



**DCS**  
SERIES

# L -39C

## «ALBATROS»



## QUICKSTART MANUAL (beta)

D I G I T A L   C O M B A T   S I M U L A T O R

## HEALTH WARNING!

Please read before using this computer game or allowing your children to use it.

A very small proportion of people may experience a seizure or loss of consciousness when exposed to certain visual images, including flashing lights or light patterns that can occur in computer games. This may happen even with people who have no medical history of seizures, epilepsy, or “photosensitive epileptic seizures” while playing computer games.

These seizures have a variety of symptoms, including light-headedness, dizziness, disorientation, blurred vision, eye or face twitching, loss of consciousness or awareness even if momentarily.

**Immediately stop playing and consult your doctor if you or your children experience any of the above symptoms.**

The risk of seizures can be reduced if the following precautions are taken, (as well as a general health advice for playing computer games):

- Do not play when you are drowsy or tired.
- Play in a well-lit room.
- Rest for at least 10 minutes per hour when playing the computer game.

## INSTALLATION AND LAUNCH

Place the Setup.exe file and all .bin files in the same folder and double click on the Setup.exe file to begin installation. Then follow the on-screen instructions.

Note: You will need to be logged into Windows with Administrator rights in order to install the game.

Launching DCS: L-39C

After installation, you will have two icons on your desktop, DCS World and DCS World Multiplayer.



DCS World is the PC simulation environment that the L-39C simulation operates within. When you run DCS World, you in turn launch DCS: L-39C.

The DCS World icon starts the game in single-player mode, and the DCS World Multiplayer starts the DCS multiplayer interface.

As part of DCS World, the Su-25T Frogfoot attack aircraft and TF-51 training aircraft is also included for free.

After executing the DCS World icon on your desktop, the DCS World Main Menu page is opened. From the Main Menu, you can read DCS news, change your wallpaper by selecting either the L-39C or Su-25T Frogfoot icons at the bottom of the page, or select any of the options along the right side of the page. To get started quickly, you can select Instant Action and play any of the missions listed in the L-39C tab.

### Game Problems

If you encounter a problem, particularly with controls, we suggest you back up and then delete your Saved Games\User Name\DCS\Config folder, which is created by DCS on your operating system drive at first launch. Restart the game and this folder will be rebuilt automatically with default settings, including all of the controller input profiles.

If problems persist, we suggest consulting our online technical support forums at

<http://forums.eagle.ru/forumdisplay.php?f=251>

## Game Manuals

The Activation Guide describing serial key activation/deactivation is available in the /Doc folder of the game's root installation directory.

Additional documentation for DCS: L-39C, including the complete Flight Manual and a key commands guide can be found in the \Mods\aircrafts\L39C\Doc folder of the game installation directory.

## Useful Links

### DCS Homepage:

<http://www.digitalcombatsimulator.com/>

### Wiki:

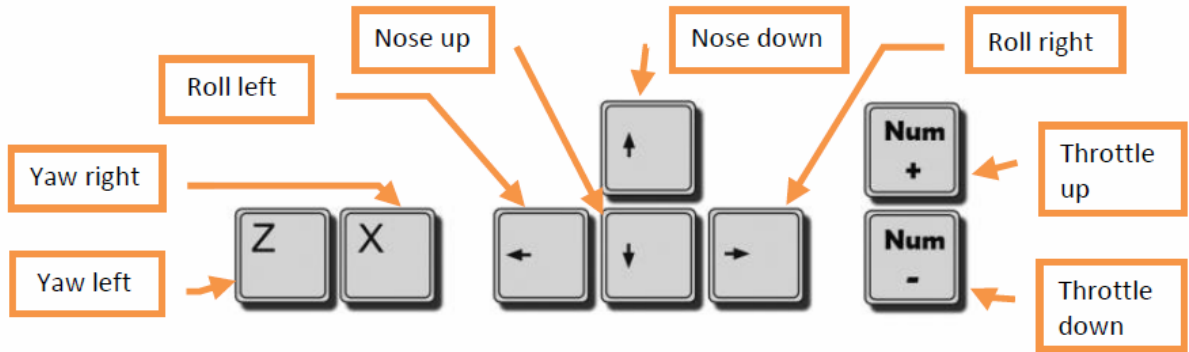
[http://en.wiki.eagle.ru/wiki/Main\\_Page](http://en.wiki.eagle.ru/wiki/Main_Page)

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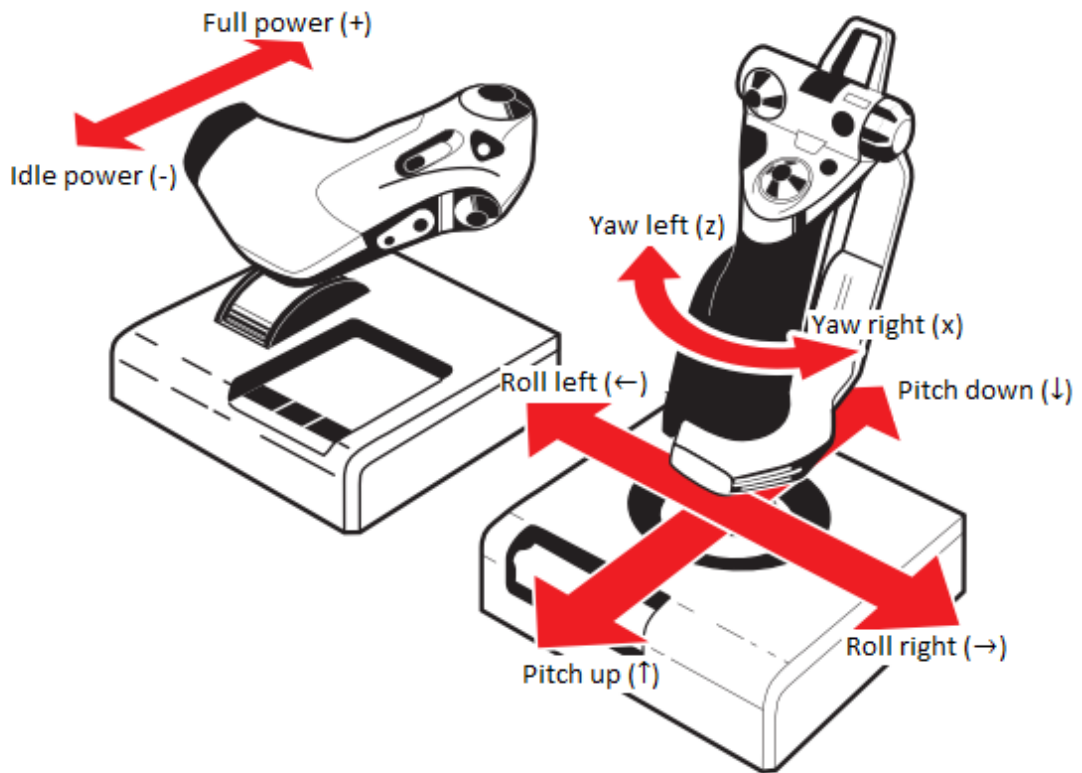
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## KEYBOARD CONTROLS



