

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

КРАТКОЕ РУКОВОДСТВО ПИЛОТА



Mi-24P **HIND**



DCS

This manual is a documentation for the user of a computer game - flight simulator Mi-24P. The manual provides the information required to master and understand the gameplay. For a description of the game's user interface and mission editor, see a separate manual.

There is a forum for user communication [DCS: Mi-24P - ED Forums \(eagle.ru\)](http://DCS:Mi-24P-EDForums.eagle.ru), where you can get additional information about the game, gameplay, as well as ask a question of interest.

© 2013-2021 Eagle Dynamics Company. All rights reserved.

ATTENTION! By purchasing the DCS: Mi-24P software product, you hereby agree not to allow the software and documentation to be copied without the written permission of Eagle Dynamics.

DCS: www.digitalcombatsimulator.com

TABLE OF CONTENTS

CONTENTS	3
READ!	6
1. PILOT'S CABIN	eight
1.1. ABOUT GENERAL PILOT'S CABIN LAYOUT	eight
1.2. LEVA AND RIGHT PANELS Gas station	nine
1.3. LEVE SIDE PILOT CONTROL	eleven
1.4. LEVE FRONT PILOT CONTROL	12
1.5. PFIBER'S RIBBOARD	13
1.5.1. Signal board block	fifteen
1.6. PRIZEL ASP-17VP	fifteen
1.7. PANEL OF THE PILOT'S WEAPON CONTROL (PUVL)	fifteen
1.8. PRIGHT FRONT PILOT CONTROL	sixteen
1.9. FROM CARTRIDGE COUNTER USB-1-2A	17
1.10. PRIGHT SIDE PILOT CONTROL	17
1.11. ABOUT PILOT'S CABIN HELICOPTER CONTROLS	eighteen
1.11.1. The general layout of the controls for the helicopter, the HB brake and engines	eighteen
1.11.2. The stick of the longitudinal-transverse control of the pilot	eighteen
1.11.3. Pilot common pitch lever	nineteen
1.11.4. Pilot pedals	nineteen
1.11.5. Engine stop levers (stop valves)	twenty
1.11.6. Main rotor brake lever	twenty
2. OPERATOR'S CABIN	21
2.1. ABOUT GENERAL OPERATOR'S CABIN LAYOUT	21
2.2. LEVA SIDE OPERATOR PANEL	22
2.3. POPERATOR'S FIBER BOARD	23
2.4. PRIZEL PKI	23
2.5. PPARKING SIDE PANEL OF THE OPERATOR'S FLYER	24
2.6. ABOUT HELICOPTER CONTROLS IN THE OPERATOR'S CABIN	25
2.6.1. The handle of the longitudinal-transverse control of the helicopter	25
2.6.2. Pilot-operator common step lever	26
2.6.3. Extendable Operator Pedals	26
3. PREPARATION AND PERFORMANCE OF FLIGHTS	27
3.1. PPREPARATION AND STARTING OF ENGINES	27
3.1.1. Preparing to launch. Simplified procedure	27
3.1.2. Launching the APU	thirty
3.1.3. Starting TV3-117VMA engines	32
3.1.4. Turning on generators and electrical equipment, turning off the APU	34
3.1.5. The inclusion of aviation and radio electronic equipment, preparation for taxiing	36
four. ARMAMENT MI-24P	40
4.1. GENERAL INFORMATION ABOUT THE HELICOPTER'S WEAPON	40
4.2. BCINDER HOLDERS BD3-57KR-VM	44
4.3. TOPILOTS	44
4.4. HMODERATION OF BEAM HOLDERS AND STARTERS ATGM	44
4.5. EPARTS OF THE WEAPON SYSTEM LOCATED IN THE CABIN OF THE AIRCRAFT	45
4.5.1. Gas stations weapons of the left panel of the gas station	45
4.5.2. Gas stations weapons of the right panel of the gas station	46
4.5.3. Button "RS" on the pilot's RPPU for firing / starting / dropping weapons	46
4.5.4. The ASP-17VP pilot's sight	46
Basic data of the sight ASP-17VP	47

S-17V PU sighting head with control panel	48
Fixed reticle (NS) and movable mark (PM) of the sight	52
Analog-digital computing device (ADSVU)	53
4.5.5. Pilot armament control panel (PUVL)	54
4.5.6. Switch BACKLIGHT SHIELD SPETSOBORUD. ON - OFF	56
4.5.7. Counter of cartridges USB-1-2A	57
4.6. WEAPONS SYSTEM PARTS LOCATED IN THE OPERATOR'S CABIN	60
4.6.1. Safety switches and a display for signaling their status	60
4.6.2. Timer devices	60
4.6.3. The left panel of the operator's dashboard	62
4.6.4. "PC" button on the operator's manual transmission	64
4.6.5. Operator's PKI sight	64
4.6.6. The right panel of the operator's dashboard	64
4.6.7. Control panels and objects of the URV 9K113 complex	66
Operator's panel	66
Guidance device (PN)	68
View of the field of view of the guidance device	68
Elements of the field of view PN at a multiplicity of x10	69
The dimension of the strokes of the PN grid	70
Guidance device control panel (PU PN)	70
Control panel (PC)	72
ShTV-91 console	75
4.7. PWEAPONS SYSTEMS AND AIRCRAFT DESTRUCTIONS (ASP)	76
4.8. BLOCKS AND DEVICES FOR RECEIVING, PROCESSING AND TRANSMITTING DATA NECESSARY FOR OPERATION WEAPONS	76
Communication and distribution device USR-24M	76
Angle of attack and slip sensor DUAS-V	76
4.9. HMOBILE BUILT-IN CANNON SYSTEM	76
4.9.1. Purpose	76
4.9.2. Structure	77
4.9.3. Basic data of the aircraft gun 9-A-623K	77
4.9.4. Rate of fire and choice of burst length	78
4.10. PSINGLE-MOUNTED SMALL-CANNON ARMS	79
4.11. HaveGUIDED MISSION WEAPON	80
4.12. HE-GUIDED MISSION WEAPON	80
4.13. BOMBARDING WEAPONS	80
4.14. FROMLITTLE LOAD DISCHARGE SYSTEM KMGU-2	83
4.15. FROMEMERGENCY RESET SYSTEM	83
4.16. ABOUTFEATURE OF THE WEAPON SYSTEM OPERATION WHEN SWITCHING THE WEAPON CONTROL BETWEEN CABINS OF THE PILOT AND OPERATOR	85
five. COMBAT APPLICATION OF MI-24P	87
5.1. PPREPARATION FOR COMBAT USE OF THE MODULE	87
5.1.1. Equipping the helicopter with weapons from the mission editor	87
5.1.2. Setting up "quick views" for ergonomic equipment handling cockpit during the mission	89
5.2. ABOUTFEATURE OF PILOTING WITH SUSPENDED WEAPONS	90
5.3. PORDER OF ENABLING SUBSYSTEMS OF WEAPONS	90
5.3.1. Turning on the gas station of the weapon system	90
5.3.2. Switching on the ASP-17 sight and setting the aiming angle (for all types weapons)	90
5.3.3. For the use of a 30-mm fixed gun mount (NPU)	94
5.3.4. For the use of NAR S-5, S-8, S-13, S-24	97
5.3.5. For the use of the GUV-1 handball (machine guns 12.7 mm (7.62 mm) and grenade launchers 30100 mm)	102
5.3.6. For the use of small arms from the cargo compartment	102
5.3.7. For the use of bomber weapons	102
5.3.8. For the use of anti-tank guided missiles (ATGM)	105
5.3.9. For the application of KMGU	116
5.3.10. Emergency reset	120
5.4. ABOUTFEATURES OF USING THE SIGHT OPERATION MODES ASP-17 AND ENTERING THE RANGE IN ACVU	124
5.5. HaveAIMING HEADS FOR MANUAL RISE MODE	127
6. HOW TO PLAY.....	130

6.1.	ABOUT GENERAL PROVISIONS	130
	Player's ability to act in the cockpit	131
6.2.	ZRELEASE OF BUILT-IN MISSIONS	131
	The procedure for user actions when starting the built-in mission:	131
6.3.	Have CONTROL OF THE HELICOPTER AND CABIN OBJECTS IN THE GAME	132
6.3.1.	<i>Controlling the aircraft (helicopter, airplane) using the joystick</i>	<i>133</i>
6.3.2.	<i>Helicopter control from the keyboard</i>	<i>133</i>
6.3.3.	<i>Controlling cockpit objects with the mouse</i>	<i>134</i>
6.4.	Have VIRTUAL PILOT HEAD POSITION AND VIEWS IN CABIN CONTROL 6DOF	134
6.4.1.	<i>Controlling the position of the head of the virtual pilot in the cockpit 6DOF</i>	<i>134</i>
	Keyboard and Mouse Actions to Move the Head, Turn It, and Zoom the Image	135

Read it!

A short guide to the DCS game module: Mi-24P.

In this manual, a complex object (system) is considered first as a structural element (or system), and then as a control object from the cockpit.

The description of the operation of the weapon system is also divided into two parts: the first part briefly describes the purpose and composition, functional features. In the second, the procedure for operating each of the weapon subsystems when performing tasks as intended, as well as the actions of the crew with the weapons control bodies by flight stages.



This approach (when exhaustive information is not contained in one place of the document) is due to the presence of multiple cross-links between the objects (systems) of the helicopter and the presence of several features by which the content can be systematized.

In any case, for those wishing to deeply understand the structure and operating features of our model of the Mi-24P helicopter, it is recommended to study all references to a particular system, equipment or element of the helicopter design.

The small print reflects explanations for users who want to learn more about the features of the operation of a mechanism, system or equipment.

If the user wants to start flying and combat use without delay, and to study the helicopter as he gains flight experience, then he can go directly to the sections [PREPARATION AND PERFORMANCE OF FLIGHTS](#), and [COMBAT APPLICATION of Mi-24P...](#)

For the convenience of studying the helicopter, the document includes [cross](#) and [hyperlinks](#), which link references to the same object in different places in the document, or when it is necessary to consider the work of one object (system) in relation to another.

To navigate by hyperlinks, you need to click the mouse on the element. To return, you can use **[Alt] + [-]** (LEFT arrow) or **[Alt] + [=]** (arrow RIGHT).  

If the player **FOR THE FIRST TIME** gets acquainted with the world of DCS World or the module, it is recommended to go to the section [HOW TO PLAY...](#)



one

COCKPIT



1. PILOT'S CABIN

The cockpit includes panels with systems and equipment controls, helicopter and engine controls, instrumentation.

Most cockpit controls have tooltips that appear when you hover the mouse cursor over a particular control or switch. They make it easier to remember all the switches in the cab. Hints can be turned on or off in the settings menu.

Using the mouse, you can perform the following actions:

- to activate a switch or a button, press the left mouse button;

- to turn the rocker switch in the required direction, press the right or left mouse button respectively;

- to turn the rotary encoder (1st option), rotate the mouse wheel (when rotating with the LShift key pressed, the rotation speed increases by 10 times);

- to turn the rotary encoder (2nd option), hold down the left mouse button and drag the mouse.

If you hover the mouse cursor over a device that you can control, the cursor turns green, and an icon appears next to it indicating the action you can take on that device. All functions performed with the mouse are duplicated by the corresponding

keyboard shortcuts and indicated in the window control settings laziness. IN

this leadership such combinations keys marked **[special**
formatting]...

1.1 General cockpit layout

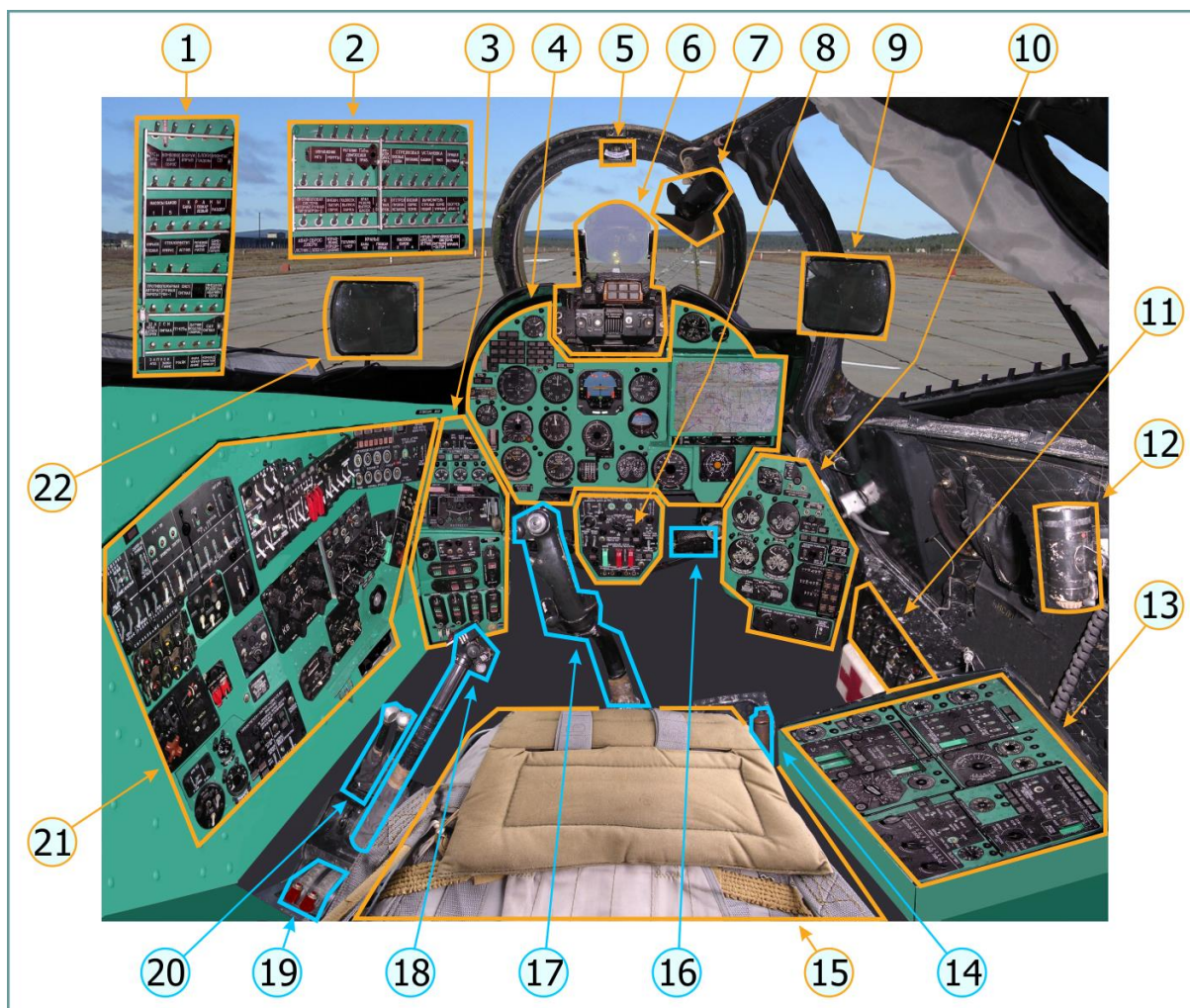


Fig. 1.1 General cockpit layout

- | | |
|--|---|
| 1. The left panel of the gas station | 13. Right side panel |
| 2. The right panel of the gas station | 14. HB brake lever |
| 3. Left front panel | 15. Pilot's seat |
| 4. Dashboard | 16. Pedals |
| 5. Compass KI-13 | 17. Handle for longitudinal-transverse control (RPPU) |
| 6. Sight ASP-17VP | 18. Common pitch lever (ROSH) HB |
| 7. Fan | 19. Control levers for stop cranes ("stop cranes") |
| 8. Pilot armament control panel (PUVL) | 20. Levers for separate engine control (RRUD) |
| 9. Right mirror | 21. Left side panel |
| 10. Right front panel | 22. Left mirror |
| 11. Counter of cartridges USB-1-2A | |
| 12. SBK lamp | |

1.2. Left and right panels of the gas station

The left panel of the gas station is located on the left behind the pilot's seat. Right - right back.



