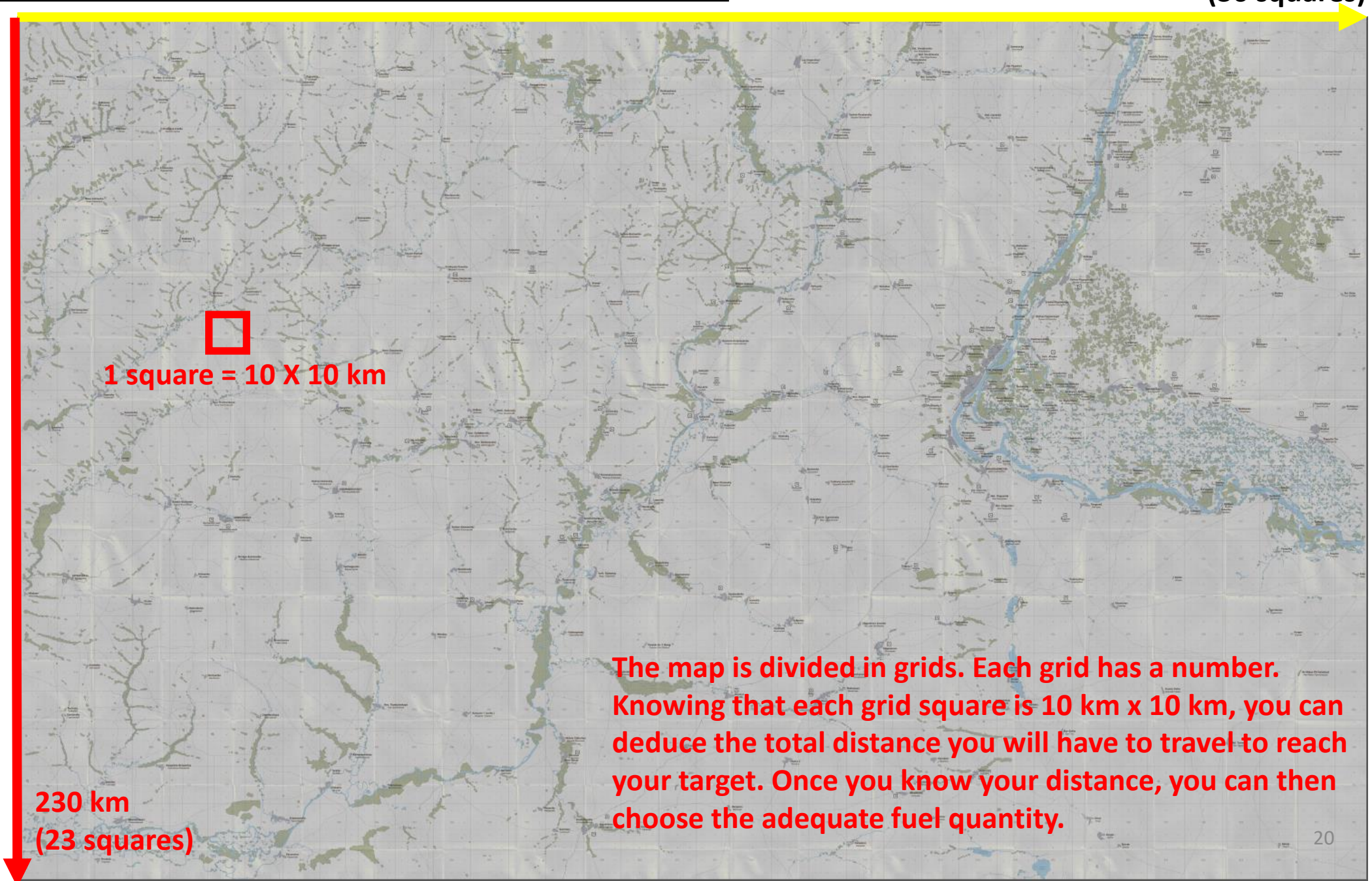
Pe-2 87 Series has the standard turret
Pe-2 100 Series has the Blister Turret

HOW TO CALCULATE YOUR REQUIRED FUEL

- You can calculate how fuel you will need pretty easily if you want to optimize your aircraft's capabilities during the missions. The less fuel you bring, the faster and more manoeuvrable you will be.
- The Pe-2's fuel tanks have a maximal capacity of approx. 1500 litres.
- The Pe-2's maximal range is 1770 km.
- Hence, we can deduce that you will need approx. 0.9 litre per km, or inversely that you will travel approx. 1.2 km per litre of fuel.
- If you know what your trajectory will be, you can easily know how much fuel you need to get there and come back.
- To judge your total distance, you can use the in-game map and plot your course at the same time.