## JOYSTICK CONTROLS



## ENGINE START AND FLIGHT

## COLD START

**Automatic engine start procedure is activated by key combination: L.Win + Home].**

Engine should be started from the front cockpit, because «STOP» latch, which allows moving the throttle from the «STOP» to the «IDLE» and further, located on the front cockpit throttle only.

Engine start with opened canopy is strictly forbidden.

On the L-39 ground engineer closes and opens canopies of both cockpits.

If pilot starts engine with rear cockpit opened, then to close it ground crew has to stay very close to air inlet of working engine. This is very dangerous.

This feature is present in the L-39C simulator.

Engine can be started using ground power or battery.

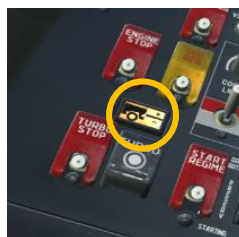
**Enable:**

- **«BATTERY» (Battery) CB**, the following signals should go on:
  - «ENG. MIN. OIL PRESS»;
  - «GENERATOR»;
  - «EMERGENCY GENERATOR»;
  - «DON'T START»;
  - «CANOPY UNLOCKED»;
  - «INV. 115V FAIL»;
  - «AIRCONDIT OFF»;
  - «INV. 3x36V FAIL»;
  - master caution panel.

If pressure in the hydraulic system is less than  $100 \pm 5 \text{ kg/cm}^2$  the «HYD. SYST. FAIL» signal is on.

Voltammeter should indicate not less than 24V.

If ground power is connected, signal with ground equipment icon should be on and voltammeter should indicate 27-29 V.



- **«ENGINE» CB** on main CB panel, as a result signals «DON'T START» and «INV. 3x36V FAIL» should go off.
- **«115V INVERTOR I»** and **«115V INVERTOR II»** circuit breakers (signal «INV. 115V FAIL» goes off).
- **«RDO» CB.**
- **«FLT RECORDER».**



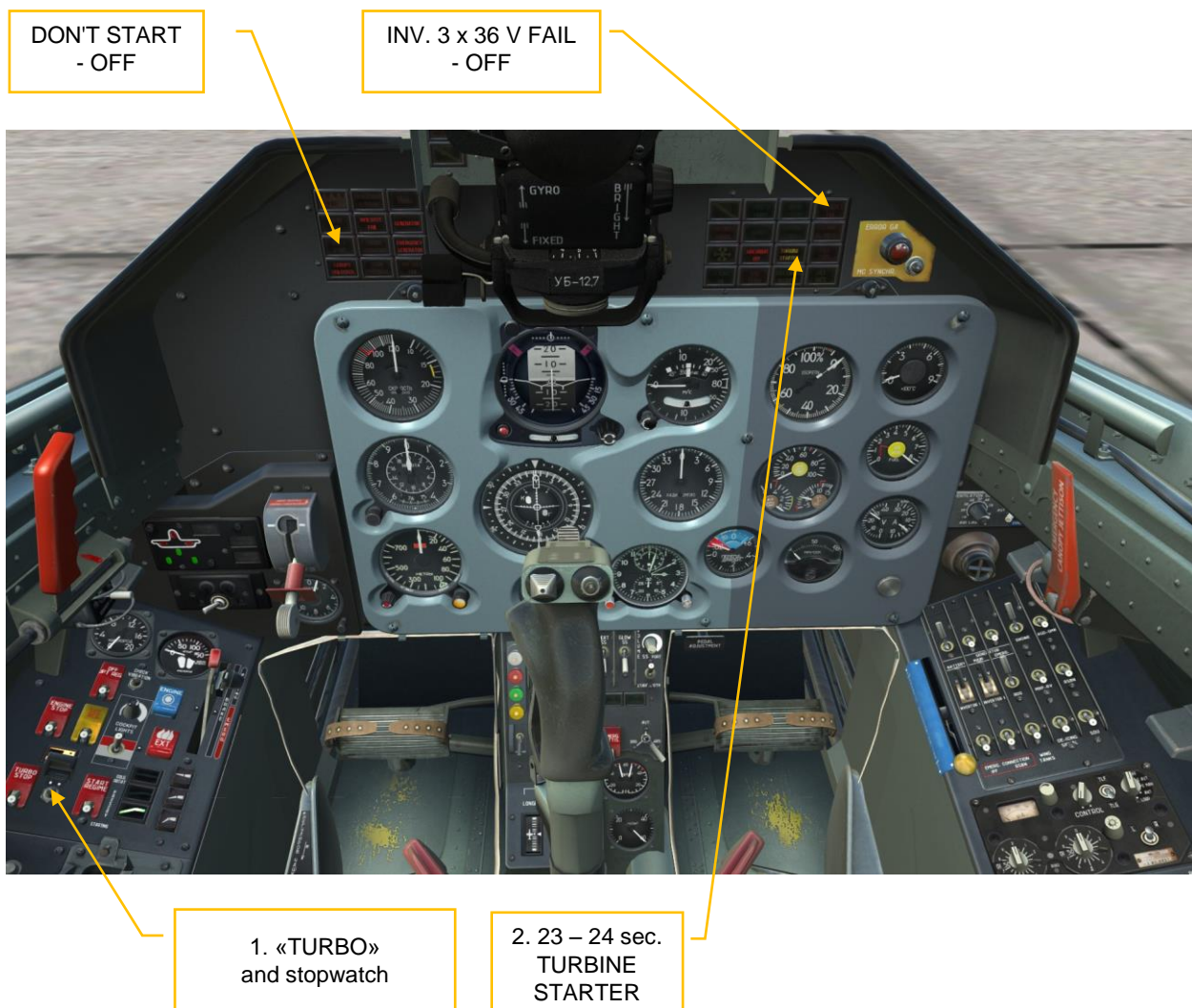
Set the wheel chocks under the main landing gear: [N] (radio menu), [F8], [F4], [F1] (set wheel chocks);

Ask permission to start engine [N] (radio menu), [F5], F3 (Permission to start) and once received, **disable**:

- «115V INVERTOR I» CB,
- «115V INVERTOR II» CB;
- «RDO» CB;

#### Perform engine start.

- make sure that throttle is in «STOP» position and that «DON'T START» and «INV. 3x36V FAIL» signals are off.
- start Sapphire-5 APU, for that simultaneously press stopwatch button and «TURBO» button for 1-2 seconds.
- listen if APU has started and move sight to the caution & advisory lights panel, after 23-24 seconds, «TURBINE STARTER» signal flashes on. Now the engine can be started.