Fig. 1.2. The left panel of the gas station

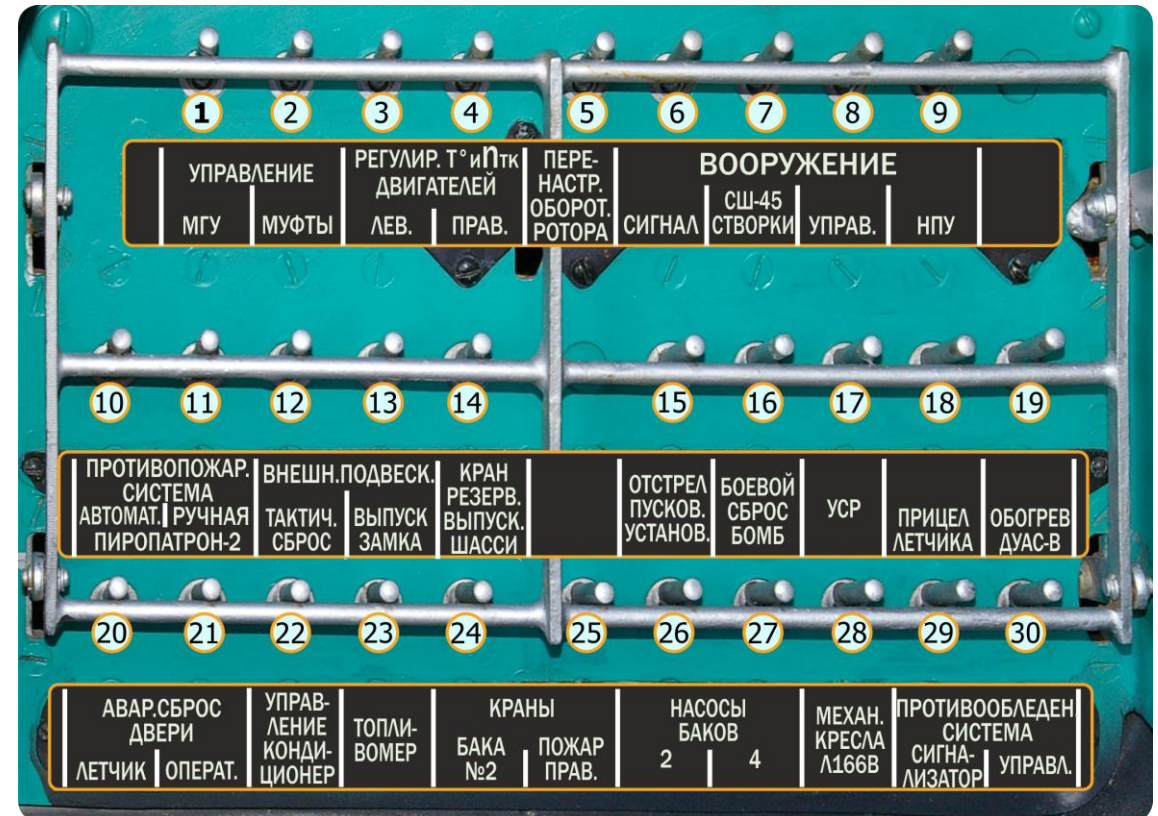


Fig. 1.3. Gas station right panel

1.3. Left side pilot panel

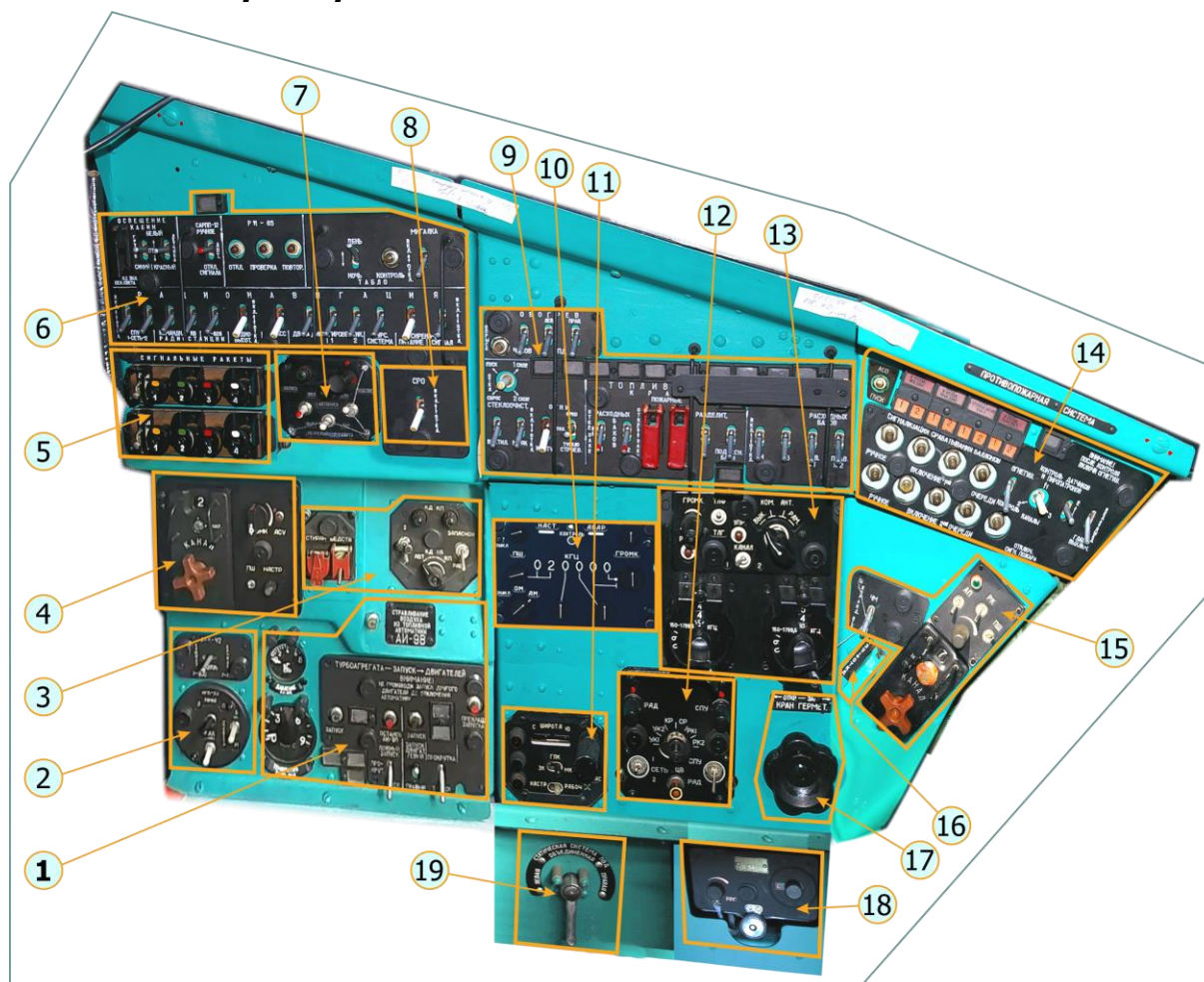


Fig. 1.4. Left side pilot's console

1. Control panel for starting the APU and engines
2. Control panel (PU) of the ARK-U2 radio compass and switch "KOMP0AS R-852 COMMUNICATION - KOMPAS R-828"
3. Blocks 484 and 485 from the product kit 6201 (product controls)
4. Control panel (PU) of the radio station "Eucalyptus-M24" (R-828)
5. Two consoles "SIGNAL ROCKETS"
6. Control panel for cab lighting, SARPP-12, RI-65, flasher and radio navigation systems
7. MC-61 tape recorder control panel
8. Panel "SRO" with switch "ON. - OFF "
9. Control panel for glass spraying, heating (LDPE, hours), wiper, beacon (as well as front and edge lights), fuel
11. Control panel of the course system "Comb" (PU-38)
12. Subscriber station of the aircraft intercom SPU-8
13. Control panel from the ARK15M automatic radio compass set
14. Shield "FIRE-FIGHTING SYSTEM"
15. Remote control (RCU) command radio station MBDMV range R-863 s modulation switch
16. "ROM-OFF" switch (under the protective cap)
17. Valve of the cock of the cabin sealing
18. Control panel for VHF radio receiver R-852
19. LEFT COMBINED - RIGHT static pressure valve switch (under normal conditions the switch is in the "COMBINED" position and

helicopter system
10. Control panel (CP) of the communication HF
radio station "Yadro-1"

locked)

1.4 Left front pilot's console



Fig. 1.5. Left front pilot's console

1. Control panel for lighting equipment (STO);
2. Shield "HYDROSYSTEM";
3. Block of signal boards;
4. Shield "CHASSIS";
5. Control panels SAU-V24-1
6. Control unit "MOBILE SUPPORTS" (BU-32) from the set SPUU52
7. Panel for technical control of equipment DISS and system SPUU-52 (not used in the game)

1.5. Pilot's dashboard



Fig. 1.6. Pilot dashboard

one.	Propeller pitch indicator USHV-1K - to indicate in degrees the value of the total pitch HB (graduated from 1 to 15 °);
2.	Vertical gyro control: switch "GYROVERTICAL 1-2" (for connecting the PKP-72M flight command device to the corresponding vertical gyro) two buttons "ARRET." (to the left and right of the vertical gyro switch) - to turn on the electrical locking system for the 1st vertical (left button) and 2nd vertical (right button); and two red displays "GYROVERT.1 FAILURE" and "GYROVERT.2 FAILURE" - for information about the power off or about the blockage of the gyro unit of the corresponding MGVS-1SU vertical gyro (the display is connected to the "Blinker" mode);
3.	The switch under the protective cap "CONTROL BY YOURSELF", which serves to disconnect the operator control (power supply to the GA-163/16 crane for connecting the operator's rods) and the yellow signal panel "CONTROL TO OPERATION." - to signal the connection of operator control;
four.	Hovering and low speed indicator (block 6) from the DISS-15 kit - to indicate the longitudinal (forward - backward), transverse (left - right) and vertical (up - down) components of the helicopter low speed vector; Signal board block;
five.	
6.	Airspeed indicator US-450 - for measuring and indicating the indicated airspeed of a helicopter (with a graduation from 0 to 450 km / h);
7.	G-force indicator of the UP accelerometer ADP-4, which serves to indicate vertical g-forces acting on the helicopter;
eight.	Green board "SPEED STABILIZER." and the yellow board "CARD BORDER".
nine.	Aerobatic command device PKP-72M - for displaying parameters that determine the position of the helicopter in space and changing this position;

10. SIGHT of the pilot ASP-17V
11. VAR-30MK variometer - for measuring and indicating the vertical component of the flight speed during climb (on the "LIFT" scale, graduated from 0 to 30 m / s) and during descent (on the "SPUSK" scale, graduated from 0 to 30 m /from);
12. Aviation clock AChS-1M - for displaying the current standard time, flight time and individual time intervals;
13. Block SZM-5M from the SPO-10 set - for warning about the radiation of the helicopter by the airborne or ground radar from the outside.
14. Roll and pitch indicator UKT-2 - to indicate the roll and pitch angles of the helicopter, measured by vertical gyro No. 2 as a duplication of PKP-72M readings.
15. Cartographic indicator (block 10) from the DISS-15 kit - for indicating on the map the location of the helicopter at each time of flight (duplicates the digital readings of the coordinate indicator).
16. Fuel gauge indicator UTPR-1K-1A - for indication of total and separate (by tanks) fuel supply.
17. Ground speed and drift angle indicator (block 7) from the DISS-15 kit - to indicate ground speed and drift angle in the helicopter cruising flight mode, as well as to indicate the "Memory" mode;
18. Dual temperature indicator 2UT-6K from the 2IA-6 meter kit for indicating the gas temperature of the left and right engines;
19. Radio magnetic indicator RMI-2 - a combined flight and navigation device - for simultaneous indication of the direction to two radio stations (two radio beacons) and the course of the helicopter flight;
20. Push-and-turn electric ratchet of the "ZK" heading adjuster - for setting the arrow "2" on the RMI-2 to the required position in the "ZK" indicator operation mode;
21. Mode indicator UR-117V from the set of the IR-117 mode meter - for indication in order to control the engine operating modes up to the outside air temperature of + 25 ° and up to a barometric altitude of 2500 m;
22. Index ITE-2T "ENGINES" - for measuring and displaying, as a percentage, the revolutions of turbochargers of engines (arrow "1" - left engine, arrow "2" - right engine), graduated from 10 to 110%;
23. Crane emergency release chassis
24. Barometric altimeter VD-10K - for measuring and indicating the barometric altitude relative to any level with the pressure set on the barometric scale of the device;
25. Pointer ITE-2T "CARRIER SCREW", used for measuring and indicating in percent the value of revolutions (rotation frequency) of the NV with two arrows, working out the readings together, with a graduation from 10 to 110%;
26. Height indicator UV-5 from the set of the RV-5 radio altimeter - to indicate the value of the flight altitude above the surface to be flown, to issue a signal for monitoring the RV, and also - to indicate the control (including dangerous) altitude and RV failure;
27. Switch under the protective cap "PEDAL DAMPER ON - OFF" - to include the hydraulic damper SDV-5000-OA in the directional control system (designed to limit the speed of movement of the directional control pedals), as well as to turn off the hydraulic damper;

1.5.1 Signal board block



Fig. 1.7. Block of signal boards on the pilot's dashboard

First row	third row
Red board "ICE" Red board "FIRE"	yellow board "LEFT MOTOR VIBRATION INCREASED" yellow board "RIGHT MOTOR VIBRATION INCREASED" red board
Two scoreboards on the top right	"LEFT MOTOR t ° GASES HIGH" red display "RIGHT MOTOR t ° GASES HIGH FAILURE "
green board "ROM LEFT.MOTOR.CONNECTED"	
green board "ROM RIGHT.MOTOR.CONNECTED"	
second row	yellow board "GREAT PRESSURE IN THE CABIN"
red board "TANK # 1 REMAINING 120 L" red board "TANK # 2 REMAINING 120 L"	fourth row
red display "CH. ED. PRESSURE LOW" yellow display "ATTENTION TO EL. SYSTEM CONTROL"	red board "TURN OFF LEFT ENGINE" red board "TURN OFF RIGHT ENGINE"
yellow board "AUTOMATIC POS CONTROL" red board "MANEUVER LIMIT." red display "CHIPS IN OIL CH. ED."	yellow board "CHIPS IN OIL LEFT MOTOR." yellow board "CHIPS IN OIL RIGHT MOT." yellow board "INCLUDE SPARE CODE" (ed. 6201) red board "SRO REFUSAL"
	in the picture there are two separate scoreboards on the right:
	green board "SPEED STABILIZER." (left) yellow board "MAP BORDER" (right)

1.6. Sight ASP-17VP

Cm. [4.5.4](#)

1.7. Pilot armament control panel (PUVL)

Cm. [4.5.5](#)