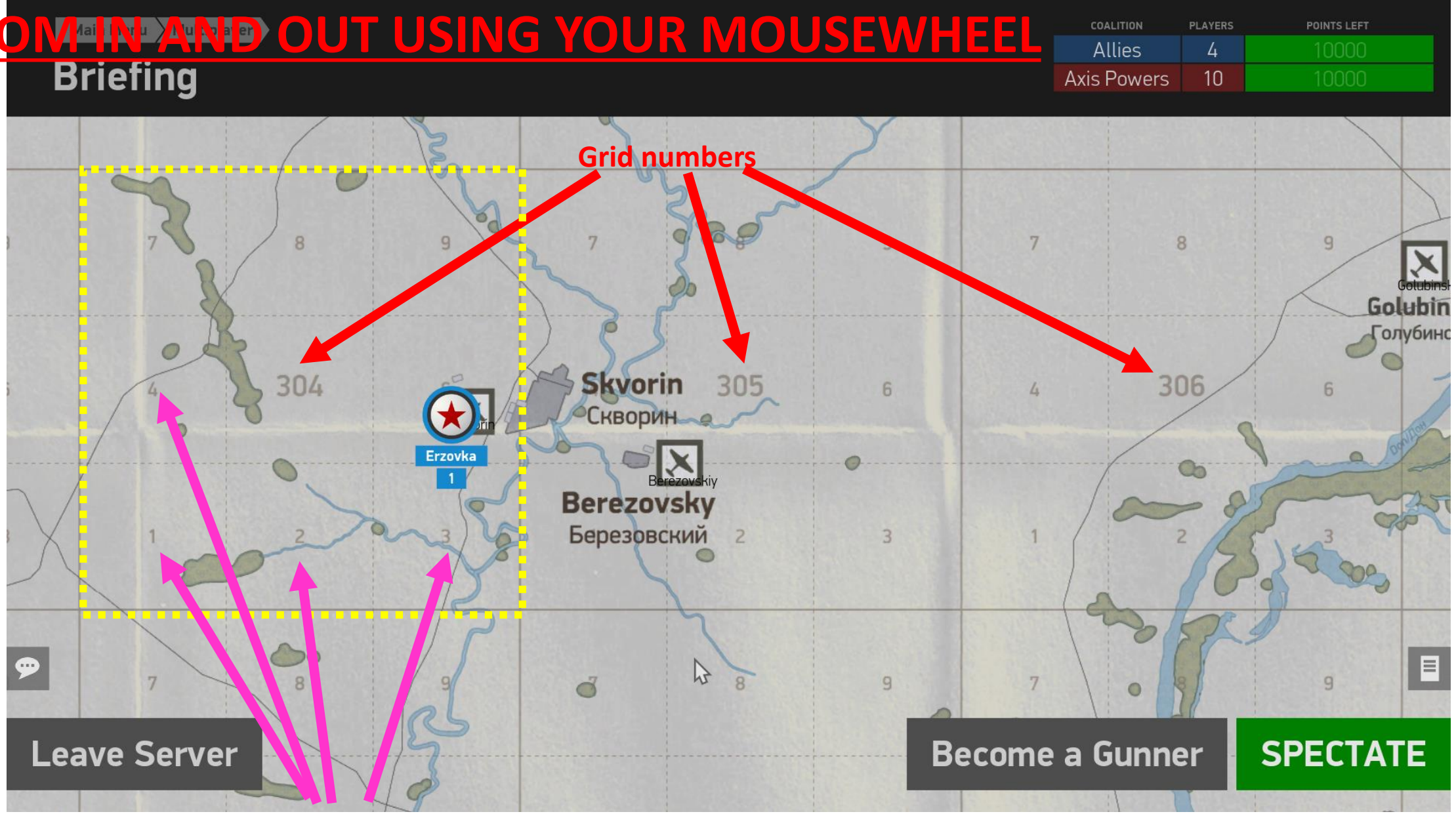
PART II: MISSION PLAN

CHECK THE MAP BY PRESSING “O”



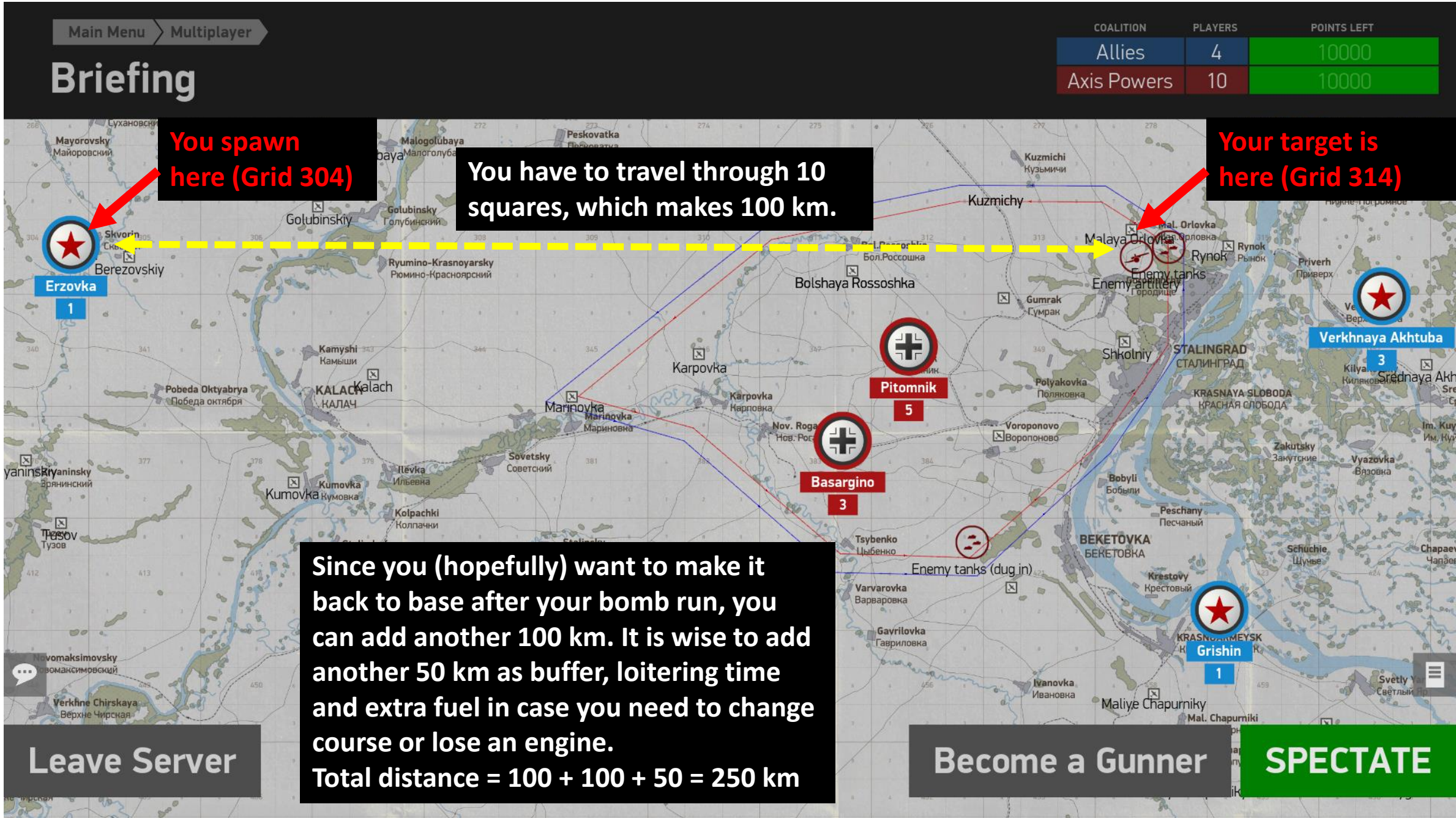
PART II: MISSION PLAN

ZOOM IN AND OUT USING YOUR MOUSEWHEEL



PART II: MISSION PLAN

PLOT AND PLAN YOUR COURSE



HOW TO CALCULATE YOUR REQUIRED FUEL

- Now that we have a rough estimate of our flight path, we know that we need fuel to travel 250 km.
- Knowing that our plane consumes approx. 0.9L/km:
- Required fuel = 250 km X 0.9 L/km = 225 L
- Out of a capacity of 1500 L, we need roughly 15 % fuel.
- You can also consider it in a matter of time. The Pe-2 will travel approx. 5 km/min if it maintains 300 km/h in a climb.
- To fly 250 km (not counting loiter time), you can simply calculate: 250 km / 5 km/min = 50 min of flight time for the whole mission.
- Using the same thought process, we can evaluate the maximal fuel % we'd need to make the longest bombing run ever. Let's calculate it, just for fun.
- Knowing that the maximal distance you would have to travel is the whole diagonal of the map (425 km, so 850 km for a full flight), the longest flight you could make from point A to point B back and forth would require 720 L of fuel, which is slightly less than 50 % of your tank capacity (1500 L).