- simultaneously press stopwatch button and «ENGINE» button for 1-2 seconds.

1. «ENGINE» and stopwatch



- after 3-6 seconds from the moment button was pressed move the throttle to the «IDLE» position [RAIt + Home];

2. after 3- 6 sec. set throttle to «IDLE»



- Look at engine RPM gauge, HPC (n1) RPM should increase constantly and at 15<sup>th</sup> second, from the moment the «ENGINE» button was pressed, should be not less than 20%. From this point LPC (n2) RPM should start increasing as well.



1. ITE-2 not less than 20%.

- Look at EGT gauge and as soon as temperature stop increasing, look back at the engine RPM gauge, HPC and LPC RPMs should be gradually increasing and reach values corresponding to «IDLE» mode.
- Press stopwatch button.



Temperature is not growing

HPC and LPC RPM are growing

When engine operates at «IDLE» mode, check:

- HPC RPM should be within  $56\pm 1,5\%$ ;
- EGT should be not more than  $600^{\circ}\text{C}$ ,
- oil pressure is not less than  $2\text{ kg/cm}^2$ , the «ENG MIN. OIL PRESS» is off;
- engine start up time is not more than 50 sec.



EGT  $\leq 600^{\circ}\text{C}$

HPC (n1)  $56\pm 1,5\%$

Oil pressure is not less than  $2\text{ kg/cm}^2$

not more than 50 sec

*NOTE: When HPC RPM reach  $41,5\text{—}44,5\%$  within 45 seconds, the Sapphire-5 APU automatically shuts off, air starter disconnects, «TURBINE STARTER» signal goes off, finishing starting cycle. Engine reaches Idle mode (HPC RPM within  $56\pm 1,5\%$ ;) on its own.*

In case of unsuccessful engine start, perform cold rotation of the engine

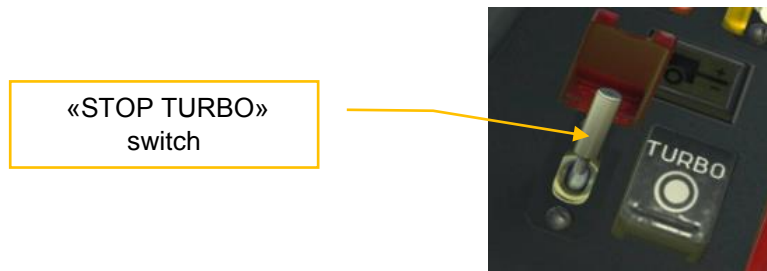
For that set the «STARTING – PRESERV. – COLD. ROTAT» switch into «COLD. ROTAT» position. In this case, ignition is disabled and starting and working fuel is not fed to engine.



«STARTING-  
PRESERV.- COLD  
ROTAT» switch

Cold rotation is used to remove accumulated fuel from the combustion chamber. During cold rotation throttle should be kept in «STOP» position.

- press «TURBO» button for 1-2 seconds.
- when «TURBINE STARTER» signal flashes, press «ENGINE» button for 1-2 seconds.
- air starter spins up the HPC rotor within 45 seconds and automatically disables, turbine starter switches to idle mode.
- disable turbine starter by «STOP TURBO» switch;



- when turbine starter is stopped return the «STOP TURBO» switch into initial position;
- set the «STARTING – PRESERV. – COLD. ROTAT» switch back into «STARTING» position;
- re-start the engine.

There is a possibility to do a false start, which is used for preservation and depreservation of fuel lines. During false start pilot performs the same actions as for normal start, except that «STARTING – PRESERV. – COLD. ROTAT» switch must be in «PRESERV» position. In this case ignition system is off, but all the starting units trigger in a normal (for engine start) sequence. This function is not implemented in simulator.

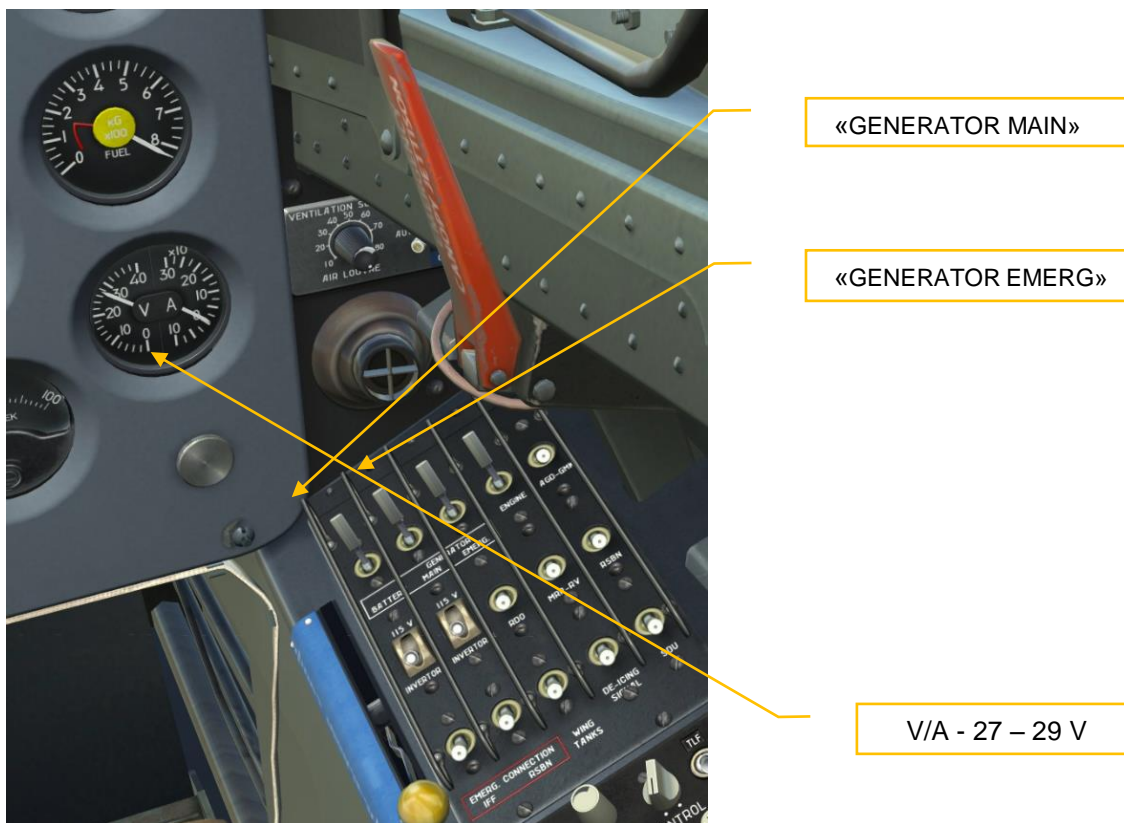
#### After engine start enable:

- «GENERATOR MAIN».
- «GENERATOR EMERG.»

If ground power was used for engine start, give command to disconnect ground power. **[N (radiomenu), [F8], [F2], [F2] (disconnect ground power).**

The «GENERATOR» and «EMERGENCY GENERATOR» and “Ground power connected” signals go off.

Check that voltage in onboard network is within 27-29V using voltammeter.



- «AGD-GMK»;
- «115V INVERTOR I», «115V INVERTOR II»;
- «RDO»;
- «MRP-RV»;
- «RSBN» (Iskra) ;
- «WING TANKS».
- Operation mode switch on the RLK-41 control panel has to be set to «C AUT». This enables backlighting of control panel and tune indicator (if panel is not backlit, set the ADF control switch to “my cockpit” position).

AGD-GMK

115V INVERTOR – I (II)

RDO

MRP - RV

RSBN

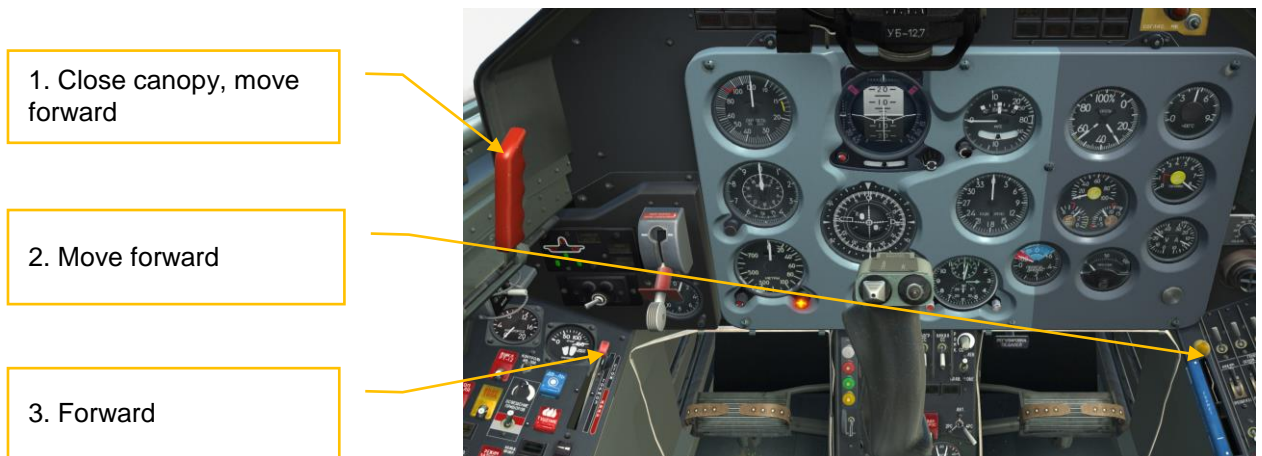


WING TANKS

RLK-41 - C AUT

- give “Close canopy” command \*, [N] (radio menu), [F8], [F2], [F1] (Close canopy).
- when the canopy is closed, move canopy locks’ lever to the far most position, ensure that cockpit is reliably closed and the «CANOPY UNLOCKED» signal is off.
- seal the cockpit by moving cockpit pressurization and ECS lever all the way forward, after 30 seconds «AIRCONDIT OFF» signal goes off. Check pressure difference in the cockpit, read on UVPD (0,02-0,05).
- set emergency brake lever to the far most position (parking brake).

*\*Note: canopy can be opened and closed by player by pressing: [LCtrl + C]*



## PREPARING TO TAXIING AND TAXIING

1. Extend flaps at 25° **[Shift+F]**;
2. Press braking lever **[W]**;
3. Release parking brake;



4. Give the “Remove wheel chocks” command to the ground crew **[N]** (radio menu), **[F8]**, **[F4]**, **[F2]** (remove wheel chocks);
5. Slowly increase engine RPM **[Numpad+]** so that airplane starts rolling. If the front wheel was turned to the side at the start of movement, pilot has to prevent airplane from turning by using brakes;

Turns during taxiing are initiated by deflecting pedals **[Z]**, **[X]** (not less than 50% of full deflection range) together with brake **[W]** usage. To stop turning use short presses of opposite pedal and brake.

Take the runway and roll 10-15 m in a straight line to align nose wheel with takeoff direction. Brake wheels **[W]**.

Check that aileron and elevator trimmers are in neutral positions.



If they are not in neutral positions using keys: **[RCtrl+]** – elevator trimmer up, **[RCtrl+]** – elevator trimmer down, **[RCtrl+]** – aileron trimmer left, **[RCtrl+]** – aileron trimmer right – set the trimmers in neutral position.

Check if the RKL-41 ADF and the GMK-1AE compass show correct values (if necessary align it). Check that there are no warning signals except the «**DANGEROUS ALTITUDE**».



## Takeoff

Move the throttle all the way forward to the «TAKE OFF» position, make sure that engine RPM reached takeoff value, release brakes and start takeoff run.

During the first phase of run airplane must be kept in a straight line with help of brakes, after 100 km/h by rudder. The stick should be in neutral position.