1.8. Right front pilot's console

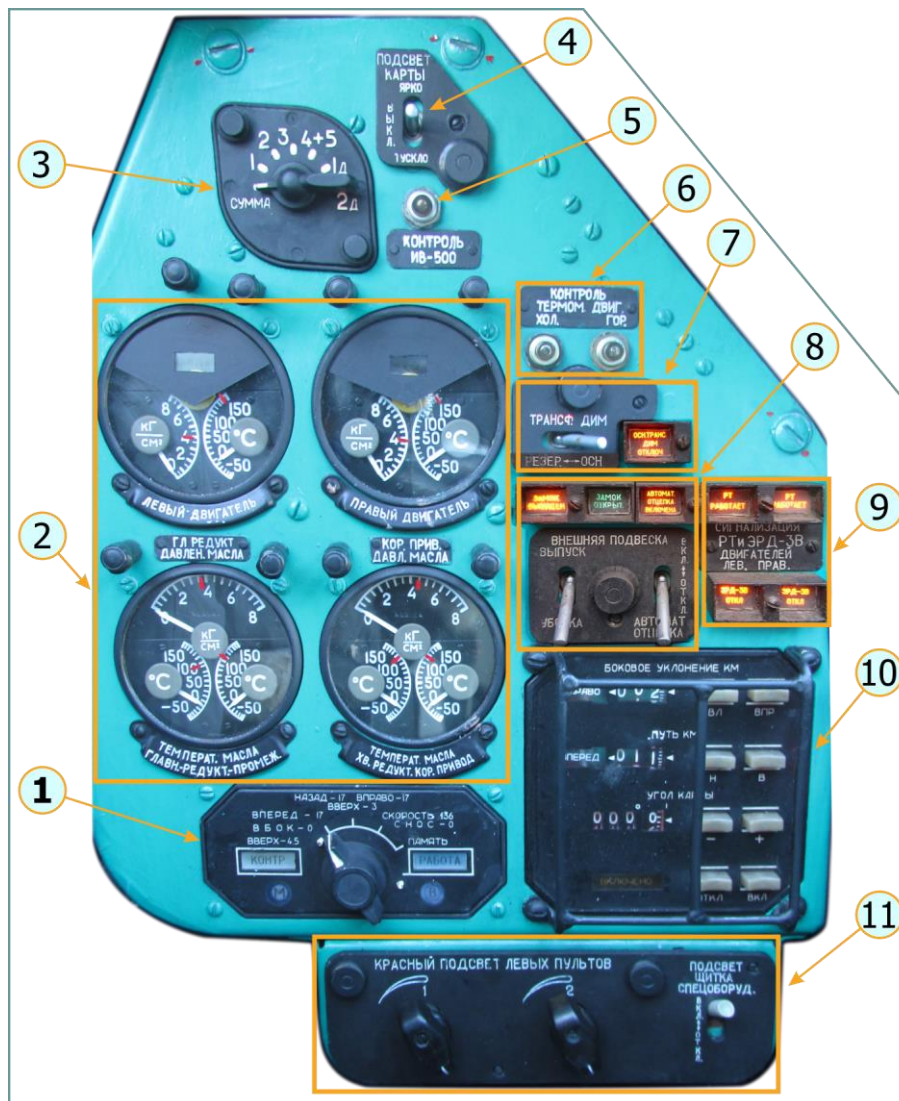


Fig. 1.8. Right front pilot's console

1. Control pools (PC) from the DISS-15 set (for test performance checks, equipment operation control and for indication of equipment failures DISS-15)

2. Part of the propeller control devices helicopter groups (oil pressure and temperature in engines and all helicopter gearboxes)

3. P7M5K-1 fuel meter switch

4. Switch "CARD BACKLIGHT ON / 1" (to turn on and off the illumination of the map indicator tablet from the DISS-15 kit)

5. "CONTROL IV-500" button (to check the serviceability of the TVZ-117 engine vibration meter)

6. Two buttons for checking the efficiency of the engine gas temperature indicators

7. Switch "TRANSF. DIM RESERVE - MAIN." and a signaling board about failure (disconnection) of the main transformer TR-115/36 and about the inclusion of a backup transformer

8. Shield "EXTERNAL SUSPENSION" (switches and signal panel for controlling the external suspension, not a weapon!)

9. A group of displays signaling the operation (failures) of the automatic engine control system

10. Coordinate indicator (block 8) from the DISS-15 kit (for working out and indicating the orthodromic coordinates of the helicopter location (path and lateral deviation))

11. Shield with a stencil "RED LIGHT OF LEFT CONTROLS" (for adjusting the brightness of equipment lighting on the left side and left front panels of the pilot of the first and second groups of red illumination) and a switch for illumination of the armament shield

1.9. Counter of cartridges USB-1-2A

См. [4.5.7](#)

1.10. Right side pilot's console



Fig. 1.9. Right side pilot's console

1. DC shield
2. AC Shield

3. Shield of an anti-icing system

4. Air conditioning shield

1.11. Pilot cockpit helicopter controls

1.11.1. General layout of controls, helicopter, HB brake and engines

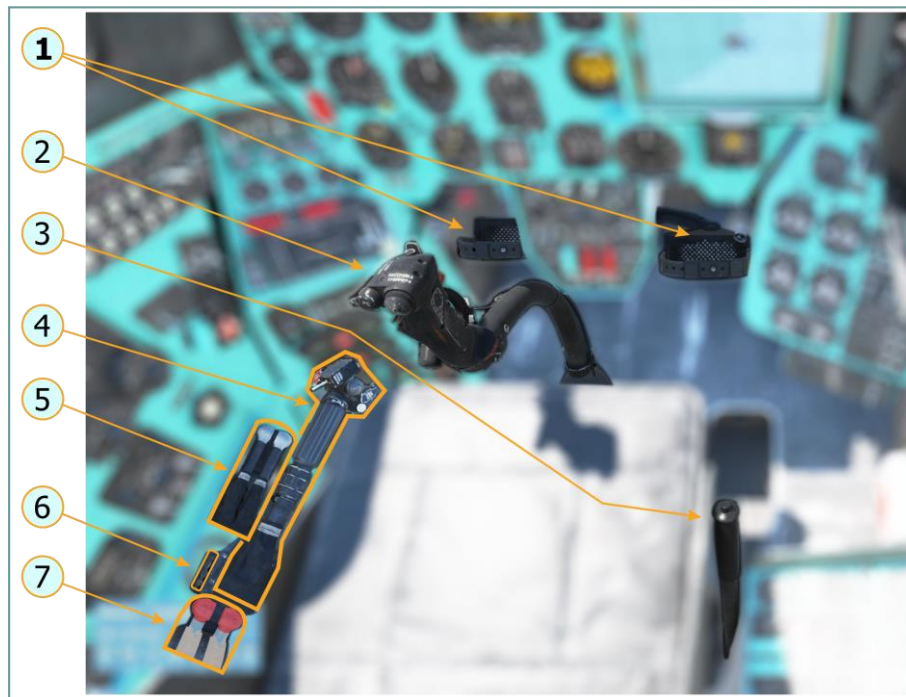


Fig. 1.10. General layout of controls, helicopter, brake NV and motors

- | | |
|---|--|
| 1. Pedals | 6. Flywheel of the clutch lever of the common step |
| 2. The handle of the longitudinal-transverse control (RSPU) | 7. Levers for stopping engines (stoppers) |
| 3. Main rotor brake lever | |
| 4. Cumulative Lever (ROSH) | |
| 5. Levers for separate engine control (RRUD) | |

1.11.2. Pilot longitudinal-transverse control stick

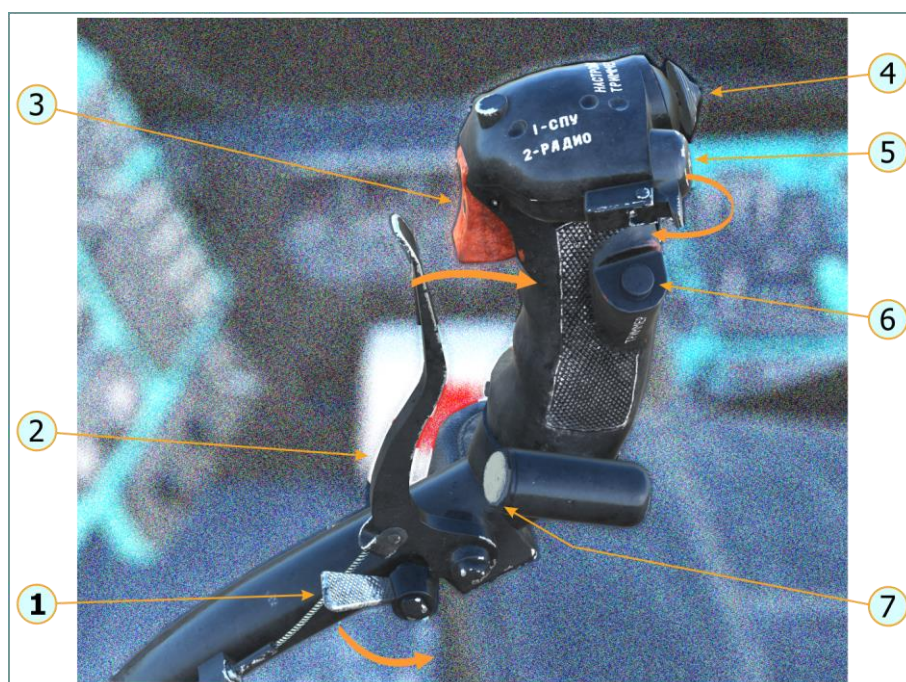


Fig. 1.11. Pilot longitudinal-transverse control stick

1. Stopper (brake lock for long-term parking)
2. Wheel brake trigger
3. Trigger "SPU-RADIO" (trigger button)
4. Eight position trim switch
5. PC button under the safety cap:
6. TRIMMER button
7. Autopilot off button

RPPU stroke:

RPPU towards yourself, -150mm	RPPU away from you, +
150mm to the left, -135mm	RPPU to the right + 135mm

1.11.3. Pilot common pitch lever

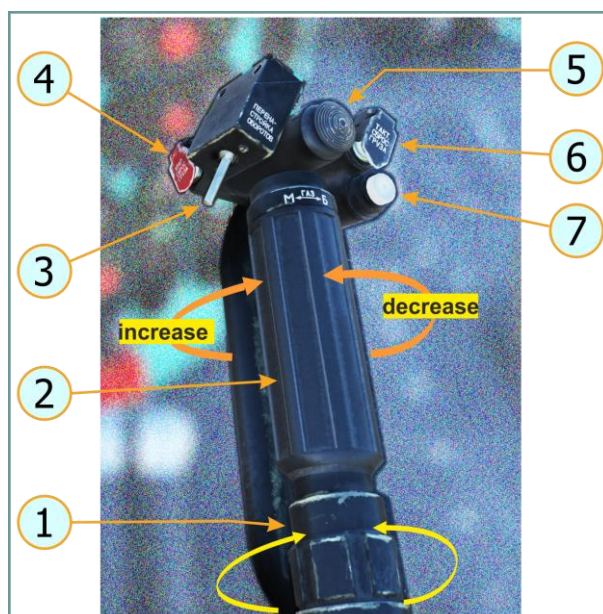


Fig. 1.12. Pitch Lever Pilot

1. Friction of the correction handle
2. Correction handle
3. Three-position switch for reconfiguring the main rotor speed
4. Emergency release button under the safety cap
5. Button for control of the landing search light FPP-7 (joystick)
6. Tactical weight release button under the safety cap
7. General step lever clutch release button
8. Flywheel of ROSH clutch

1.11.4. Pilot pedals

The pedals have paddles that are equipped with microswitches. When you put your feet on the pedals (at least one), the autopilot in the direction channel switches to the matching mode (i.e., stops holding the previously set flight path)

1.11.5. Engine stop levers (stop valves)

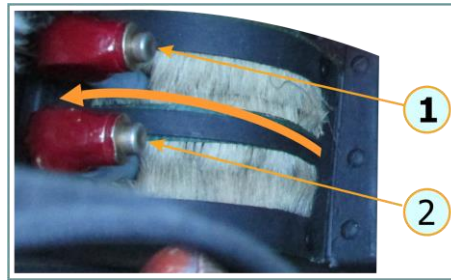


Fig. 1.13

1. Stop button LION
2. RIGHT stopper button

1.11.6. Main rotor brake lever



Fig. 1.14. Main rotor brake lever

The lever has a mechanical stop button (in the game it is pressed with a mouse or a combination of keys)

2. OPERATOR'S CABIN

2.1 General layout of the cockpit

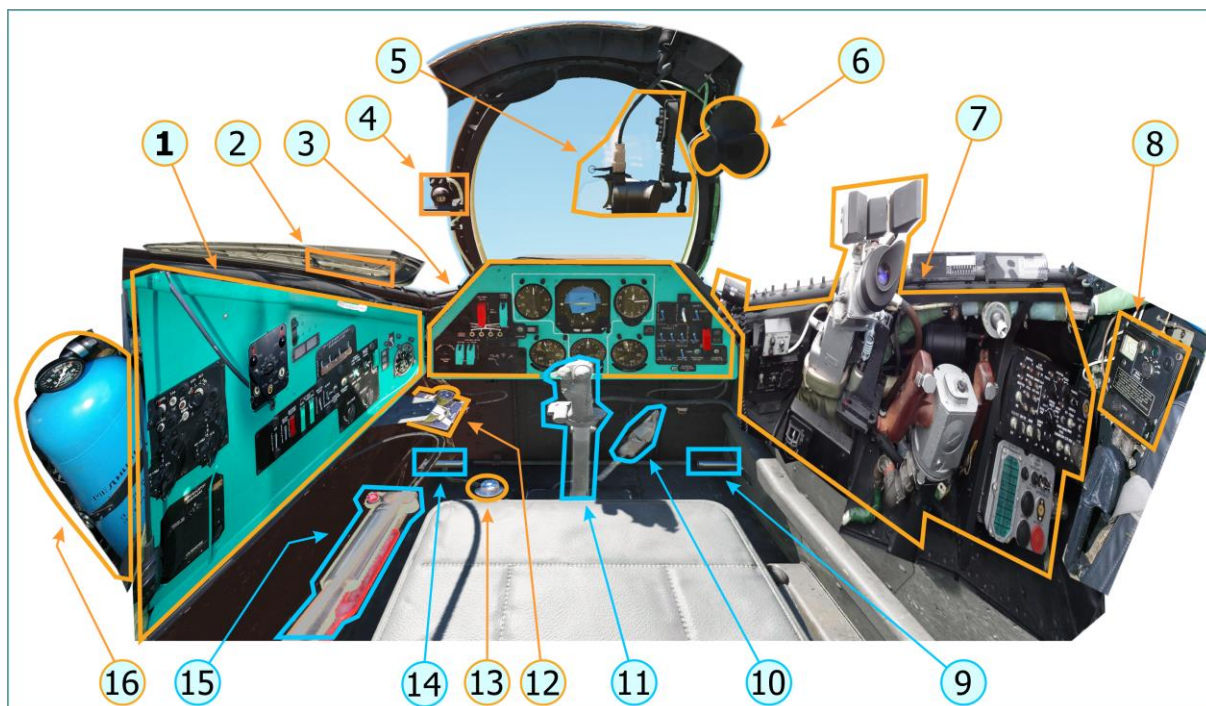


Fig. 2.1 General layout of the cockpit

- | | |
|--|--|
| 1. Left side operator panel | 9. Right pedal (retractable) |
| 2. Handle for opening / closing the operator's hatch | 10. The body of the helicopter lock (for fixing the operator's RPA in "stowed" position) |
| 3. Dashboard of the pilot-operator (PDLO) | 11. Operator control handle |
| 4. Compass KI-13 | 12. Timer devices |
| 5. PKI sight | 13. Floor button SPU (similar to the button on the RPPU) |
| 6. Fan | 14. Left Operator Pedal (Extendable) |
| 7. Right side panel of the operator pilot | 15. Operator common step lever |
| 8. Dosimetric device (not implemented in the game) | 16. Oxygen cylinder |

2.2 Left Side Operator Panel



Fig. 2.2 Left side operator panel

- | | |
|---|--|
| 1. Control panel from the ARK15M automatic radio compass set | 6. Control panel for systems and equipment from the operator's cabin |
| 2. Deviation compensator | 7. Group of green panels for signaling landing gear |
| 3. Subscriber station of airplane intercom SPU-8; | 8. Headlight switch FPP-9 |
| 4. Placard of red color "CAUTION! CHAINS OF THE ARM. UNDER ELECTRIC"; | 9. Clock AChS-1 of the operator's cabin |
| 5. Placard green "WEAPON CHAINS DISCONNECTED" | |

2.3 Dashboard of the pilot-operator



Fig. 2.3. Dashboard of the pilot-operator

one. [Dashboard left panel operator](#)