HOW TO CALCULATE YOUR REQUIRED FUEL

- As you can see, we now know that we do not really need 50 % fuel. Just by making a quick estimate, we saved 35 % fuel, and our aircraft is now 350 kg lighter, which is about the weight of this adorable manatee.

- The lighter your aircraft is, the easier time you will have climbing. And the higher you are, the less likely you are to get bounced. Also, altitude allows you to have a better view of the landscape and navigate visually.

PART III: TAKEOFF

- Taking off in the Pe-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 radiators

4) Set minimum RPM

5) Ignite (“E” key by default)!

Flap setting indicator

6) Set your flaps to 15 degrees. Keep in mind that your flaps switch is continuous and will keep moving your flaps as long as you hold it. If your flaps are deployed too much (over 30 degrees), you will simply stall, crash and burn on takeoff. Consult your flap indicator to make sure that you are set up correctly.

PART III: TAKEOFF

7) Wait for your oil radiator temperatures to reach 40 degrees C.

8) Line yourself up on the runway and lock your tailwheel by pulling your stick back to keep your tailwheel down.

9) Fully open your water radiators.

9) Throttle up full power, max RPM. Correct heading with small rudder input.

10) As soon as you reach 100 kph, center the stick and level out to pick some speed.

11) When you reach 150 kph, rotate gently.

12) Once you are up in the air, retract flaps, pull your gear up and start climbing. Adjust RPM and manifold pressure accordingly (see engine management in part I).

PART IV: NAVIGATION

- Now that we are up in the air and that we know what our mission will be, let's do an example. We cannot bomb our target if we cannot find it, right?
- First, let's make a brief summary of the mission.

1. We are going to bomb artillery positions
2. We will bomb our targets at an altitude of approx. 3500 metres with 10 X FAB-100M bombs. The altitude is not set in stone, but more of a general idea.
3. We will approach the target from the East.
4. In this case, we will go in alone. But if you lead a bomber wing, it is important for the leader to give his speed and engine settings to his wingmen in order to allow them to form up easily on you. Generally, bomber formations will drop on the bomber lead's go while wingmen will maintain formation. By managing the workload in this way, precision is maximized and coordination maintained throughout the bombing run.

PART IV: NAVIGATION

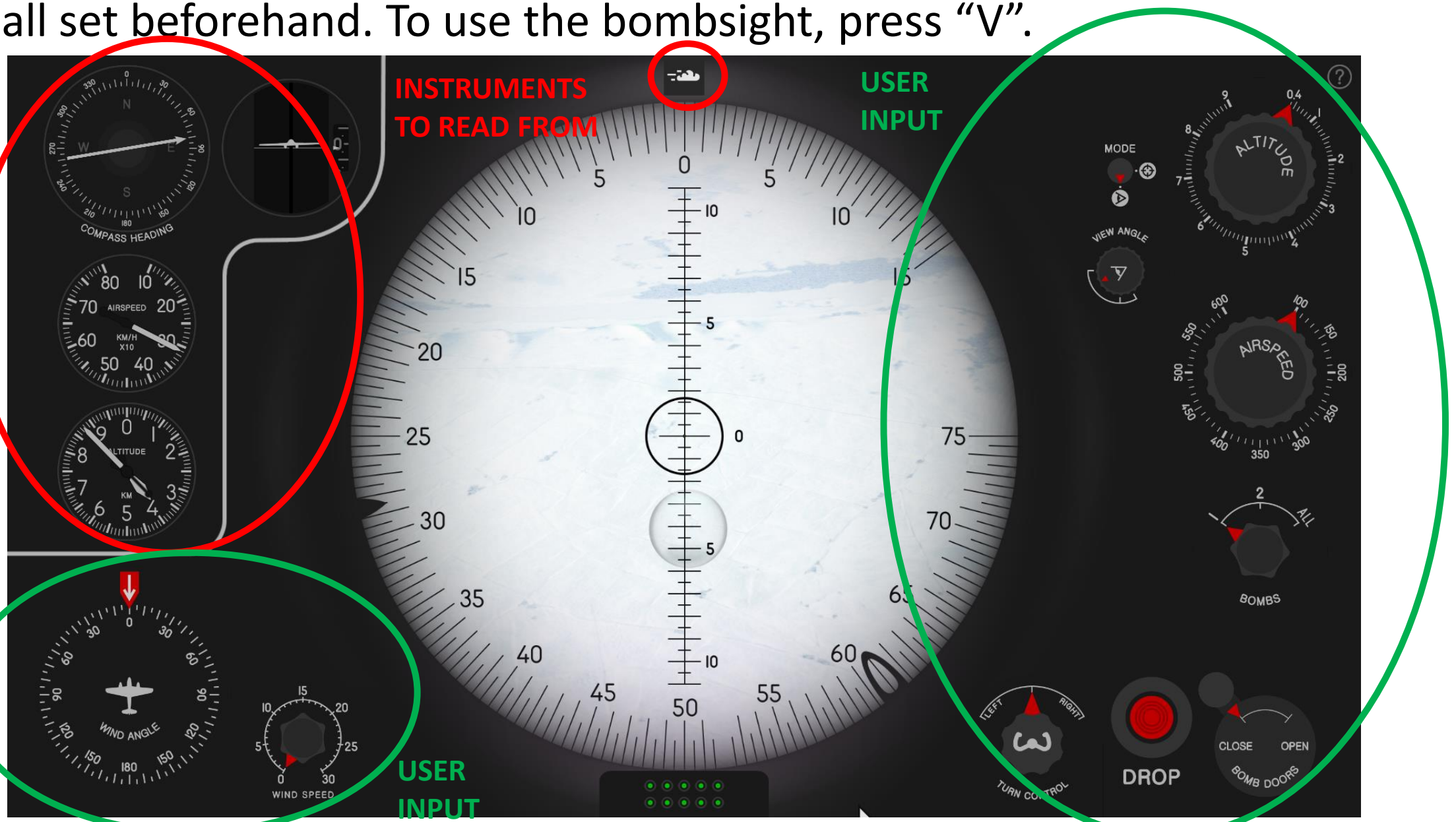
- Here is an overview of where the map is located and where we currently are. Spot landmarks that you could recognize.