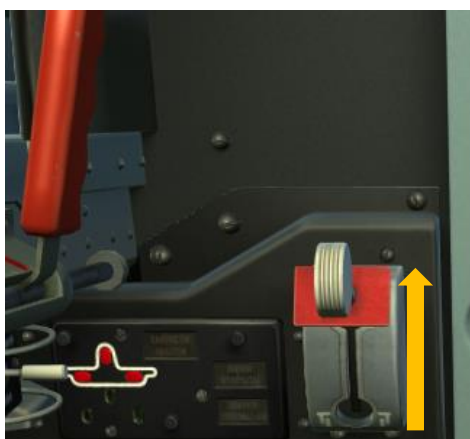
When speed reaches 150 km/h by smooth stick movement towards yourself (approximately half way back) lift the nose wheel to the takeoff position and keep this position until the airplane is airborne. If the wheel is lifted correctly, the horizon line will be aligned with gunsight pillow.

At 190-200 km/h airplane smoothly detaches from the ground.

At height of 20 m and speed of not less than 250 km/h retract landing gear by setting the landing



gear control lever in the upper position. [G]



At altitude of 50-70 meters and speed of not less than 280 km/h retract flaps. [F]



**WARNING.** At IAS of 310 km/h flaps retract automatically.

After flaps retraction, at altitude of 100 m, set engine RPM to «NOM» mode and continue climbing, increasing speed to 400 km/h.



«NOM» mode

### Landing approach

At altitude of 600 m, speed of 350 km/h and distance of 15 km. by maneuvering the airplane align flight direction with runway threshold.



decrease engine RPM to 80%, reduce speed to 330 km/h, and extract gears; [\[G\]](#)



At speed of 280 km/h extend flaps at 25°. **[LShift+F]**;



increase engine RPM to 90%;

descent with  $V_y$  3 – 4 m/s, keeping speed of 280 km/h;

maneuver airplane so that flight direction is aligned with runway threshold, control altitude and speed

**WARNING.** At IAS of 310 km/h flaps retract automatically.

At distance of not less than 4 km extend flaps at 44°. **[LCtrl+F]** and set  $V_y$  2 m/s;



descent towards runway threshold gradually reducing speed to 230 km/h;



## Landing

At altitude of 8-10m by smoothly pulling the stick start flaring with such a descending rate that airplane flares at altitude of 1m. At the end of flaring gradually reduce engine RPM. **[Numpad-]**. While airplane descends towards the ground by pulling the stick create landing angle so that airplanes lands on two main wheels without parachuting. Airplane lands at speed of 180 km/h. After front wheel touched the ground start braking by pressing smoothly the brake lever, pedals are in neutral position. After landing run leave the runway, retract flaps **[F]** and taxi to the parking place.

## ENGINE SHUTOFF

**Automatic engine shutoff procedure is activated by key combination [L.Win + End].**

**When arrived at parking place:**

- set the throttle to idle mode;
- move the cockpit pressurization and ECS lever all the way back.
- set operating mode switch on the RKL-41 control panel set to the «OFF» position.
- disable all the CBs, leave only «ENGINE» CB, «BATTERY» and «FLT RECORDER» switches enabled.
- Set throttle to the «STOP» position. [RAlt + End]
- открыть замки фонаря.
- Open canopy locks.
- Give command “Open Canopy” to the ground crew. [N] (radio menu), [F8], [F2], [F1] (Open canopy).
- After engine RPM pointers reached scale zero, disable all remaining CBs on the main CB panel and disable the «FLT RECORDER» switch.

## COMBAT EMPLOYMENT

The L-39C airplane has bomb and missile armament. It has the ASP-3NMU-39 gunsight, FKP-2-2 gun camera and EKSR-46 auxiliary armament.

Armament, gunsight and photo control equipment of the L-39C are used for the following tasks:

- accurate dive bombing with 50 - 100 kg bombs;
- accurate S-5 rocket shooting at ground target during diving;
- shooting R-3S at aerial targets.

**Weapon controls are concentrated on the center panel in front cockpit. Combat button is located on the stick in the front cockpit only.**



## GROUND TARGETS ENGAGEMENT PRE-FLIGHT PREPARATION

Ground targets engagement flights are complex tasks, which require from pilot strong piloting skills and knowledge of aircraft armament operation.

Before flight examine the armament operation procedures, piloting technique, clarify aiming data (fictitious target base and reflector deflection angle).

### Fictitious target base calculation

Since the recommended shooting and bombing ranges exceed maximum distance (800 m) which can be entered into gunsight, fictitious target base should be entered for external base rangefinder to operate correctly. It is defined by the following equation:

$$B_f = B_a \times D_m / D_s$$

where:

- $B_f$  – fictitious target base, m;
- $B_a$  – actual target size, m;
- $D_m$  – maximum distance, entered into gunsight - 800 m;
- $D_s$  \* – shooting (bombing) distance.

$D_s$  \* - see Tables 1 and 2.

### Specific of aiming at small-sized targets

Small-sized target is a target with fictitious target base of less than 14.5m.

For recommended shooting distances of 1200 and 1460 m, small-sized targets are those, who have actual size of less than 22 and 27 m correspondingly.

For recommended bombing distances of 1600 and 1300 m, small-sized targets are those, who have actual size of less than 29 and 24 m correspondingly.

When shooting at such targets one must take into account the following:

- targets cannot be surrounded correctly by the moving circle at recommended distances, because their angular size at these distances are less than that of rangefinding circle;
- maximum distance cannot be entered into gunsight if fictitious target base is less than 14.5m.

### Fictitious base calculation for small-sized targets:

$$B_f = K \times B_a \times D_m / D_s$$

where:

- *multiplicity coefficient 2,3.*

*K=2 when  $10m \leq B_a < 27(22) m$  u  $K=3$  npu  $B_a < 10m$ . – for rocket shooting*

*K=2 when  $10m \leq B_a < 30 m$  u  $K=3$  npu  $B_a < 10m$ . – for bombing*

*At the moment of shooting visible target size should be K times smaller than the rangefinding circle.*



## BOMBING FLIGHTS

Before the flight, make sure that the «NETW», «ARMS» and «SIGNAL» CBs are enabled in rear cockpit.

**Very important phase of dive bombing is arriving at point where turn and dive entry are performed. The accuracy of arriving at this point impacts on dive angle and release speed.**

Bombing should be performed at diving angles of 20<sup>0</sup> and 30<sup>0</sup> under conditions listed in Table 1.

Table 1.

No	Parameters	30 <sup>0</sup>	20 <sup>0</sup>
1	Gunsight reflector deflection angle	11 <sup>0</sup>	13 <sup>0</sup>
2	Dive entry altitude at ingress point	1500 m.	1200 m.
3	Dive entry speed at ingress point	350 km/h	400 km/h
4	Release altitude	800 m.	700 m.
5	Release speed	550 km/h.	560 km/h
6	Bombing distance	1600 m.	1300 m.
7	Range of the actual target sizes for recommended bombing distances	29-45 m.	24-45 m.
8	Range of the fictitious target bases, entered into gunsight for recommended bombing distances	14,5-22,5 m.	14,7-27 m.