2. Speed indicator US-450
3. PKP-72M
4. Altimeter VD-10K

five. [Dashboard right panel operator](#)

6. Tachometer ITE-2T ENGINES
7. Radio magnetic indicator RMI-2
8. Tachometer ITE-2T Main Rotor

2.4 Sight PKI

(WIP)

2.5. Right side panel of the operator pilot

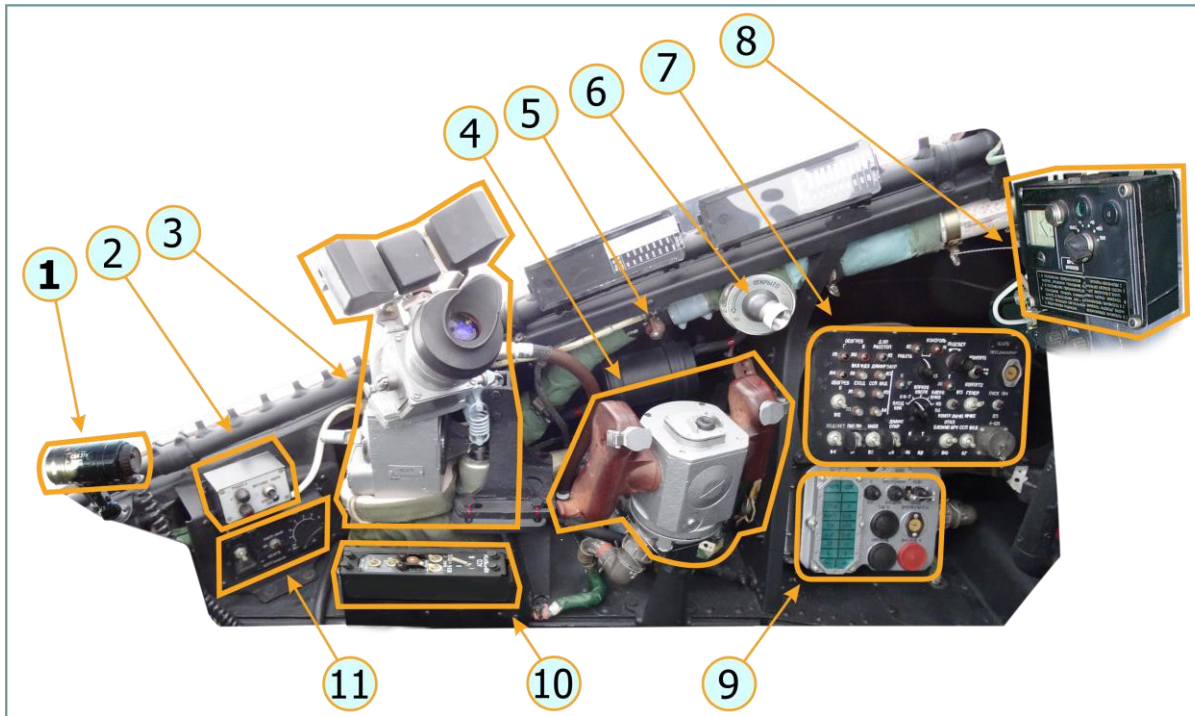


Fig. 2.4. Operator Pilot Right Side Panel

- | | |
|--|---|
| 1. SBK lamp | 7. Control Panel (from the URV 9K113 complex) |
| 2. Control panel of the L166V equipment | 8. Dosimetric device |
| 3. Aiming Device (PN) (from the URV 9K113 complex) | 9. Block ShTV-91 (from the URV 9K113 complex) |
| four. Aiming device control panel (PU PN) (from the URV 9K113 complex) | 10. Control panel from the ASO-2V system |
| 5. Manual shutter of the Air Conditioning System (ALC) | 11. Operator's shield (from the URV 9K113 complex) |
| 6. Swivel pipe individual blowing from the SCV collector | |

2.6. Controls of the helicopter in the cockpit of the pilot-operator

2.6.1. Helicopter longitudinal-lateral control handle

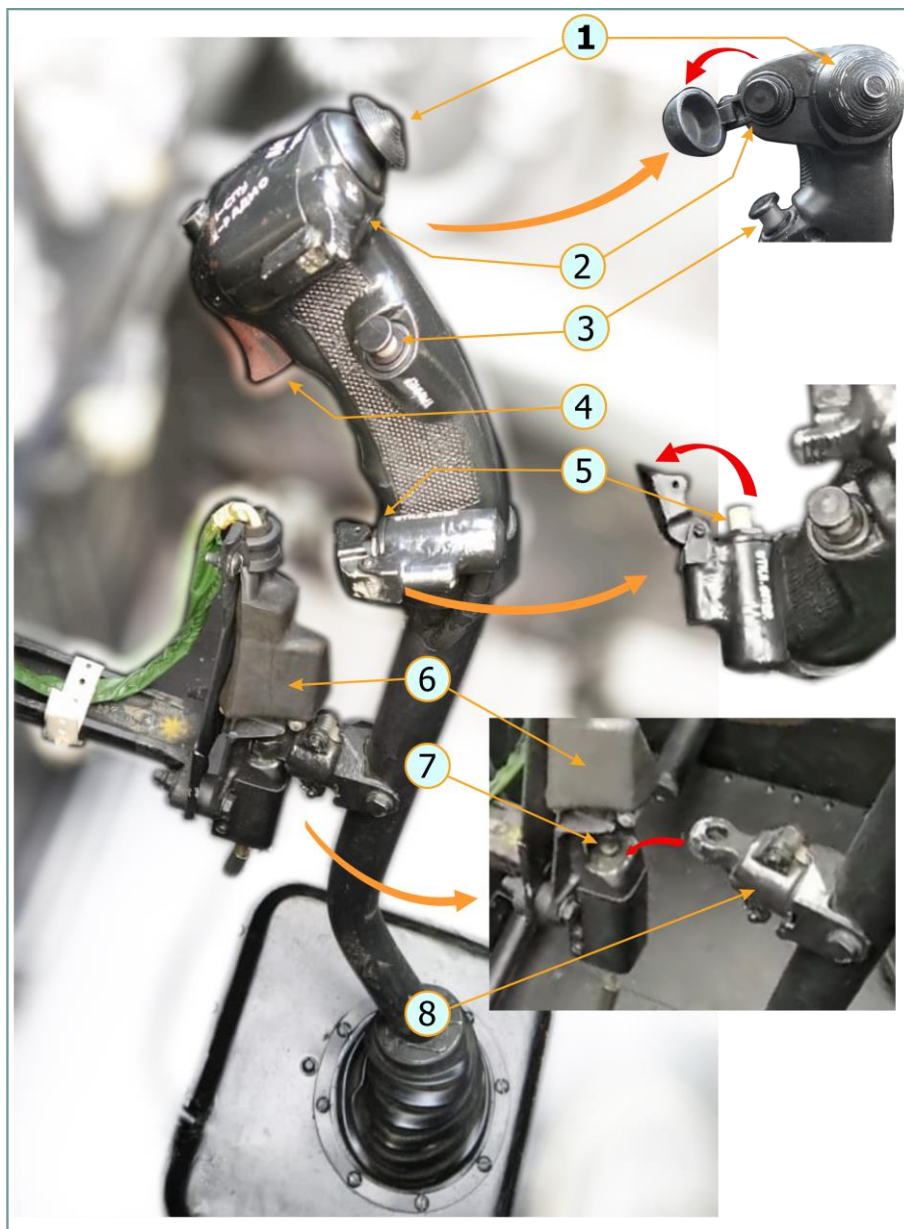


Fig. 2.5. Helicopter longitudinal-lateral control handle

- | | |
|---|--|
| 1. Eight position trim switch | 5. Button for disconnecting the operator's PPU handle from helicopter control under a protective cap |
| 2. PC button under the safety cap: | 6. Helicopter lock case |
| 3. "TRIMMER" button | 7. Locking bush |
| 4. Trigger "SPU-RADIO" (trigger button) | 8. Disconnecting latch |

RPPU stroke:

RPPU for yourself, -132 mm	RPPU for yourself, +132 mm
to the left, -116 mm	RPPU to the right +118 mm

2.6.2. Pilot common pitch lever

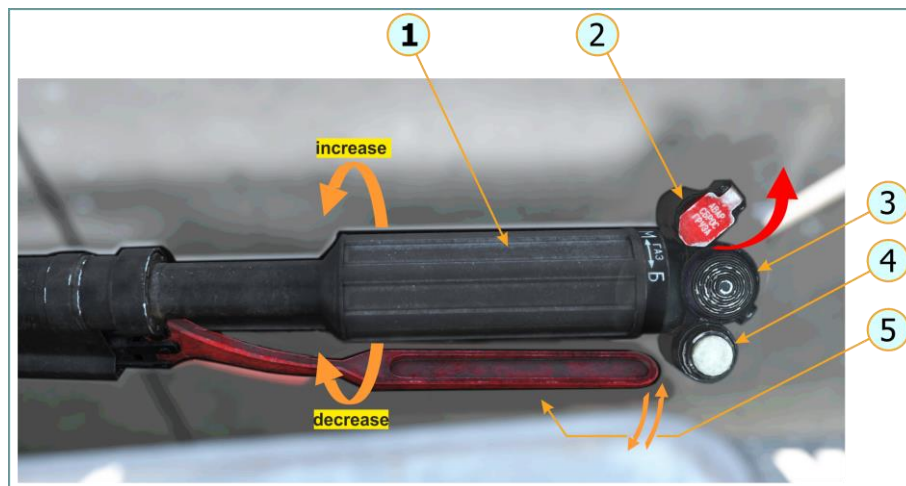


Fig. 2.6. Pilot common pitch lever

- | | |
|--|---|
| 1. Correction handle | 4. The button for disengaging the clutch lever of the general step |
| 2. Emergency release button under the safety cap | 5. Trigger for connecting the handle of the longitudinal-transverse control and the directional control pedals operator |
| 3. Button for control of the landing search light FPP-7 (joystick) | |

When the trigger is pressed (upward), the GA-163/16 electromagnetic valve of the auxiliary hydraulic system is switched on, and the operator's handle is set to the operating position corresponding to the position of the PPU handle at the pilot's workplace. Disconnection of the PPU handle is made by pressing the "OPER. OFF" button located on the RPPU (see above, RPPU, p. 5).

2.6.3 Extendable Operator Pedals

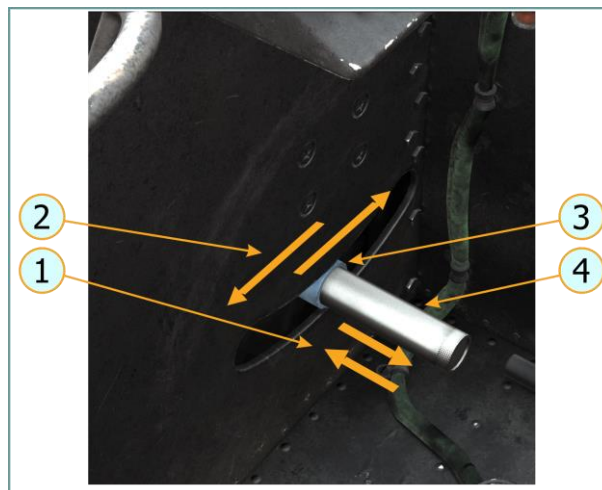


Fig. 2.7. Retractable operator pedals

- | | |
|---|---------------------|
| 1. Direction of extension (retraction) of the support platform from the body | 3. Cylindrical body |
| 2. The direction of movement of the pedals when controlling the helicopter in the track channel | 4. Support platform |

Pedal travel ± 75 mm, rigidly connected to the commander's pedals.

3. PREPARATION AND PERFORMANCE OF FLIGHTS

The automatic start procedure (preparing the helicopter from the "all off" state to the "ready to fly" state) is started by the key combination

[LWIN] + [HOME.] Automatic shutdown **[LWIN] + [END.]**

Below are two options: *SIMPLIFIED PROCEDURES* (minimum required actions) and *FULL PROCEDURES* (full set of actions)... In addition, items that can be skipped are highlighted. *

Keyboard commands useful for the startup procedure:

No.	Act	TOteam
one	Switching between booths	[Page Up]
2	Switch between clickable cockpit mode and mouse view	[LAlt + C]
3	Zoom in on the image move away	[Num +] [Num /] or rotating the mouse wheel in browse mode
four	Move Camera Right to the left	[RCtrl + RShift + Num6] [RCtrl + RShift + Num4]
five	Move camera up down	[RCtrl + RShift + Num8] [RCtrl + RShift + Num2]
6	Move Camera Forward back	[RCtrl + RShift + Num +] [RCtrl + RShift + Num -]
7	Return camera to center	[Num5]
eight	ROSH, RPPU, cabin construction elements hide show	[Backspace]
nine	Control position indication Parking brake	[RCtrl + Enter]
10		[LShift + W]
eleven	Wheel brake	[W]
12	Control knob	[Up] [Down] [Left] [Right]
13	Common pitch lever	[Num +] [Num -]
fourteen	Pedal control	[Z] [X]

3.1 Preparation and starting of engines

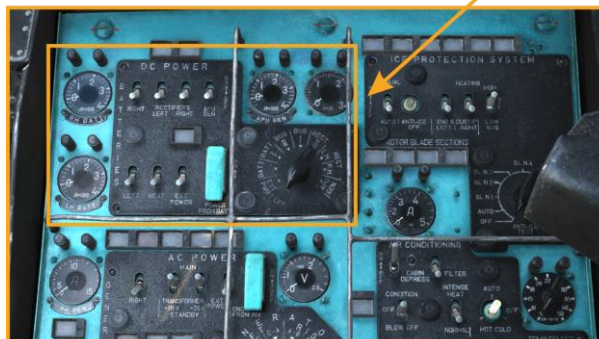
3.1.1 Preparation for launch. Simplified procedure

The procedures are the minimum required to start.

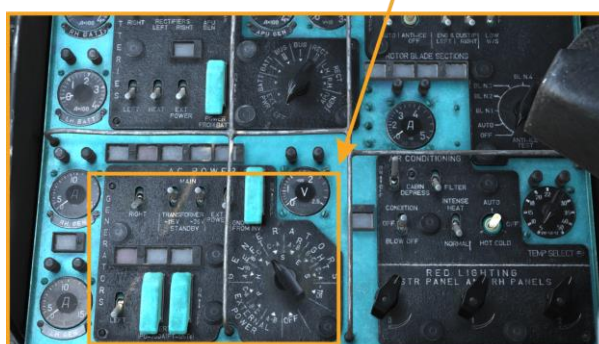
Starting option - from rechargeable batteries

1. Switch on all circuit breakers (gas stations) on the left and right panels of the gas station	
--	--

2. Switch on the on-board storage batteries (1);
turn on the MAINS TO THE BATTERY (2) (so that the consumers connected to the bus of rectifier devices (VU) can turn on from the batteries)



3. Switch on the PO-750 converter. It is necessary for nutrition pressure gauges and a gas temperature indicator 2UT-6A of TV3-117VMA engines through a 115/36 transformer.
Note: in reality, for the reliability of the AI-9V launch "from their" PO-750A, as a rule, they do not turn on the AI-9V launch stage.



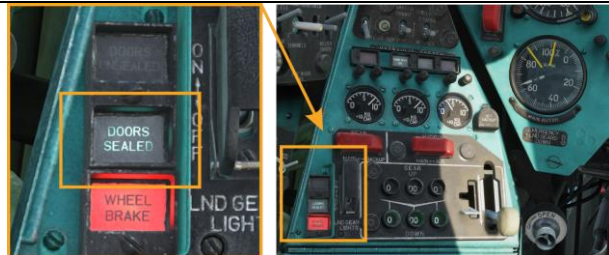
4. Close the door and let the operator close the hatch cover.