- Here is an overview what you see in your cockpit. Recognize anything familiar?

- Here is an external view. So? Aaaah, yes, it all comes together now, does it? Let's turn a bit and try to find our target using the bombsight.

PART IV: BOMB RUN

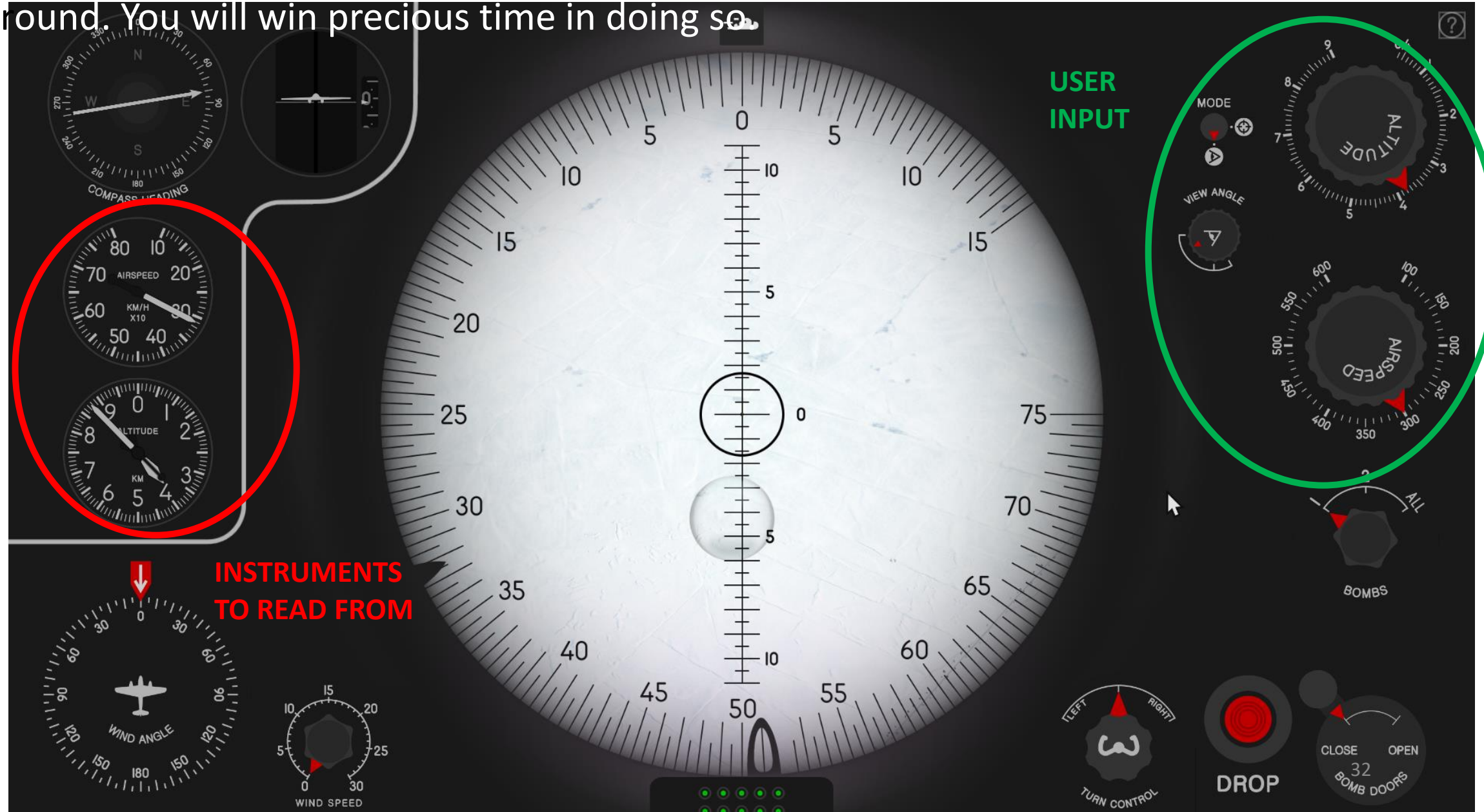
- Now comes the toughest part: understanding the bombsight and using it properly. It requires a lot of preparation, so make sure you are all set beforehand. To use the bombsight, press “V”.



PART IV: BOMB RUN

Engage the level-auto-pilot (LAlt + A) and enter speed and altitude.

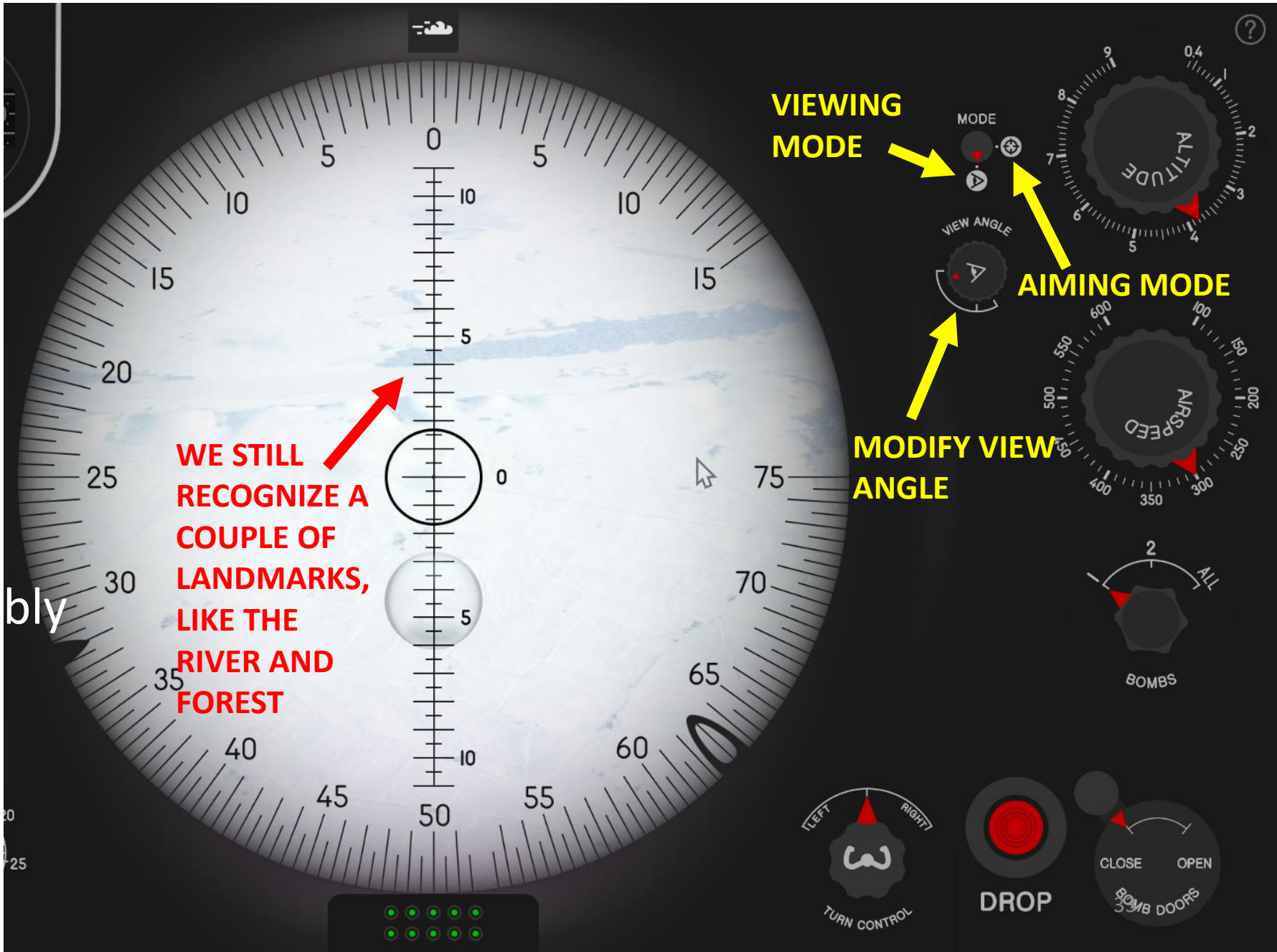
Tip: decide your speed and bombing altitude beforehand and set your bombsight on the ground. You will win precious time in doing so.