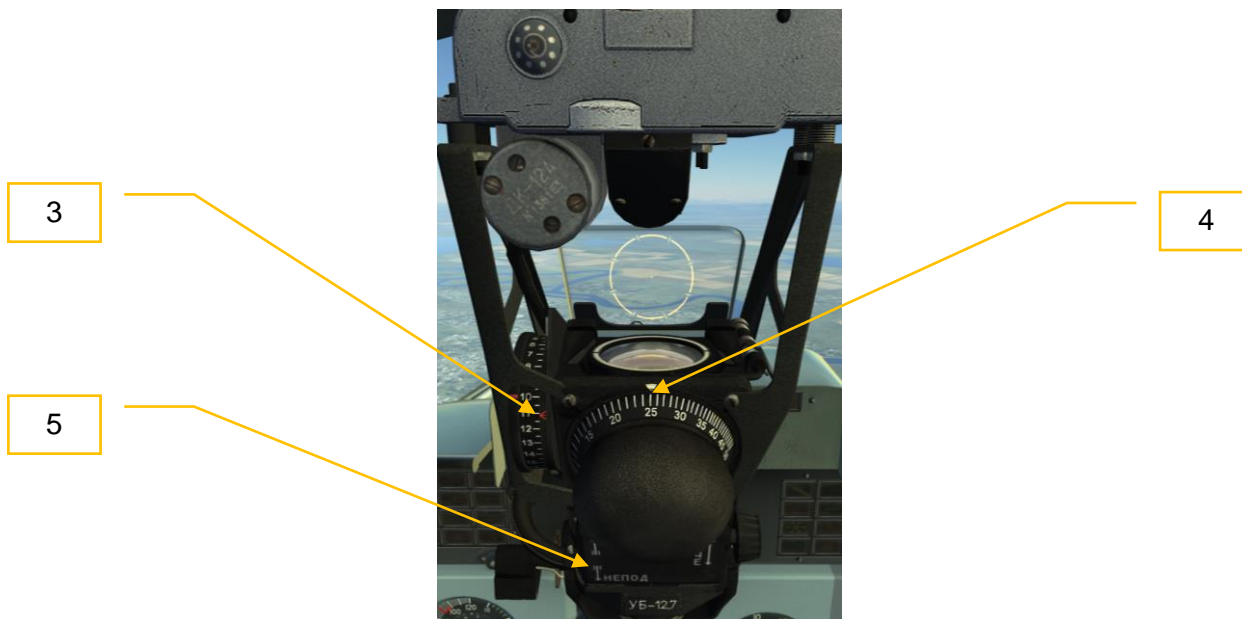
### While approaching target:

- enable «ASP-FKP» CB;
- set the desired bombs release mode using the «PORT- STARB. BOTH» switch;



- set gunsight reflector to angle corresponding to dive angle and raise the seat to the upper position [**LShift+S – raise the seat, LAlt+LShift+S – lower the seat**] so that one could see the central dot of aiming grid and upper part of the rangefinding circle. Due to that, habitual view from the cockpit will change.
- set the fictitious target base;

- «GYRO-FIXED» switch set in the «FIXED» position. [LShift+J]

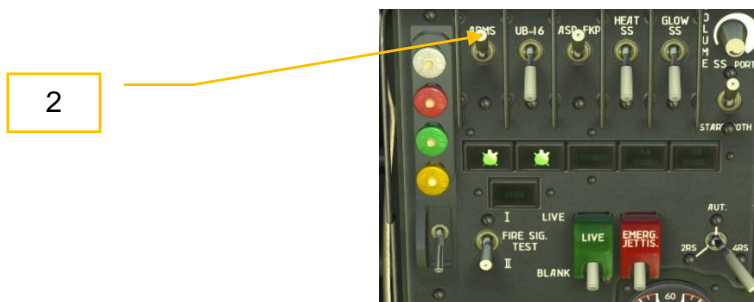


- enter maximum distance into gunsight [;];



**Actions in the target area:**

- approach target required altitude of and at required speed (see Table 1);
- enable the «ARMS» CB;



3. ingress maneuver should be performed in such a way that target moved to the required target viewing angle (turn starting point);



4. at the moment when target reaches required viewing angle, start turning towards attack course with 60-120° roll and simultaneous dive entry. While entering the dive, set engine RPM of 90-92%;



- turn and dive entry should be finished in such a way that aiming grid center is under the target at distance equal to 1 radius of the constant diameter aiming circle;



- flip the combat trigger down [LCtrl+Space], and while airplane is descending, the central dot of the aiming circle will be moving towards the target, speed and altitude - towards the required release values;
- when required speed and altitude are reached and central dot is aligned with the target, press the combat trigger (1 second) [Space] and release the bombs;



8. immediately after bombing exit from the dive with G-factor of 4-5 units, simultaneously increasing engine RPM to «TAKE OFF»;

In case of tactical release system failure, armed bomb must be released using emergency system. To do that is necessary:

- set the «LIVE – BLANK» switch in the front or rear cockpit to the «LIVE» position;
- enable the «EMERG. JETTIS.» switch in the front or rear cockpit, bomb will be released simultaneously.

To perform bombing from emergency system with non-armed bombs, one must set the «LIVE – BLANK» switch to «BLANK» position.

### TYPICAL MISTAKES DURING BOMB RUN

- Error in the dive angle of  $\pm 1^\circ$  when bomb is dropped causes deviation of  $\pm 30$  m. This occurs due to early or late dive entry;
- Error in the drop speed of  $\pm 20$  km/h causes deviation of  $\pm 25$  m. This occurs, when dive entry speed or dive angle were not kept correctly;
- Error in the release altitude of  $\pm 50$  m. – causes bomb deviation of  $\pm 80$  m.

### FLIGHT FOR SHOOTING UNGUIDED ROCKETS

Before the flight make sure that the «NETW», «ARMS» and «SIGNAL» CBs are enabled in rear cockpit.