5. Receive the operator's report on closing the hatch cover, open the shut-off valve of the sealing system of the entrance doors and the operator's cabin hatch



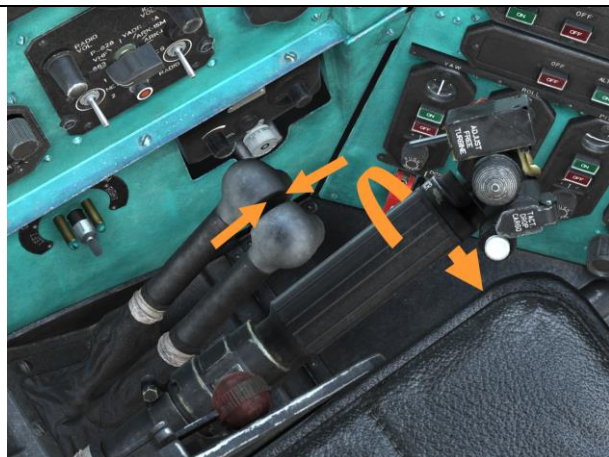
at the same time on the chassis control panel the panel "DOORS WALKING UP" should light up.



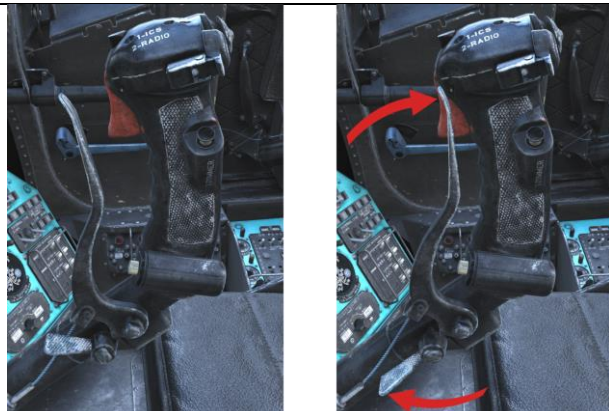
6. Release the main rotor


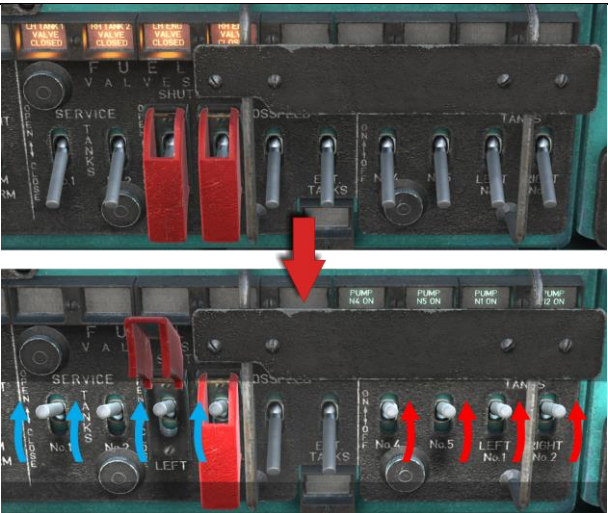


7. Lower the collective pitch lever down to the stop;
move the correction handle to the extreme left position;
put the levers of separate engine control in the middle position ("on the latch");




8. Brake the chassis wheels



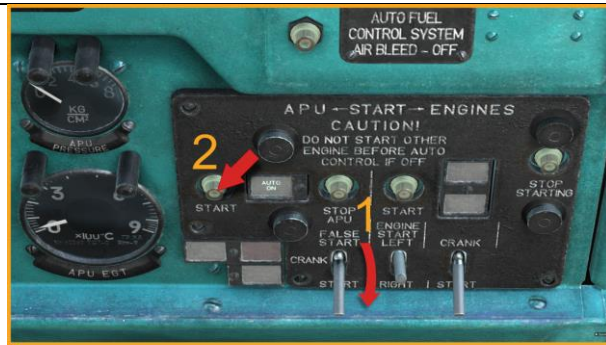
<p>9. Set the "EXTINGUISHING - CONTROL" switch to the "EXTINGUISHING" position, and the "MAIN OFF." to the "ON" position.</p> <p>in this case, not a single signal board should light up.</p>	
<p>10. Open the valves of the supply tanks, fire valves of the engines (blue arrows), the separating valve and turn on the fuel pumps of the supply tanks "LEFT. No. 1" and "RIGHT. No. 2" and tanks No. 4 and 5 (red arrows);</p> <p>control them operability by lighting up (extinguishing) signal panels located above the switches.</p> <p>Note. to save batteries - temporarily turn off / do not turn on the pumps of tanks No. 4 and 5</p>	

* When flying with outboard fuel tanks filled, additionally turn on the "SUSPENDED TANKS" switch and make sure that the "PUMPING RUNNING" signal board lights up. When tank No. 3 is not fully filled (for 150 liters and more), the "PUMP SWITCHES." Display briefly lights up.

3.1.2. Launch of the APU

<p>1. Switch the DC voltmeter (2) to the position corresponding to the source from which the power is supplied (switch "GENERATOR AI-9V" - to the "OFF" position (1)).</p>	
--	--

2. Put the switch for the type of work in the "START" position, Press the "START" button for 2-3 s, turn on the stopwatch and control the lighting of the "AUTOMATIC ON" signal board.



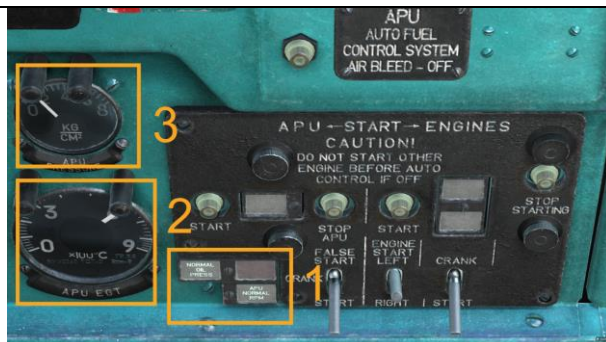
3. The engine goes out to idle mode automatically, it is controlled by lighting up the signal board "AI-9V REVOLUTION NORMAL." , board "AI-9V RABOT." (1), and the signal board "OIL PRESSURE NORMAL." with green filter

After the AI-9V engine reaches idle speed, make sure that:

the signal board "AI-9V REVOLUTION IS NORMAL" is on;

the temperature of the gases behind the turbine does not exceed 720 °C;

the signal board "OIL PRESSURE NORMAL" is on, indicating normal oil pressure at the entrance to the AI-9V engine.



4. Before starting the TV3-117VMA engines to supply power to consumers, turn on the STG-3 APU generator by setting the "AI-9V GENERATOR" switch to the "ON" position.

Note.

1. This is used to conserve accumulators and batteries during the warm-up period of the AI-9.

2. It is recommended to turn off the APU generator before starting the engine.

3. Nothing "breaking" the APU will happen in the Mi-24 DCS, even if the generator and air bleed for starting are switched on at the same time. This is a limitation of the effective property, affects the earlier exit of the APU into disrepair.



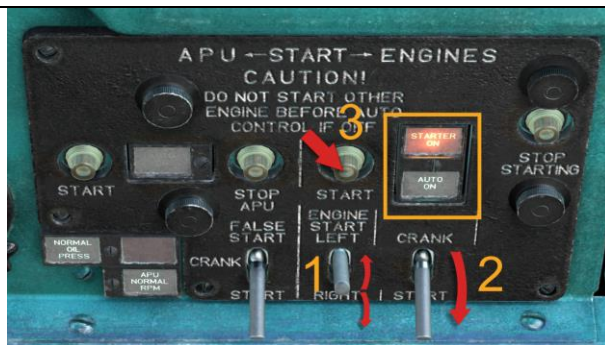
* 5. If PO-750 was disabled, then it must be enabled (1)



3.1.3. Starting TV3-117VMA engines

1 .. Set the type of work switch to the "START" position (2), and switch "START ENGINE." to the "RIGHT" or "LEFT" position (1). Press the "START" button (3) for 1-2 s ... During the start-up, check: serviceability of the automatic start panel by lighting up the "AUTOMATIC ON" signal board;

activation of the air starter when the "STARTER RUNNING" signal board comes on.



2. .. and move the stop valve lever of the engine to be started to the lower position (for example, the left one). The engine goes to idle mode automatically within 60 s.



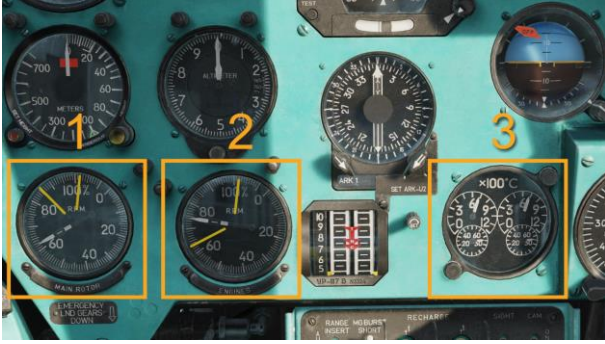
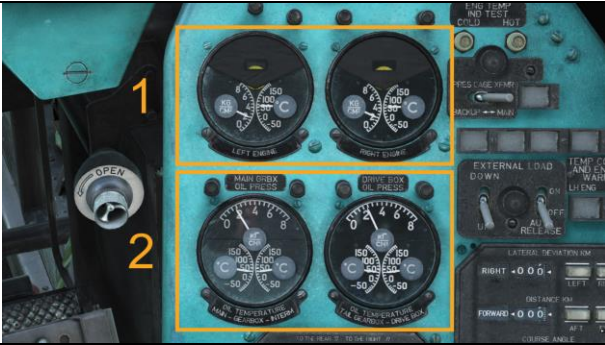
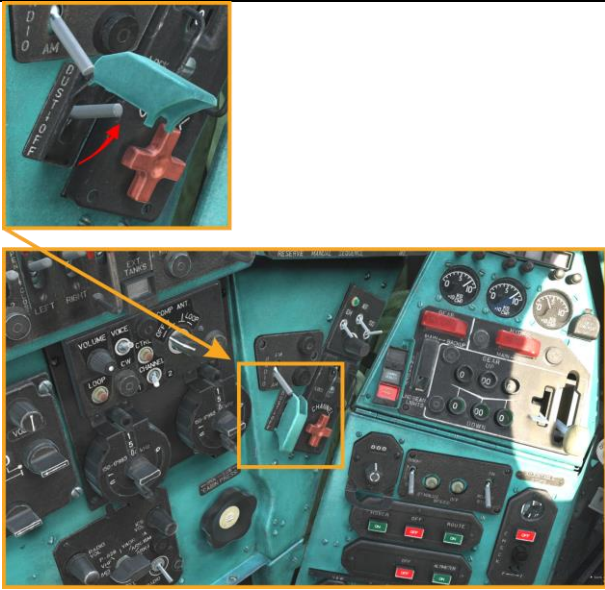

During the start-up process, check:

- the continuity of the increase in the revolutions of the turbocharger (without hovering) and the appearance of the rotation of the main rotor at ntk not more than 25%;
- the presence of oil pressure in the engine according to the pressure gauge on the right front panel, which at a turbocharger speed of 45% or more must be at least 1 kg / cm²

During the starting process, it is prohibited to: move the levers of the separate engine control, the collective pitch lever, the correction handle and the "START ENGINE." to the position to start another engine

After the engine to be started reaches idle mode, cool down the AI-9 for 1 min, while the STG-3 can be turned on.

3. After the engine to be started reaches idle mode, check the following parameters of its operation:

<p>the speed of the turbocharger (2), depending on the outside air temperature, must be within 62-79%; the temperature of the gases in front of the turbine - should not exceed 780 ° C (3);</p>	
<p>oil pressure in engine - must be at least 2 kg / cm² (the oil temperature should be in the range from minus 40 to plus 150 ° C (1); oil pressure in the main reducer - must be at least 0.5 kg / cm² (2) (oil temperature - not lower than minus 40 ° C).</p>	
<p>4. Set the "START ENGINE" switch. to the position for starting the second engine and start it in the order indicated above</p>	
<p>5. Switch on dust protection devices (ROM) of engines Switching on the ROM is accompanied (within 35-40 seconds) by an increase in the gas temperature in front of the turbine by 10-15 ° C and a possible increase in the speed of the turbocharger by no more than 0.5%.</p>	
<p>6. While the power plant is warming up, turn on the STG-3 generator (1) to save battery power by setting the "GENERATOR AI-9V" switch to the "ON" position.</p> <p>Note. If the engines were started using onboard storage batteries, then the AI-9V engine should not be turned off until the engines are warmed up and brought to an increased mode (until the main rotor speed is 88% and the main generators are turned on)</p>	
<p>Emergency stop of engines during testing is carried out in the following cases:</p> <ul style="list-style-type: none"> o with a sharp drop (below the minimum values) of oil pressure in engines, main gearbox or drive box; o with a sharp increase in the temperature of the gases in front of the turbine above the permissible; 	

- o when fuel or oil leaks;
- o in the event of a fire on a helicopter, detected visually, by the smell of smoke, burning, or by the command of the speech informant RI-65 "Board number fire, attention to the scoreboard";
- o with a sharp drop or increase in engine speed;
- o when extraneous noises, engine shaking, or when the command "Dangerous vibration of the left engine" or "Dangerous vibration of the right engine" is received from the speech informant RI-65 and the display "SWITCH OFF LEFT (RIGHT) ENGINE" with a red filter lights up;
- o when the board "CHIP IN OIL LEFT (RIGHT) MOTOR" lights up (continuous blinking); with a
- o sharp increase in the rotor speed above 100%;

For an emergency stop of the engine (one or two) from any operating mode, set the lever (s) "STOP MOTOR LEFT", "STOP MOTOR RIGHT" control of the stop-crane (stop-cranes) to the upper position. If the stop valve fails, stop the engine by closing the fire valve, after which further operation of the regulator pump is prohibited.

3.1.4. Turning on generators and electrical equipment, turning off the APU

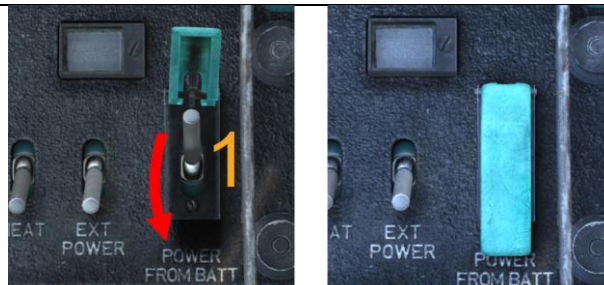
1. Set the HB speed to $95 \pm 2\%$ by moving the correction handle to the extreme right position

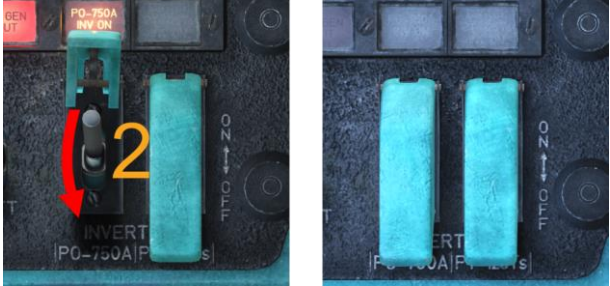

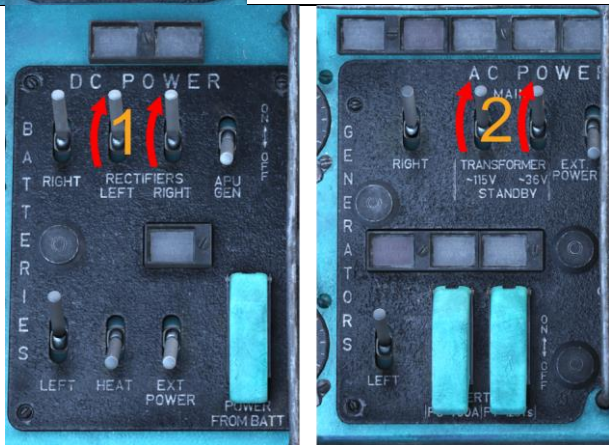
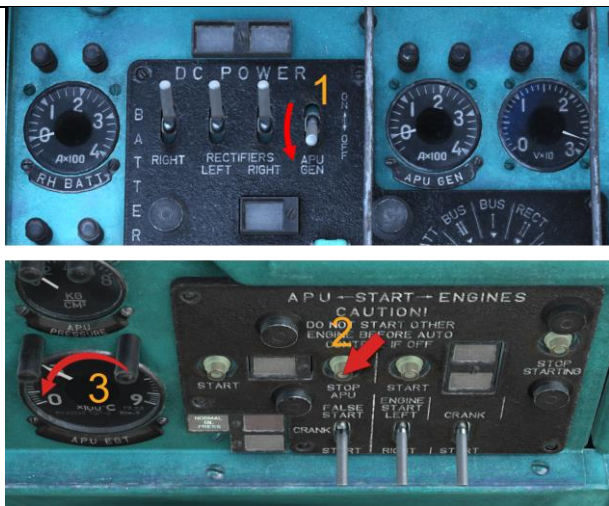


2. Transfer the power supply of the helicopter's onboard network to onboard generators, for which:
install switches "LEFT." (1) and "RIGHT" (2) the alternators to the "ON" position, and the signal displays "LEFT GEN. OFF", "RH GEN. OFF" should go out. and the board "PARALLEL. WORK GENER." (3).