PART IV: BOMB RUN

- 2) Choose the bombsight “View Mode” by clicking on it and change your view angle to where you can see farther in front of you. You can hold left mouse btn to change angle smoothly.

  We see that the target will probably be a bit more to our left.



PART IV: BOMB RUN

3) Steer your aircraft using the turn control (Lshift Z = LEFT, Lshift X = RIGHT)

In our case, we'll have to steer left.

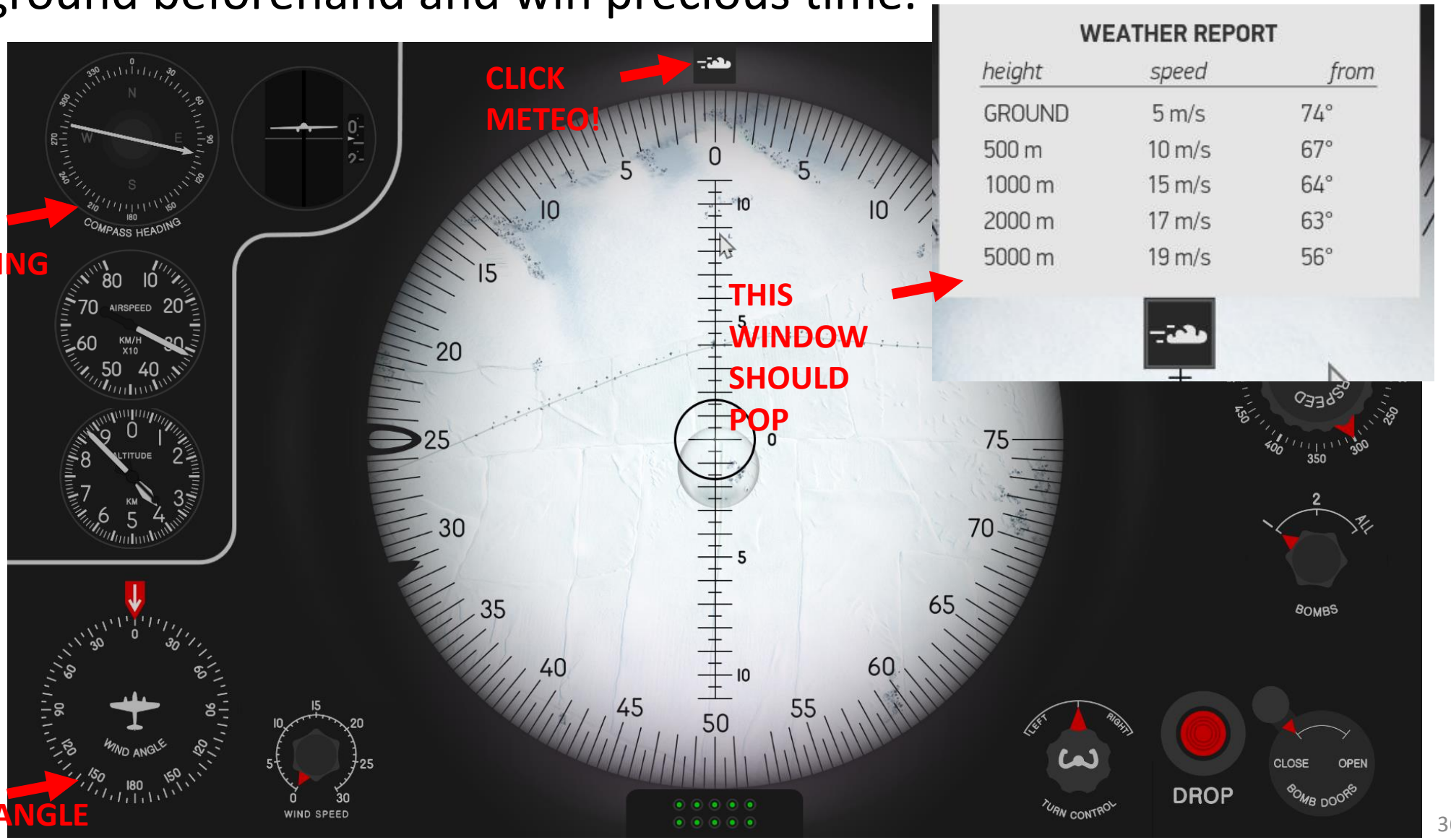
Your aircraft will swing left and right, This is normal. Just make sure your sight is aiming straight for your target.