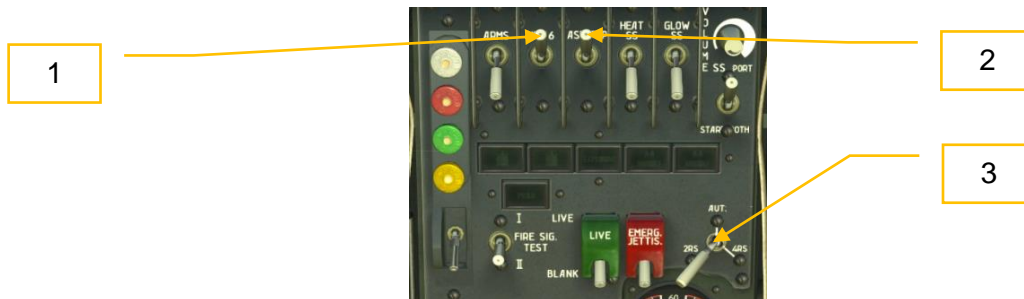
Unguided rockets should be fired at dive angles of 20 and 30<sup>0</sup> under conditions listed in the Table 2.

Table 2.

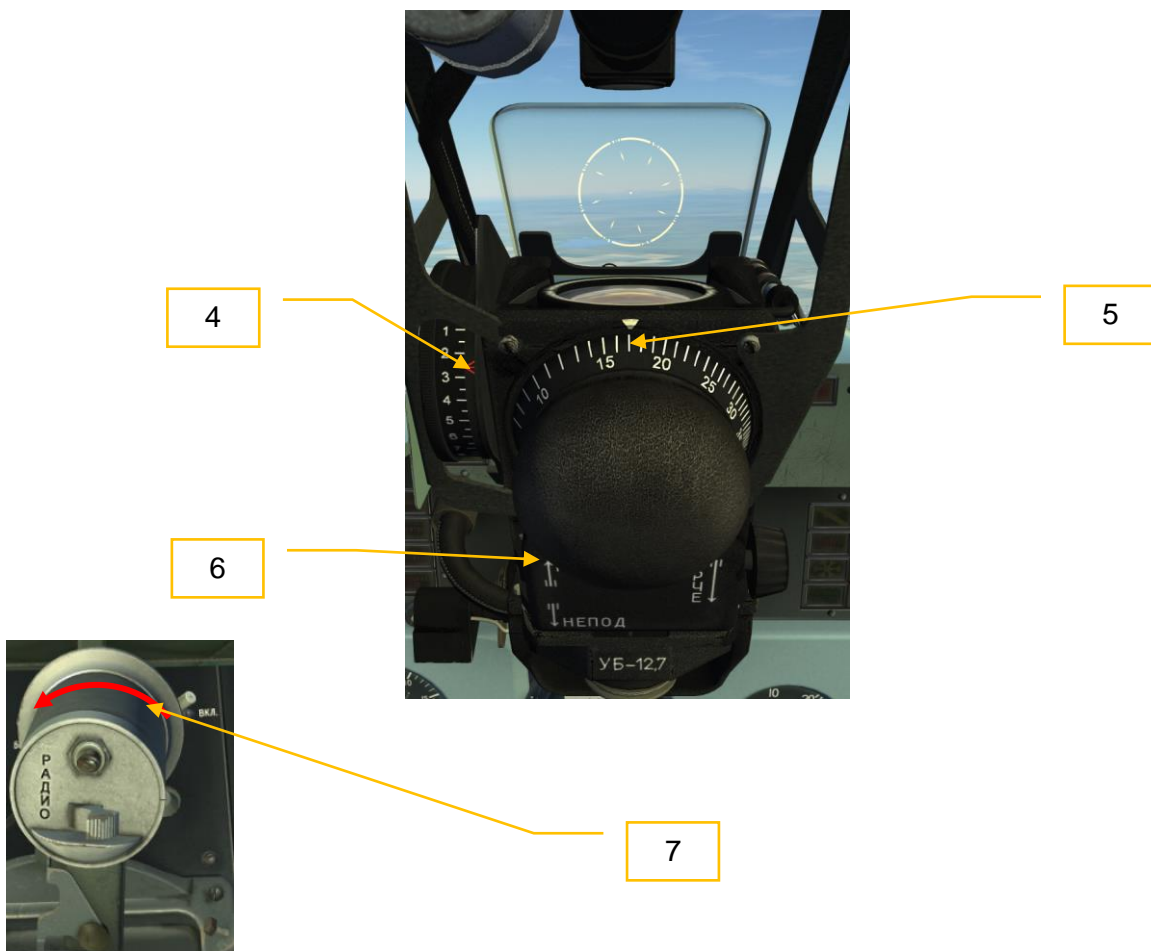
<b>No</b>	<b>Parameters</b>	<b>30<sup>0</sup></b>	<b>20<sup>0</sup></b>
<b>1</b>	<i>Gunsight reflector deflection angle</i>	2,53 <sup>0</sup>	2,30 <sup>0</sup>
<b>2</b>	<i>Dive entry altitude at ingress point</i>	1200 m.	1200 m.
<b>3</b>	<i>Dive entry speed at ingress point</i>	300 km/h	400 km/h
<b>4</b>	<i>Shooting altitude</i>	600 m.	500 m.
<b>5</b>	<i>Speed at shooting moment</i>	550 km/h.	560 km/h
<b>6</b>	<i>Shooting distance</i>	1200 m.	1460 m.
<b>7</b>	<i>Range of the actual target sizes for recommended shooting distances</i>	22 – 45m.	27 – 45m.
<b>8</b>	<i>Range of the fictitious target bases, entered into gunsight for recommended shooting distances</i>	14.6 – 30 m.	14,8 – 24,5 m.

**While approaching target:**

1. enable «UB-16» CBs;
2. enable the «ASP-FKP» CB;
3. using the «2RS – AUT – 4RS» select desired shooting mode;

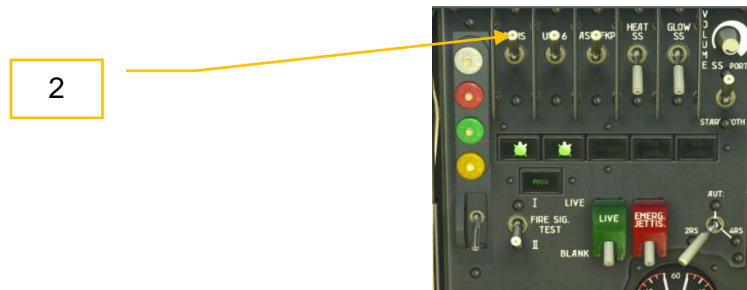


4. set required gunsight reflector angle corresponding to chosen dive angle;
5. set fictitious target base;
6. set the «GYRO-FIXED» switch to the «GYRO» position; [LShift+J];
7. enter the minimum distance into gunsight. [.]