3. In the variant of starting from batteries (in the current example), after turning on the generators, set the "MAINS TO BATTERY" switches. (1) and "PO-750A" (2) to the "OFF" position.



	
<p>4. Check the voltage of the generators by setting the on-board voltmeter switch to all positions except "OFF." and "115", while the voltage should be in the range of 203-204 V.</p>	
<p>5. If the engines are started using an aerodrome direct current source or onboard storage batteries, then it is necessary to include:</p> <p>transformers 115V and 36V (1), for what - the "BASIC-BACKUP" switches</p> <p>transformers 115 and 36 V - to the "BASIC" position;</p> <p>rectifier devices (VU) (2), for which the switches "LEV." and "RIGHT" WU</p> <p>set to "ON"</p>	
<p>6. When starting engines using onboard storage batteries</p> <p>additionally switch off the STG-3 starter generator (1) and the AI-9V engine after cooling it at idle speed for 0.5-1 min. For disconnecting AI-9, press the STOP button AI-9V (2).</p>	

3.1.5. Switching on aviation and radio-electronic equipment, preparing for taxiing

Note. Each device from the radio equipment, as a rule, has several switches in the circuit: a gas station, a switch on the left operator panel, a switch on the system (device) control panel.

1. Include:

flasher (2),
heading system (1, right) by
setting the switch
"COURSE. SYSTEM" to the "ON"
position;
turn on both small-sized verticals
by installing switches

"GYROVERTICALS 1, 2" to "ON" (1,
left and center),



2. Check the functionality of the
vertical gyro:

on the flight command device
PKP-72M,
according to the roll and pitch indicator
UKT-2,

for which, in 1-2 minutes after turning on
the gyroverticals, press the locking
buttons on the dashboard.

Wherein:

the signal boards "FAILURE OF
GYROVER. 1" and "FAILURE OF
GYROVER. 2" should go out



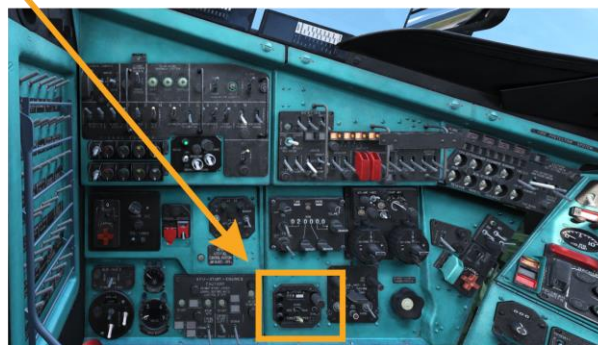
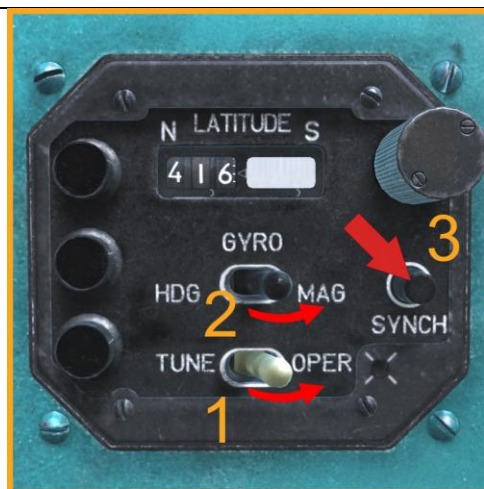
red flags from the front of the
PKP-72M device and the UKT-2
indicator should
get out, and the silhouettes of the
planes should show
parking roll and pitch angles
of the helicopter;



"RADIO ALTITUDE." and "SPO (POWER)" to the "ON" positions. (sound the alarm can be turned off SIREN -3M / SIGNAL)



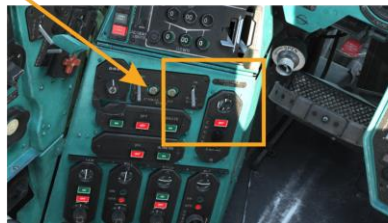
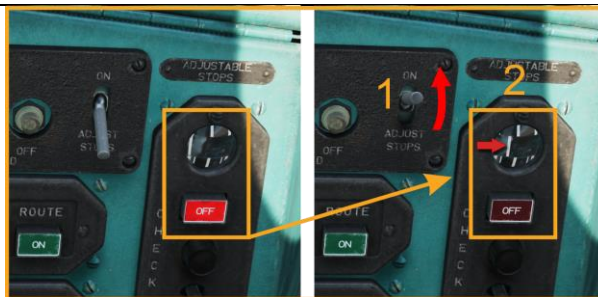
to install the work of the course system "ZK - GPK - MK" in MK (2); agree on the exchange rate system (3), keeping the button pressed until the end of the rotation of the scale on the indicator RMI-2 (on the dashboard)



4. Set the "MOVING STOP" switch to the "ON" position. and make sure that the SPUU-52-3 system is operational by extinguishing the "MOBILE SUPPORTS" display button with a red filter on the control panel and by setting the movable index

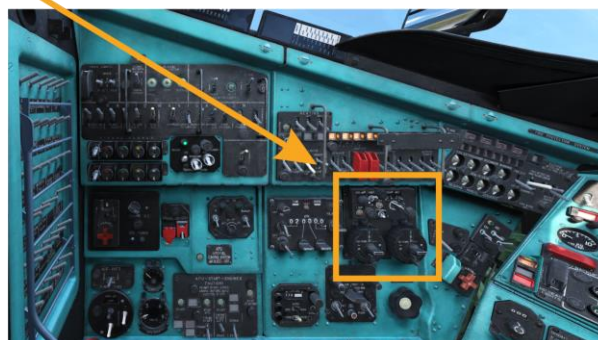
the zero indicator to the position corresponding to the air density.

* At altitudes close to sea level, moderate and low outdoor temperatures (high density), the zero indicator hand moves to the right from the extreme left position. At low density values, the arrow may remain in the extreme left or close to it.



5. Install the switch on the ARK-15 control panel in one of the positions (COM., ANT. or RAM.), adjust the desired frequency.

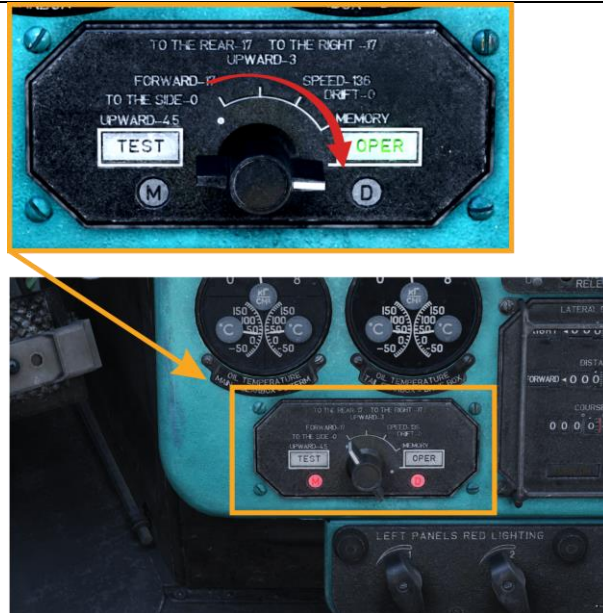
* ARK-15 by helicopter alone. However, there are two control panels - the commander and the operator. Switching between the consoles is carried out with the UPR button. - who pressed the last one controls



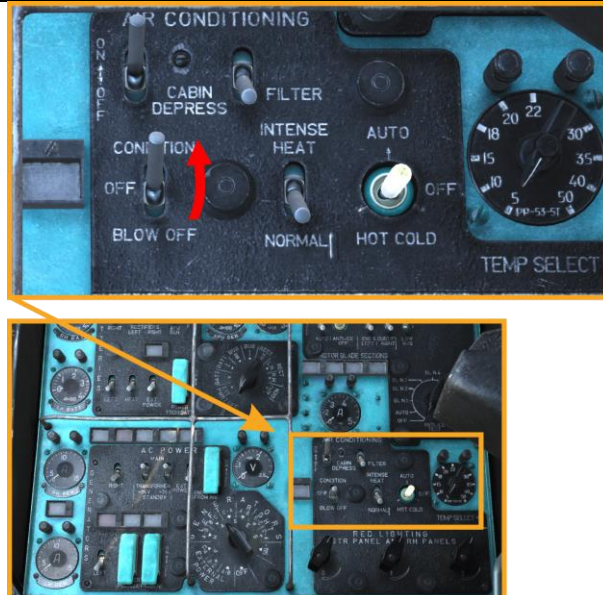
6. Set the switch on the ARK-U2 radio compass control panel to the "ON" position.



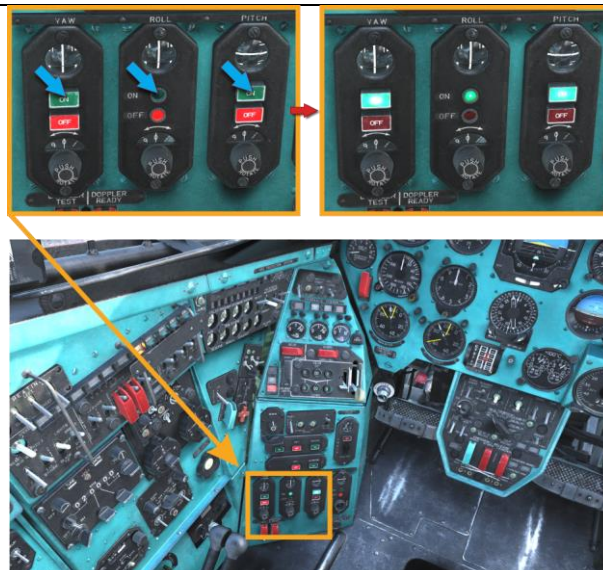
7. Put the switch on the DISS-15D equipment control panel to the "OPERATION" position.



8. Set the "AIR OUTLET" switch to the "AIR CONDITIONING" position.



9. Before taxiing enable the channels "Roll", "Pitch" and "Heading" of the autopilot. For training purposes, flights with the autopilot off are allowed



The helicopter is ready to taxi and take off.

4. WEAPON OF Mi-24P

4.1 GENERAL INFORMATION ABOUT THE HELICOPTER'S WEAPON

The armament of the Mi-24P helicopter can include guided missile armament (URV), unguided, small arms, bomber armament and a system for dropping small-sized cargo in various combinations.

Options for equipping a helicopter with weapons, in which the possibility of using each of the weapons is guaranteed, will be discussed in the chapter [5.1.1...](#)

The armament system is designed to be placed on a helicopter, control modes of combat use and the actual combat use of various aviation weapons (AAS) according to their intended purpose.

Functionally consists of elements and subsystems:

- providing placement (suspension), delivery and descent (firing) of the ASP at the point of use;
- providing control over the preparation of weapons systems, modes of use and targeted use of ASP;
- ASP and systems for their application
- emergency reset of suspensions.

Includes:

- beam holders BD3-57Kr-VM (4 pcs), [Fig. 4.1](#); [_____](#)
- wing pylons (one at the tips of each wing) with the possibility of suspension and release of launch frames with launching devices intended for guided missiles of the 9K113 guided missile system;

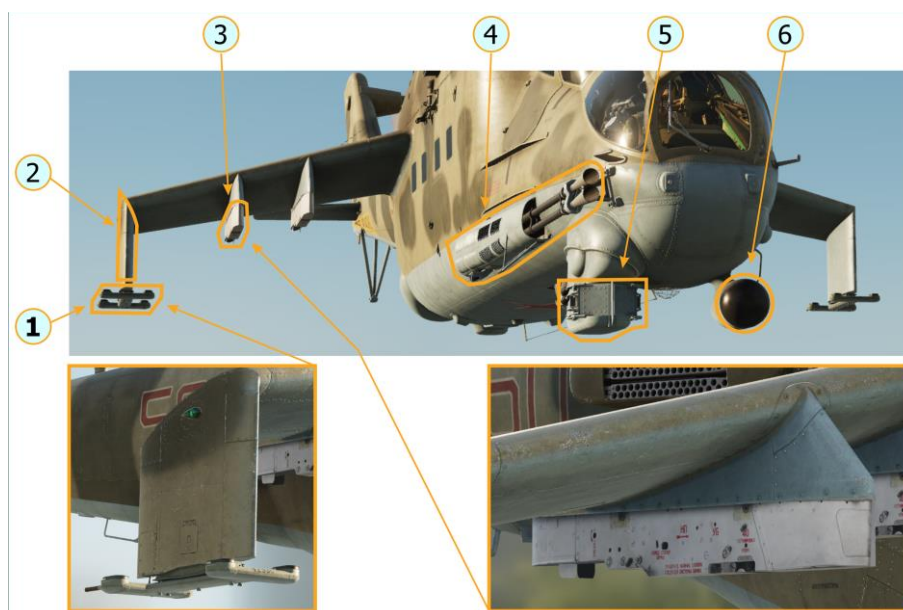


Fig. 4.1. External elements of the helicopter weapons system

- 1. Launching frame RP-149TK with two launchers
- 4. Fixed gun mount devices for ATGM 9M114 or 9M120
- 5. The outer part of the guidance device (PN)

2. Right wing pylon
3. Beam holder BD3-57Kr-VM (No. 4)

- URV systems
6. Antenna of radio control of the URV system under a radio-transparent cover

elements of the weapons system located in the cockpit,
[Fig. 4.2:](#)

- o Gas stations weapons of the left panel of the gas station;
- o Gas stations weapons of the right panel of the gas station;
- o "RS" button on the pilot's RPA for firing / launching / dropping weapons;
- o pilot's sight ASP-17V;
- o pilot's armament control panel (PUVL);
- o switch "PANEL ILLUMINATION SPECIAL EQUIPMENT ON - OFF";
- o counter of cartridges USB-1-2A;
- o photocontrol device for controlling the use of weapons SSh-45A-1-100-OS (in DCS: Mi-24P not installed);



Fig. 4.2. Arrangement of elements of the weapons system in the cockpit

1. Gas stations weapons of the left panel of the gas station
2. Gas stations weapons of the right panel of the gas station
3. Button "RS" on the pilot's RPPU for firing / starting / dropping weapons
4. Sight ASP-17V of the pilot
5. Pilot armament control panel (PUVL)
6. Switch "PANEL ILLUMINATION SPECIAL EQUIPMENT ON - OFF"
7. Counter of cartridges USB-1-2A

elements of the weapons system located in the cockpit of the operator ([Fig. 4.3:](#) _____)

- o safety switches and signaling boards states;

- o timer devices;
- o left panel of the operator's dashboard;
- o "PC" button on the operator's manual transmission;
- o operator's sight PKI;
- o the right panel of the operator's dashboard;
- o consoles and objects of the URV 9K113 complex.