PART IV: BOMB RUN

- Find your target

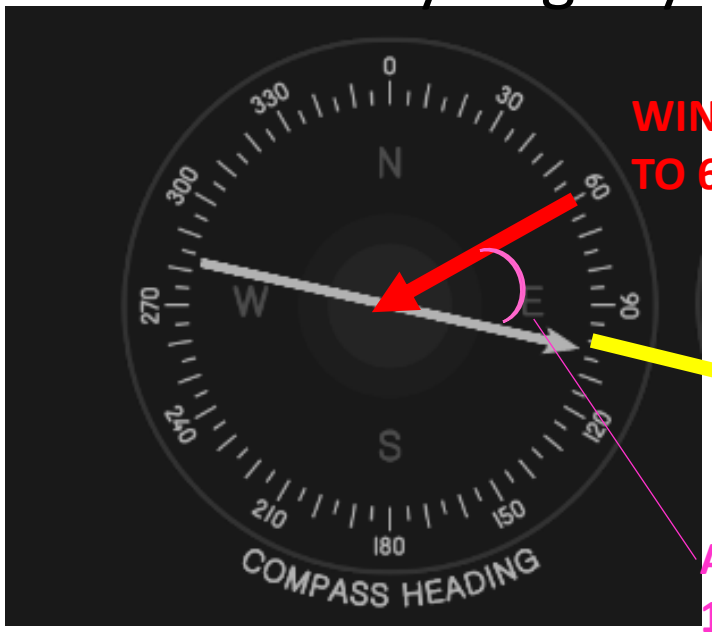
PART IV: BOMB RUN

- About 1 minute before bomb run, check for wind correction by consulting meteo conditions… Once again, you can do this on the ground beforehand and win precious time.



PART IV: BOMB RUN

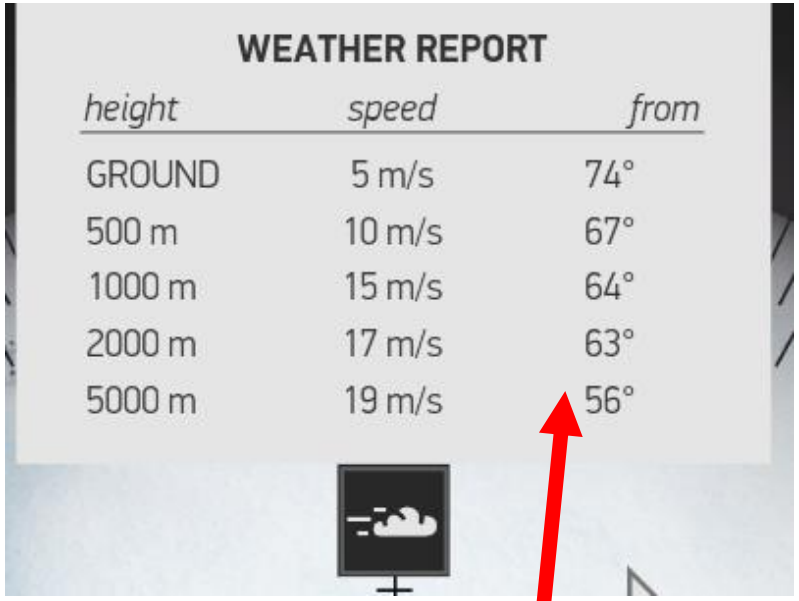
- Here is how you get your wind angle.



WIND FROM 60
TO 60+ 180 = 240 DEG

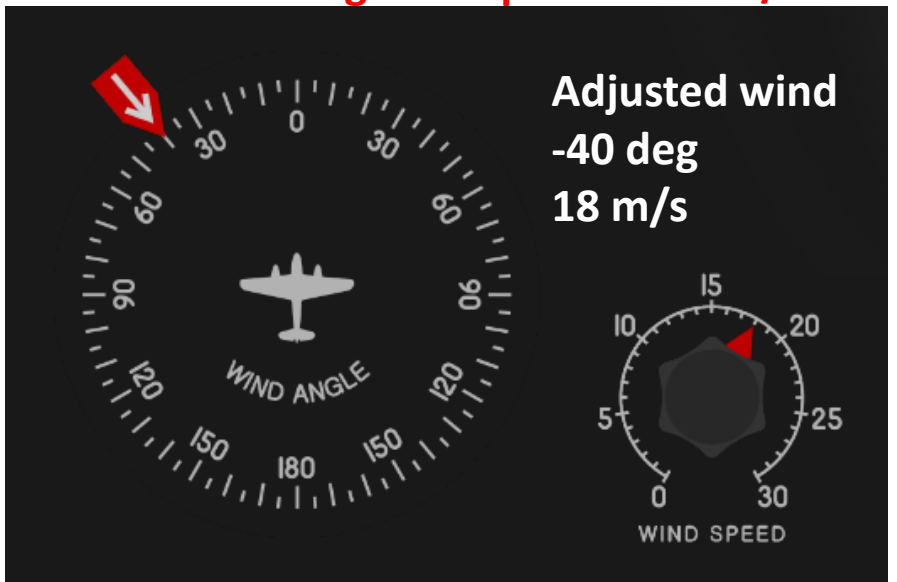
DIRECTION OF AIRCRAFT (GREY ARROW): 100 DEG

Angle between aircraft and wind:
100 - 60 = 40 deg
We choose - 40 because the wind is pushing you from your left.



At 4000 m, it is reasonable to predict a wind from approx. 60 deg for a speed of 18 m/s.