**Actions in the target area:**

1. approach target at altitude of 1200 m. at required speed;
2. enable the «ARMS» CB;



3. ingress maneuver should be performed in such a way that target moved to the required target viewing angle (turn starting point);
4. at the moment when target reaches required viewing angle, start turning towards attack course with 60-120° roll and simultaneous dive entry. While entering the dive, set engine RPM of 90-92%;
5. turn and dive entry should be finished in such a way that aiming grid center was under the target;



- flip the combat trigger down [**L**Ctrl+**Space**], enter the maximum distance into gunsight [;]. As a result aiming reticle starts moving, reacting on aircraft maneuvers. Align aiming grid center with target's center;



- while descending, keep central dot of aiming circle on the target;
- as soon as target fits the circle, formed by the diamonds, press the combat trigger (1 sec) [**Space**] and perform shooting;



- immediately after shooting exit from the dive with G-factor of 3-3.5 units, simultaneously increasing engine RPM to «TAKE OFF»;



**Note:** For rockets shooting the «FIXED» mode can be used as well. Calculated data remains the same as for «GYRO» mode. Set the maximum distance before dive entry.

Unguided rockets fire control system has no emergency launch option. UB-16 blocks are intended to be jettisoned only.

## TYPICAL MISTAKES DURING ROCKETS SHOOTING

- shooting from the distance which is, bigger or smaller, than the estimated ones, leads to rocket overfly or underfly;
- abrupt control stick movements, after entering the maximum distance, cause big oscillations of the gunsight grid – aiming is difficult

## COMBAT EMPLOYMENT AT AERIAL TARGETS

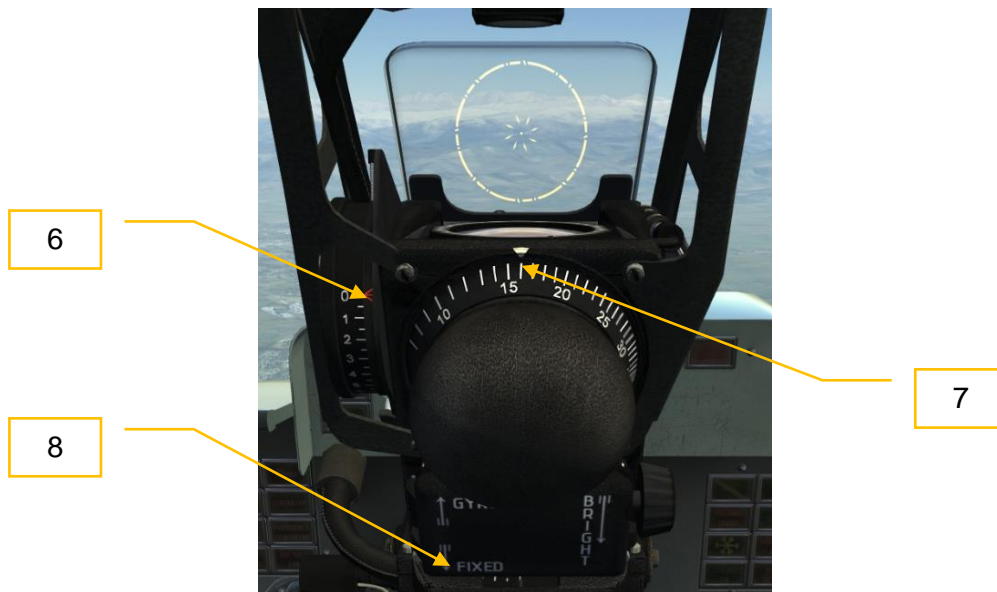
Before the flight, make sure that the «NETW», «ARMS» and «SIGNAL» CBs are enabled in rear cockpit.

### Before intercept:

1. enable «ASP-FKP» CB;
2. enable «GLOW SS»CB;
3. enable «HEAT SS» CB;
4. «VOLUME SS» - set the maximum volume;
5. using the «PORT – STARB. BOTH» select missile to be launched;



6. set the gunsight reflector angle of  $0^{\circ}$ ;
7. set the fictitious target base of 16 m;
8. «GYRO-FIXED» switch is in «FIXED» position. [LShift+J]



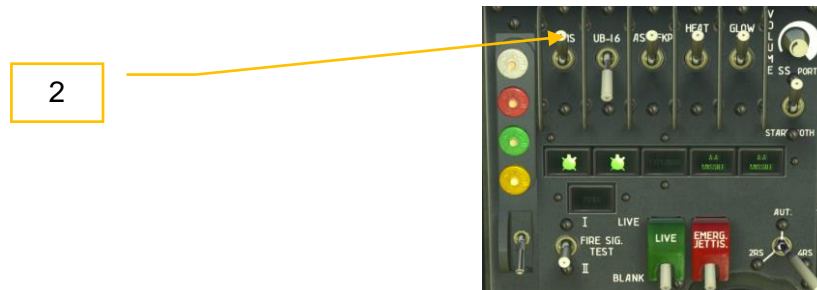
9. enter the maximum range [;].



**Note:** Perform guided missile launch from rear hemisphere at target angles from  $0/4$  to  $2/4$ , sun bearing should be not more than  $20^{\circ}$ . Missile firing range is within 1200-2000 m, according to ASP-3NMU-39, closing speed is not more than 200 km/h. Attack exit perform at distance of not less than 1000 m. Launch is allowed when missile seeker lock signal is at maximum level (at allowed launch distance) and G-factor is less than 2 units.

**Intercept:**

1. find a target and prepare for attack: distance - 2000 m, target should be seen at angle of 50 - 60°, altitude difference is 300 – 400 m.
2. enable «ARMS» CB;



3. turn towards the target with roll angle of 50-60°, when the target reaches gunsight reflector remove roll, flip combat trigger **[LCtrl+Space]**;
4. aim, by maneuvering aircraft achieve the maximum of the audial signal;
5. «NO LAUNCH» is off\*;



\*Note: «NO LAUNCH» signal indicates that allowed G-factor of more than 2 units is exceeded. Missile cannot be precisely pointed to the target.

6. when target visible size is 3-2 times smaller than the rangefinding circle, launch missile by pressing combat trigger for not less than 2-2.5 seconds;



7. exit from attack run;
8. perform consecutive attack run;

Guided missile fire control system has no emergency launch option. Missiles are intended to be jettisoned together with APU launcher only.