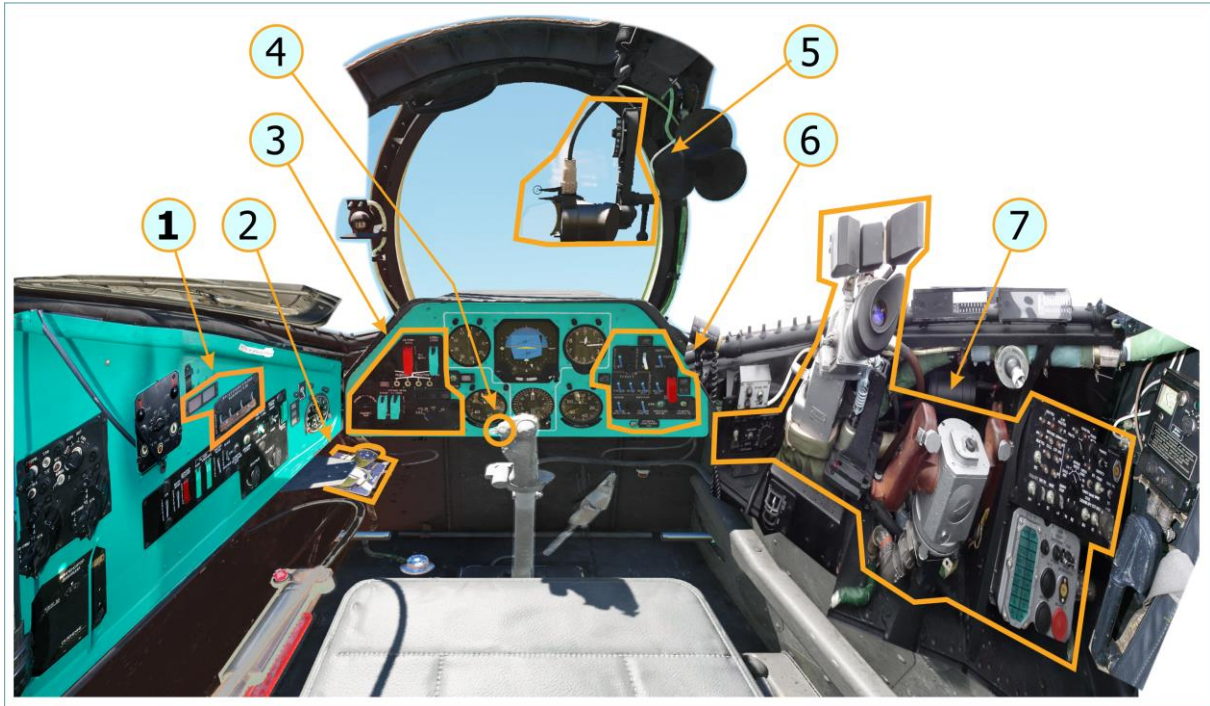


Fig. 4.3. Arrangement of elements of the weapons system in the cockpit of the operator

- | | |
|--|--|
| 1. Safety switches and signaling boards of their state | 4. "PC" button on the operator's manual transmission |
| 2. Timer devices | 5. Sight PKI operator |
| 3. The left panel of the operator's dashboard | 6. Right panel of the operator's dashboard |
| | 7. Consoles and objects of the URV 9K113 complex |

subsystems (systems) of weapons and aircraft weapons of destruction (ASP):

- o blocks and devices for receiving, processing and transmitting data, weapons necessary for the operation (about the angular position of the helicopter, its speed along all three axes, wind speed and direction, angles of attack, glide and other data);
- o fixed built-in gun mount of 30 mm GSh-2-30K (9-A-623);
- o pendant small arms and cannon armament - pendant gondolas universal helicopter GUV-8700 (9-A-669) with built-in machine guns YakB-12.7 (9-A-624) and GShG-7.62 (9-A-622), or with built-in grenade launcher AGS-17 "Flame-A" (9-A-800);
- o guided missile weapons include guided missiles (UR) with a radio command guidance system: 9M114 "Shturm" and the UR 9M120 "Attack" family (under development); UR with IR seeker of R-60M type (in development);
- o unguided missile weapons subsystem includes itself blocks UB-32 with unguided aircraft missiles (NAR) of 57-mm caliber of various types; B8V20-A blocks with 80-mm unguided aircraft missiles (NAR)

various types; B-13L1 blocks with 122-mm missiles; S-24B missiles;

- o bomber armament includes bombs caliber 100, 250 and 500 kg of various types and incendiary tanks (not yet implemented);
- o the system of dumping of small loads includes unified containers for dumping small cargoes KMGU-2.

Emergency release system.

Each of the listed *SUBSYSTEM* weapons (hereinafter - *SYSTEMS* weapons) is used using various helicopter and cabin equipment. The same cockpit (helicopter) equipment can be used for multiple weapons systems. Therefore, when describing a particular weapon system, such equipment will invariably be present in these descriptions.

4.2. Beam holders BD3-57Kr-VM

Wing helicopter beam holder BD3-57Kr-VM is intended for suspension, transportation and dropping of an aerial bomb with a caliber of 50 to 500 kg or an incendiary tank ZB-500 (weighing 375 kg, not yet implemented in DCS), or suspension of unguided missiles S-24B, gondolas GUV, blocks UB-32A-24 or B8V20-A and ensuring firing from them in flight, as well as suspension of containers KMGU-2. The helicopter is equipped with four BD3-57Kr-VM.

Main data of the holder Operating	
temperature range Overall dimensions of	60 ° C
the holder, mm:	
- length	1590
- body width	110
- body height	220
Block adjustment angles:	
- in the vertical plane	Not less than $\pm 1^\circ$
- in the horizontal plane	Not less than $\pm 26^\circ$
Holder weight in suspension version, kg:	
- aerial bombs or incendiary tank	31.25
- blocks UB-32A-24, B8V20-A, GUV gondolas, containers KMGU-2, missiles S-24B and UPK-23-250	28.5
Holder weight without grips	25.8 kg

The holders are supported by brackets mounted on the front and rear wing spars. The brackets ensure the installation of the beam holder at an angle of $+ 1^\circ$ to the building horizontal of the fuselage.

The beam holder consists of a power body, front and rear fairings, a lock, stops, a follower mechanism, impulse feed mechanisms, removable grips, electrical harnesses and plug connectors. The BD3-55M lock is used for hanging and dropping suspended loads. Has an electromagnetic trigger.

The "Explosion-Nevzryv" mechanism is used to control the dropping of aerial bombs with mechanical locking of fuses on "Explosion" or "Explosion", signaling the presence of a load on a beam holder and for supplying electric current to the MPI mechanisms when dropping a load with electro-pyrotechnic locking of fuses on "Explosion". Castle weight - 4.95 kg

4.3. Wing pylons

Wing pylons are attached to the ends of the wing consoles, in the armament system they are used to install RP-2-149TK launch frames, which, in their turn, are designed to mount 9M114 (9M120) guided missiles on them in transport and launch containers (TPK). Each launcher frame has two launchers (PU) for the installation of TPK ATGM. The launch frame is attached to the wing pylon through an adapter with a release assembly. The dump unit is designed to ensure that the launch frames are dropped from the TPK in an emergency. For this purpose, the dump unit includes two pyro-gates with PP-9 pyrotechnical cartridges.

4.4. Numbering of beam holders and ATGM launchers

The numbering scheme is shown in [Fig. 4.4.](#)

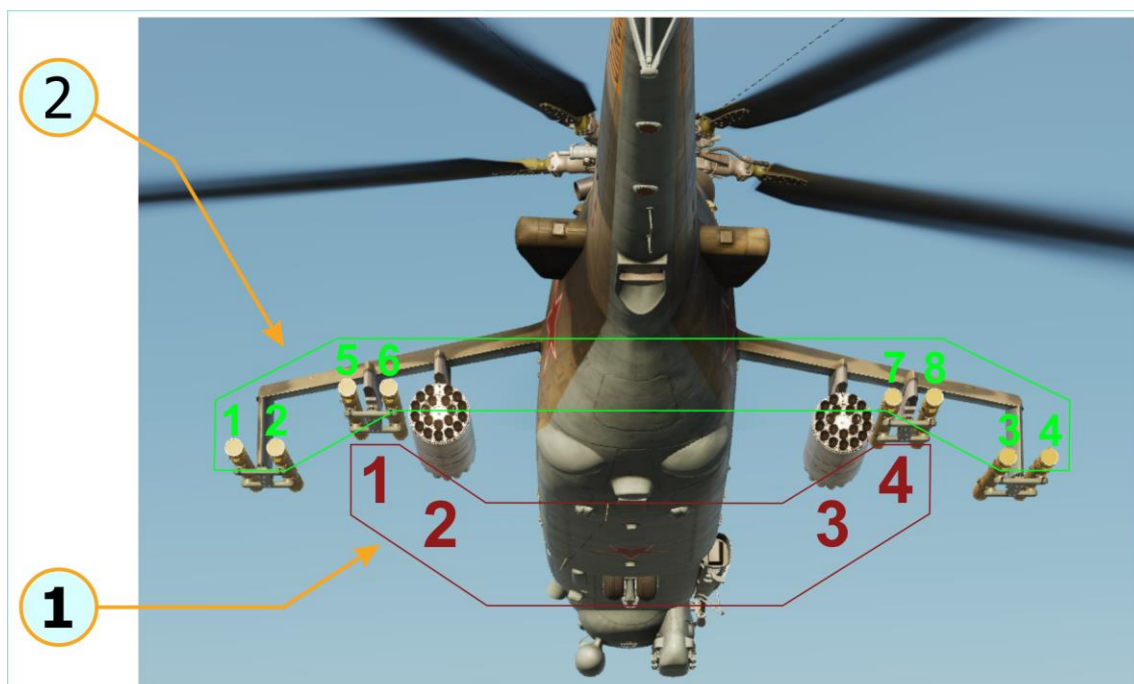


Fig. 4.4. Numbering scheme for beam holders and launchers for ATGM

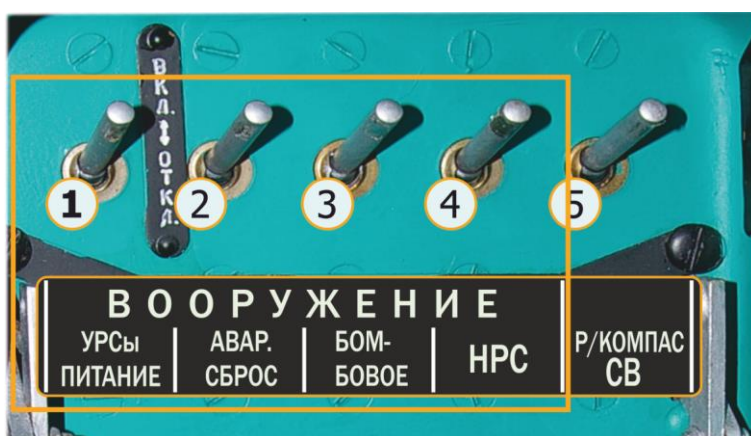
1. Numbering of beam holders BD357Kr-VM (dark red)

Used when describing the sequence of dropping bombs, "unloading" blocks from the NAR, descent of the NAR

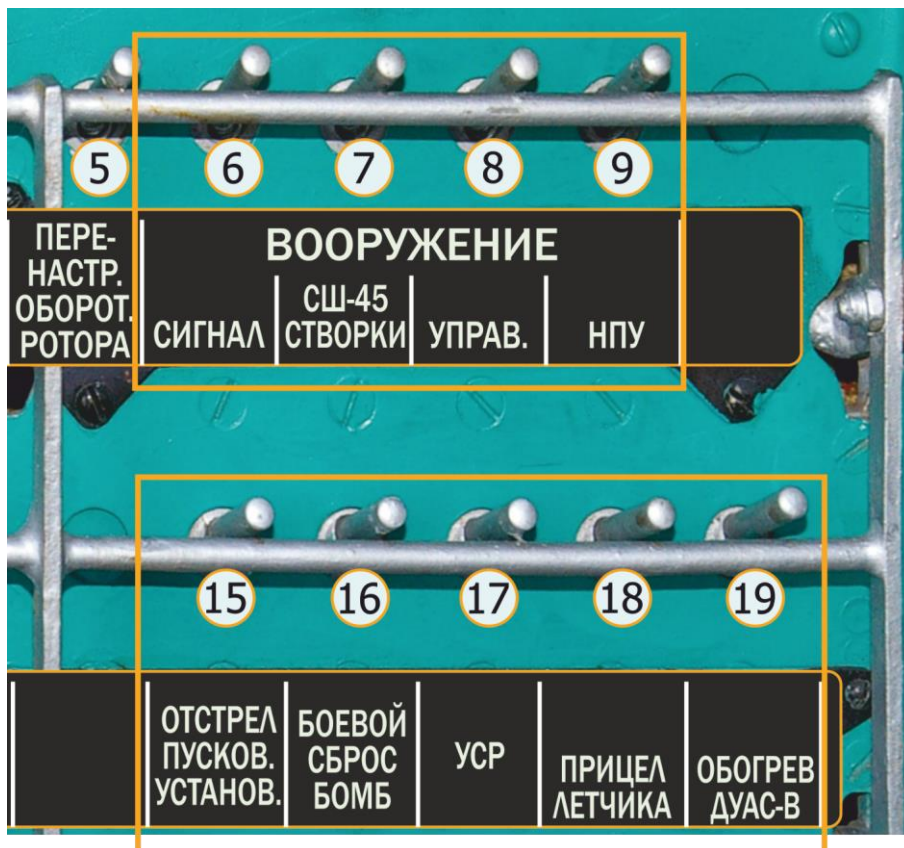
2. Numbering of the Launcher Devices (PU) of the Guided Missile Armament (URV) system (green). Used when describing the missile launcher and when selecting the launcher during the use of the missile launcher

4.5. Weapon system elements located in the cockpit

4.5.1. Gas stations of weapons of the left panel of the gas station



4.5.2. Gas stations weapons of the right panel of the gas station



4.5.3. "RS" button on the pilot's RPPU for firing / starting / dropping weapons

RPPU with display of the location of the "RS" button for firing / launch / reset is shown in Fig. 4.5.



Fig. 4.5. PC button on RPPU

4.5.4. Pilot's sight ASP-17VP

The ASP-17VP aircraft sight is designed for aiming by the pilot at moving and stationary ground and air targets.

The sight provides automatic plotting of angular corrections when firing from stationary weapons and launches of NAR (unguided missiles), and

also the installation of manual corrections in case of failure of automation or the use of weapons, for which aiming in automatic mode is not provided.

In addition, the sight is used when launching guided missiles to observe the position of the line of sight (LOS) axis of the guidance device (SL) and to determine the current range to the target using external base and elevation methods, and also allows you to determine the presence of a helicopter slip.

Basic data of objectives A SP - 17 VP

Maximum angular correction generated by the sight:

Maximum angular correction generated by the sight:	
- on the horizon	$\pm 12^\circ$
- up	6°
- down	17°
Angle size:	
- movable mark	7°
- fixed mesh	8°
Distance of the observer's eye from the reflector (calculated)	500 mm
The maximum speed of deflection of the sighting beam in the vertical and horizontal planes (the speed of movement of the PM in the will of the sight)	$20^\circ / s$
determination of the angle of sliding within the signaling	$\pm 15^\circ$
range of the current range to the target;	0-3500 m
	no more than 5 minutes
continuous work time	no more than 2h
sighting axis of sight (center of fixed reticle) Weight of	parallel to GFS
sight set, no more	55 kg

The ASP-17VP sight includes the following blocks:

targeting head ASP-17VP with control panel S-17V PU



analog-digital computing device C-17V ALBY with blocks of amplifiers and switching C-17B BUK (single block); power supply unit S-17V BP;

angular velocity sensor unit S-17 BDUS.