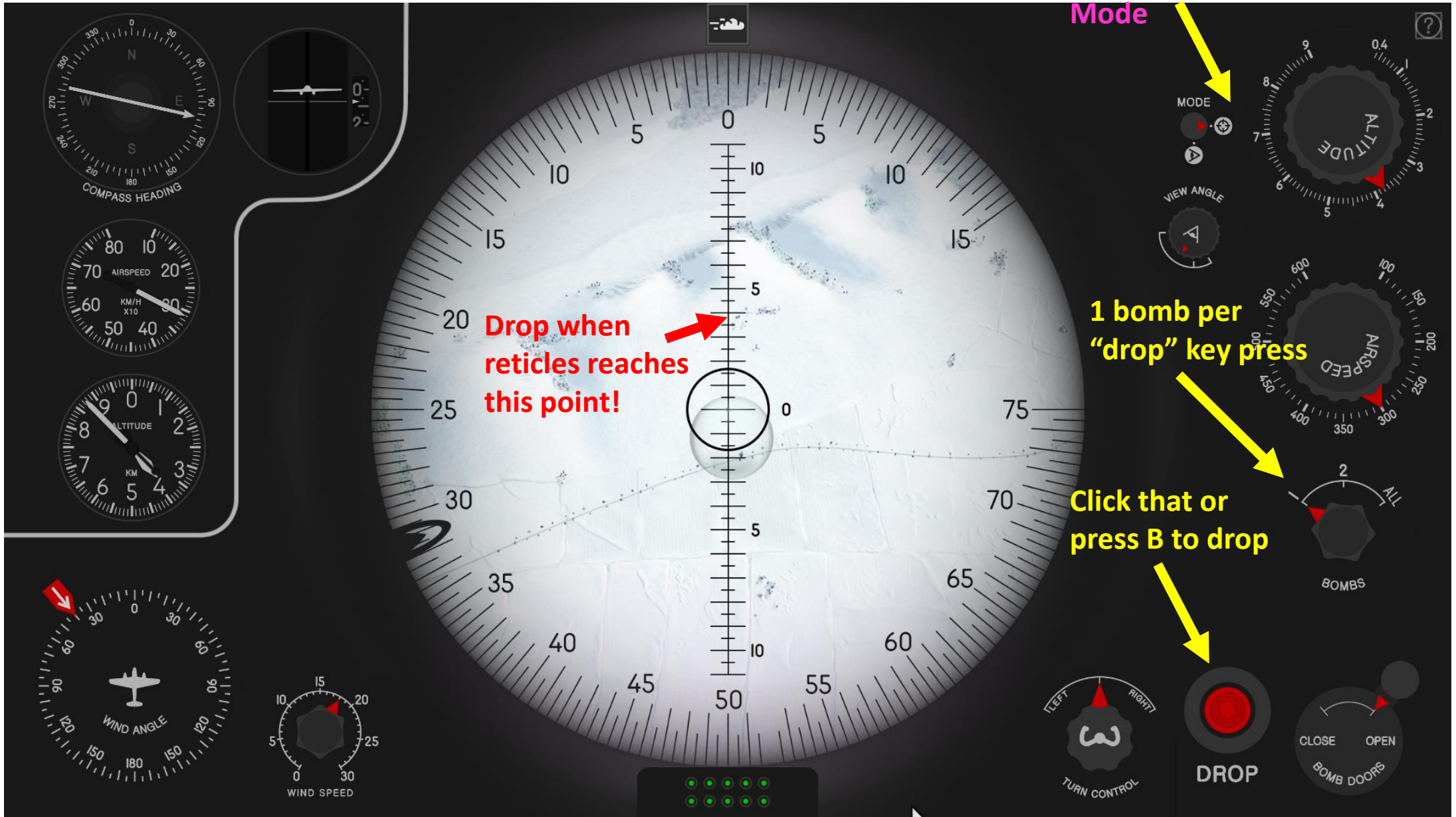
Red/white arrow is the direction where the wind will push your aircraft.



Adjusted wind
-40 deg
18 m/s

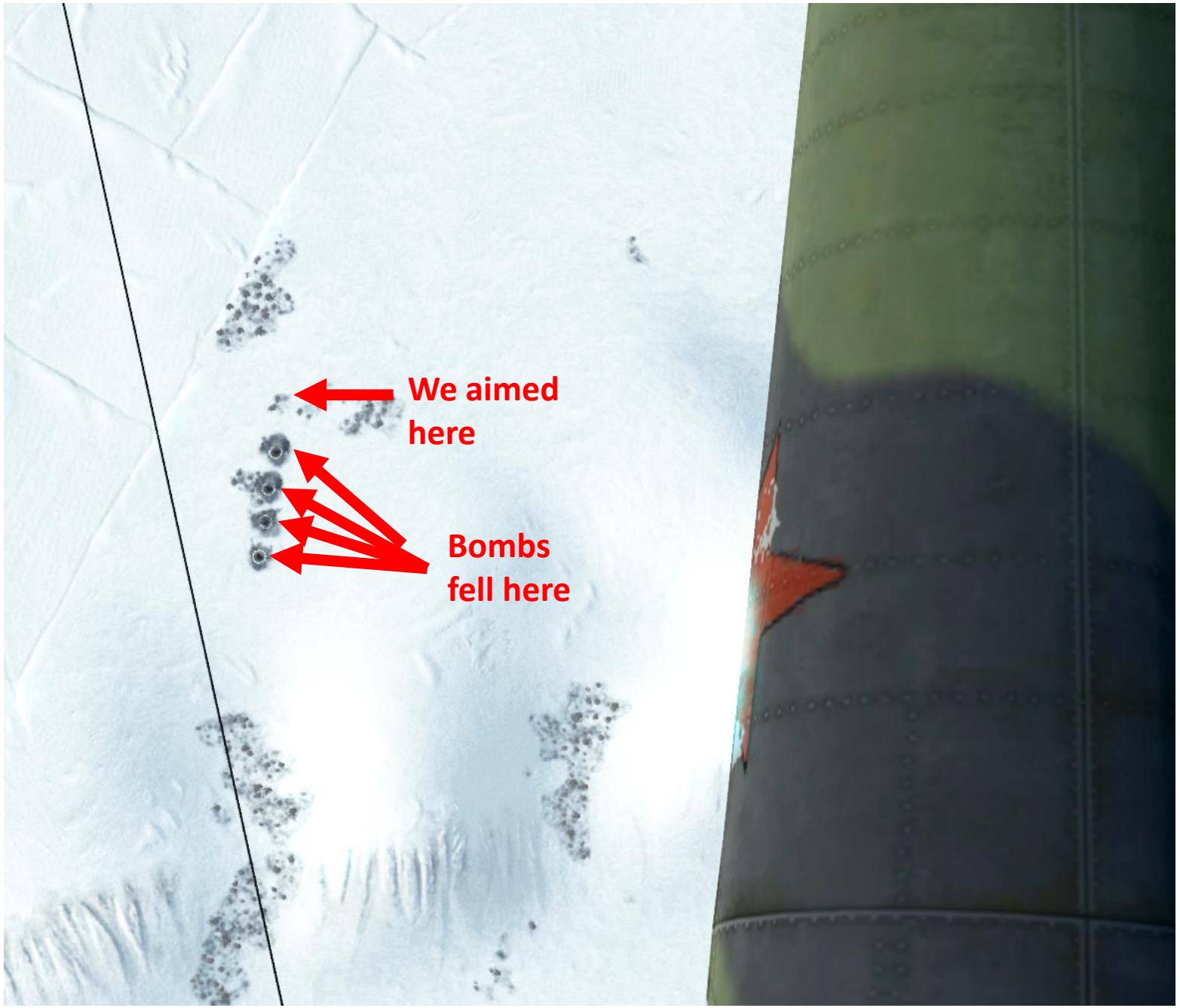
PART IV: BOMB RUN

- Now that we have all our parameters, let us drop the first 4 bombs strapped to the fuselage one by one. Bomb bay doors do not need to be open for the fuselage bombs. For the remaining bombs, press N or click the Open Bomb Doors button.



PART IV: BOMB RUN

- Not bad for a 18 m/s crosswind at 4000 m, eh?



PART V: LANDING

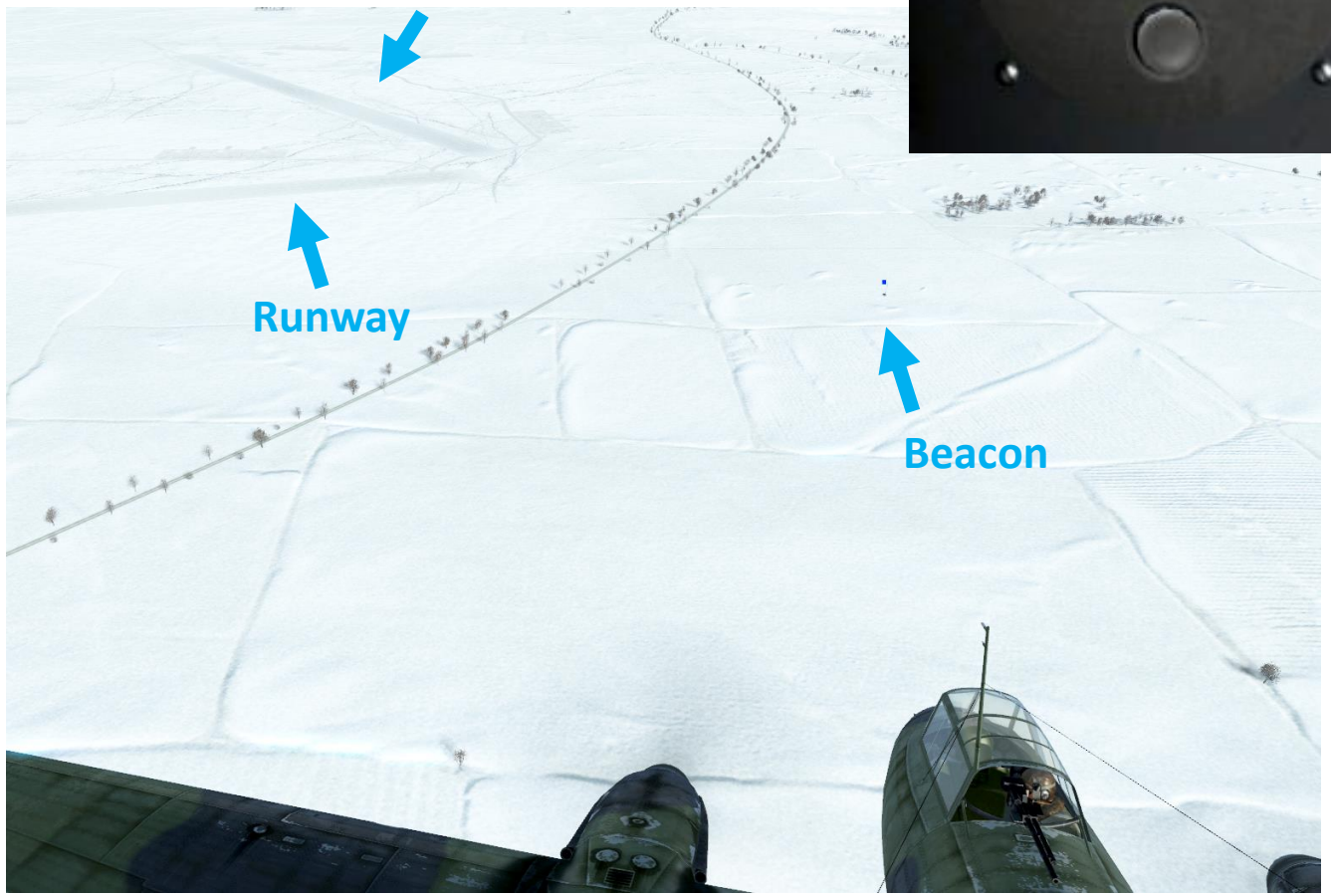
1) Deploy landing gear when going slower than 300 kph.
2) Max RPM, throttle as required to maintain approach speed at 200 kph.
3) Deploy flaps 15 degrees.
4) Trim nose down as flaps generate extra lift.
5) Touchdown at 160 kph.

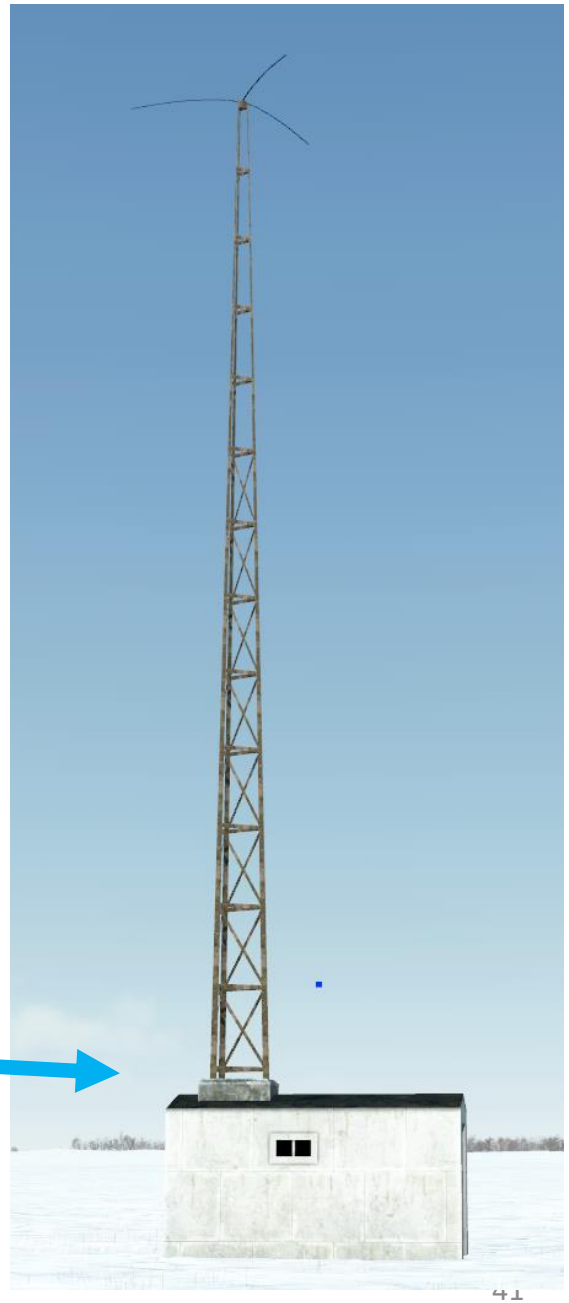
PART V: LANDING

Blind Approach Tutorial

(Radio Homing)

Note: Make sure you have the RPK-10 Radio Homing Compass installed in your aircraft.





PART V: LANDING

Blind Approach Tutorial