The sighting head with the control panel located on it is installed at the pilot's workplace above the dashboard. Blocks ATsVU, BUK, BDUS and power supply unit BP are installed in the fuselage of the helicopter on the left shelf of the radio compartment.

The sight remains operational while being supplied with the following voltages:

$(27 \pm 2.7) \text{ VDC};$

$(115 \pm 5.75) \text{ V}$ single-phase alternating current with a frequency of $(400 \pm 8) \text{ Hz}$

(36 ± 1.8) V three-phase alternating current with a frequency of (400 ± 3) Hz.

ASP-17VP is interfaced with the following onboard equipment of the helicopter:

with radio altimeter RV-5 and with meter DISS-15 for ground speed components W_x , W_y and W_q (directly);

with small-sized vertical gyro MGV-1SU, airspeed sensor DVS-24,

angle of attack and sliding sensor DUAS-V;

with a BVS unit and a Doppler meter for ground speed and drift angle DISS-15 (via USR-24).

The VG sighting head is an optical-mechanical device, forming on a plane-parallel plate movable indicator marks and scales controlled by brand with signals, coming from ADSVU or manually, as well as a fixed grid.

Viz and rn a head S - 17 V PU with control

The S-17V PU sighting head is an optical-mechanical collimator-type sighting device designed to form in the pilot's field of view an image of a fixed sighting reticle (NS) and a movable sighting mark (PM), indicator marks and scales controlled by signals from the ATSVU, ballistic computer or manually.

A control panel is attached to the body of the sighting head, designed to select the mode and method of aiming.

Elements of the S-17V PU sighting head are shown in [Fig. 4.6...](#)

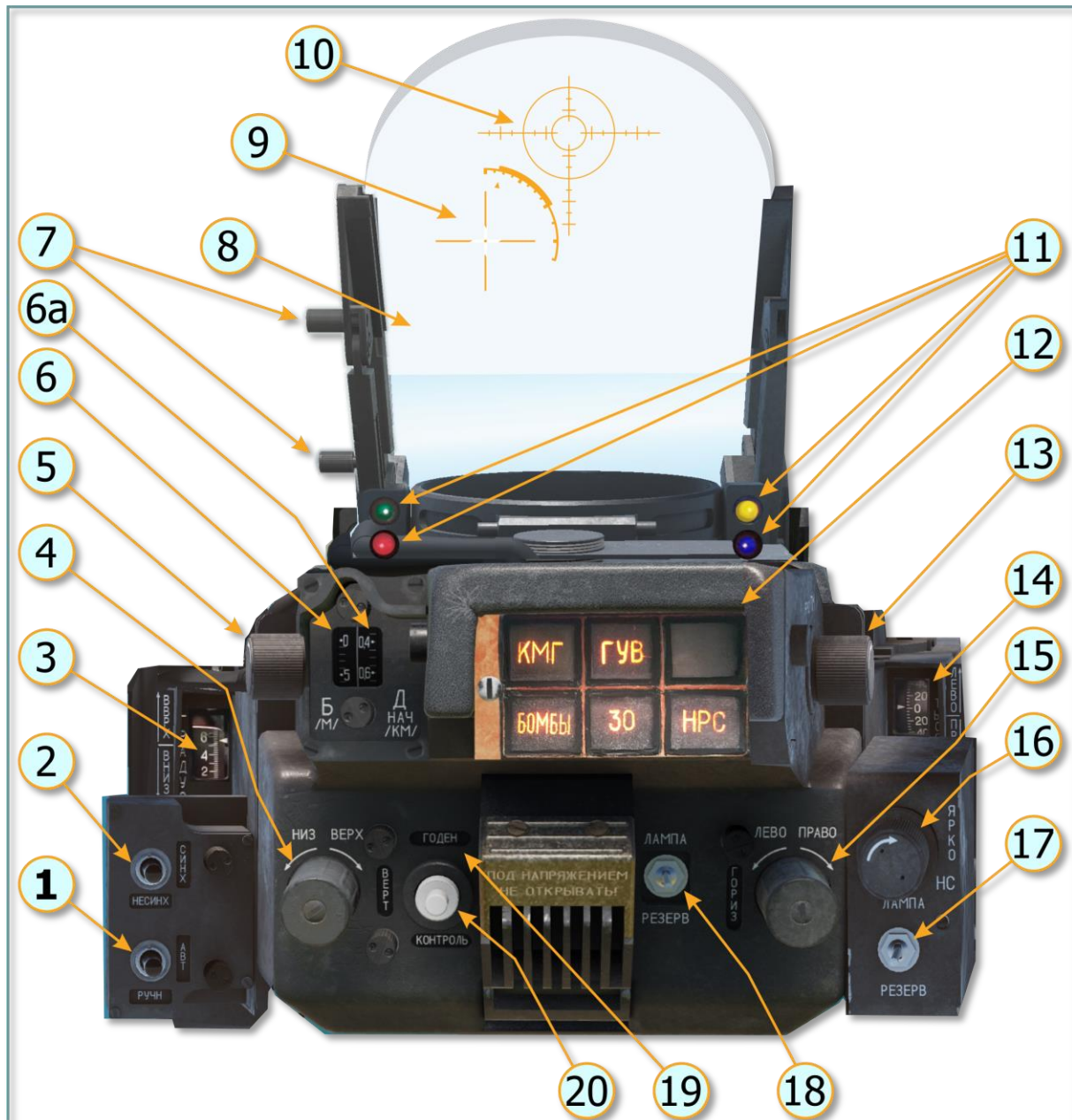


Fig. 4.6. Elements of the S-17V PU sighting head of the ASP-17VP sight

Item name	Functionality
1. Switch AVT. - MANUAL.	to switch the sight operation to automatic (AUT) or manual (MANUAL) mode (AUT. - correction is generated by ADC; MANUAL correction is set manually)
2. Switch SYNC. - NESYNCH.	to set the aiming modes of the automatic aiming mode: NESINKH - when firing at a stationary target in AVT mode, wind drift is taken into account, but the angular velocity of the target is not taken into account (the correction is generated for 1-2 seconds); SYNCH - when firing at a moving target in AVT mode, taking into account wind drift and angular velocity of the target; (retention of the grid for the required accuracy of the ADSU for taking into account the movement of the target, requires a holding time of 2-3 seconds)

3. Scale DEGREES UP-DOWN	<p>to indicate the readout of the vertical deflection angles of the movable mark (PM). The drum-type scale displays the position of the mirror, which changes either from knob 4 (in the MANUAL sight mode), or from the signals from the ADSVU (in the AVT mode). The scale has a rigid connection through a gear system with a handle 4 DEGREES BOTTOM-UP. In the sight mode MANUAL:</p> <p>when the knob is rotated in the direction of the arrow LOW (against the emergency), the indicator 3 (drum type) rotates downward at an angle of up to 30 °. When rotating in the direction of the UP arrow (according to CHS), indicator 3 rotates upward by an angle of up to 6 ° deflects the</p>
4. VERT handle with DOWN arrows for vertical movable mark deviations	movable mark 8 in the manual sight mode in the vertical plane, to take into account the corrections in shooting according to the values from the tables.
5. Knob for setting the target base (B) in m and initial range (Dnach) in km	for setting the target base (B) in m when using the manual mode of the sight to determine the current range using the external base method.
6 Scale B (m) and 6a Dnach (KM)	<p>for counting the base of the target with digitization in 5 m and the price of small divisions of 1 m. The maximum base of the target is 71 m. Initial range scale (Dnach, to the right of the target base scale), in km. It is not used on the Mi-24, it is rigidly (mechanically) connected to the indicator of the base value 6 (in m). The given base value together with the range value,</p> <p>installed with a handle on the weapon panel, is used in the sight to calculate and display the value of the divergence of the horizontal lines of the PM from 5.8 thousand radians to 78.5 thousand radians. It is taken into account and applied in the manual sight operation mode</p>
7. Handles of the mechanism lowering / raising the reflector	<p>designed to release the mechanism for lowering / raising the reflector glass (8).</p> <p>As implemented in the game: LMB on the lower (movable) handle, the handles are reduced. Next, use the mouse wheel to set the desired position of the reflector glass (8). Once again LMB on the lower handle - the glass is fixed in this position Designed to display a</p>
8. Reflector glass	<p>fixed reticle (NS) of the sight and a movable mark (PM)</p> <p>animation is carried out by turning the mouse wheel after releasing the handles (7). Stepped movement: 11 fixed positions. The most applicable position corresponds to the position when the white marks on the pantograph elements are combined</p>
9. Movable mark (PM) of the sight	to indicate the aiming angle calculated by ADSVU (in AVT mode) or set manually (in MANUAL mode, switch 2). Before pressing the open fire button, you should put the PM on the target by turning the helicopter
10. Fixed reticle (NS) sight	<p>for simplified aiming (the GFS of the helicopter is parallel to the NS and with a simplified account of the corrections, the nose of the helicopter is deflected by the pilot:</p> <p>above the target - to take into account the decrease in shells from the range,</p> <p>upwind - to take into account the "blowing" of shells from the initial line of throw,</p> <p>ahead of the target's velocity vector - to take into account the target's movement during the flight of the projectiles at a distance to the target)</p>
11. Four indicator lights: lower left (red) upper left (green) upper right (yellow) lower right (blue)	<p>red - not used on the Mi-24; green - to indicate the AUT mode. switch RANGE INPUT AVT-MANUAL on PUVL;</p> <p>yellow - to indicate that the helicopter is within the effective range</p>

	<p>the use of the weapon option selected for the PUVL. It is only activated in the AVT position. Lights up when $Deff_{min} \leq Dtek \leq Deff_{max}$</p> <p>in addition, when the OFF (URS) position is on the PUVL and the NABL mode is on, it also lights up; blue - not used on the Mi-24</p>
12.1. Yellow scoreboard group (from left to right, first line, then second): "KMG"	lights up when the switch is installed on the armament panel: to the position of KMG
12.2. "GUV"	in any of the three positions of the key switch: NPU 7.62 + 12.7, NPU12.7, NPU7.62
12.3. Not involved in MI-24P	never burns
12.4. "BOMBS"	to the AB position
12.5. "thirty"	to position LPG 30 to
12.6. "NRS"	position HPC
13. YARKO PM handle (movable mark)	for adjusting the brightness of the moving mark
14. Scale THOUSANDS	to indicate the reading of the angles of horizontal deviation of the movable mark (PM) in thousand radians. The drum-type scale displays the position of the mirror, which changes either from the knob 15 (in the MANUAL sight mode), or from the signals from the ADSVU (in the AVT mode). The scale has a rigid connection through a gear system with a 15 HORIZ knob. LEFT RIGHT. It is used for manual accounting of corrections for wind and target movement in the transverse plane. Rotation of the knob 15 against the CS moves the scale up, along the CS - down for the horizontal deflection of the
15. GORIZ handle. with arrows LEFT-RIGHT	movable mark and the rotation of the scale 14
16. YARKO NS handle (fixed grid)	to regulate the brightness of the fixed grid
17. Switch LAMP - RESERVE. to include fixed grid back-up lamp	to switch the illumination of the fixed grid from the main lamp to the backup
18. Switch LAMP - RESERVE. to include back-up lamp of movable mark	to switch the backlight of the moving mark from the main lamp to the backup
19. Lamp (board) white with a stencil GOOD	to indicate the good condition of the sight circuits (lights up if the built-in tests are passed), in addition, when the button is pressed, the PM control moves left-down to the edge of the field of view, when the button is released it returns to the center
20. CONTROL button	<p>for built-in control of the scope. Push-type button (as long as there is pressure on the button, the control is carried out). To check it is necessary:</p> <ul style="list-style-type: none"> - set the wafer switch to the PUVL in any position except OFF (URS); - on VG-17 AVT mode. <p>When you press the button and the sight is in good condition, the GOOD lamp (19) lights up above the button, and also the PM goes 100 thousand to the left and 4.5 ° down The current range scale (on the PM) is set to $1500 \pm 150m$</p>

Note. When the sight is in automatic mode, the handle (4) together with the vertical angle indication scale (3), as well as the handle (15) together with the horizontal angle indication scale (14) rotate in accordance with the angular positions of the PM, i.e. automatically.

Not in the lower net (NS) and in the lower mark (PM)

Fixed reticle and movable mark when you turn on the sight on PUVL (4.5.5) are immediately visible on the reflective glass. If necessary, you can adjust the brightness of the HC with the knob (16), PM - with the knob (13).

HMOBILE GRID has an angular dimension of 8° and consists of luminous concentric circles, radial strokes and crosshairs, dimensions elements are shown in the diagram [Fig. 4.7](#)

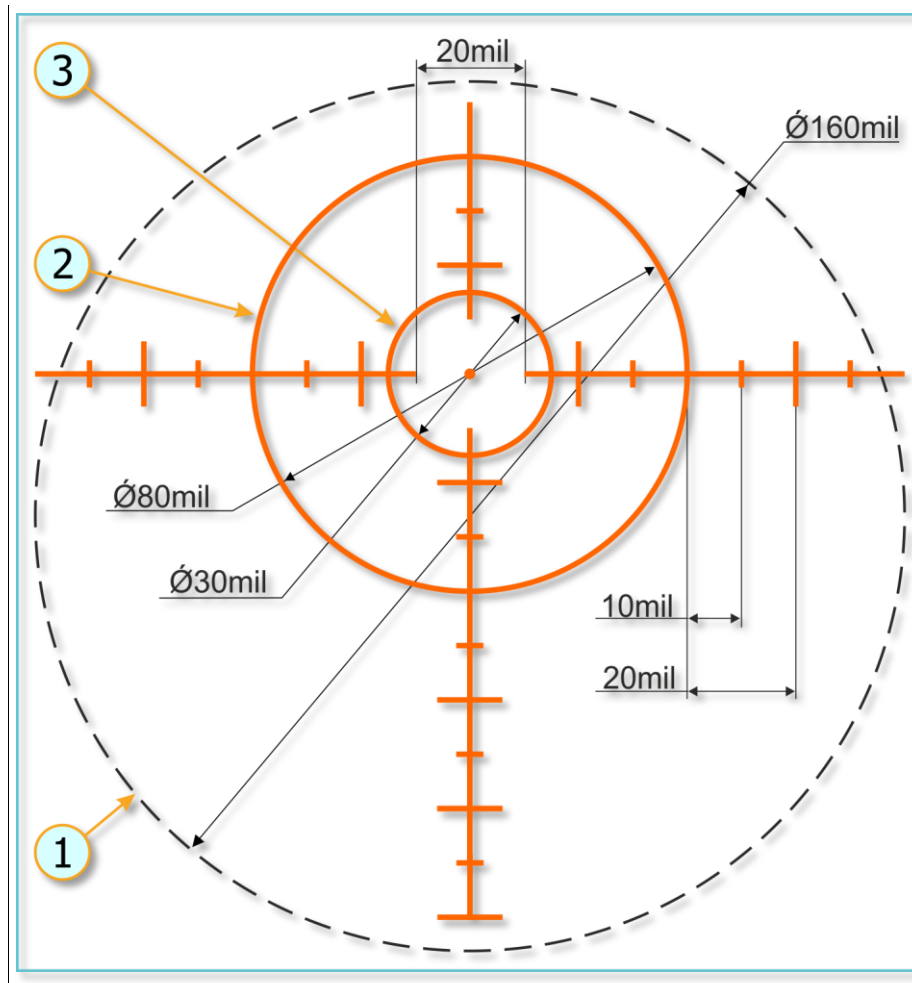


Fig. 4.7. Sizes of fixed reticle elements

1. Field of view of the sight
2. Large number of sight
3. Small ring of the sight

Note. The color of the NS in the diagram has been changed for clarity.

17.45 thousand correspond to an angle of 1°

PMobile aiming *BRAND* (Fig. 4.8) has an angular dimension of 7° and consists of AND from the following luminous marks moving in the field of view:

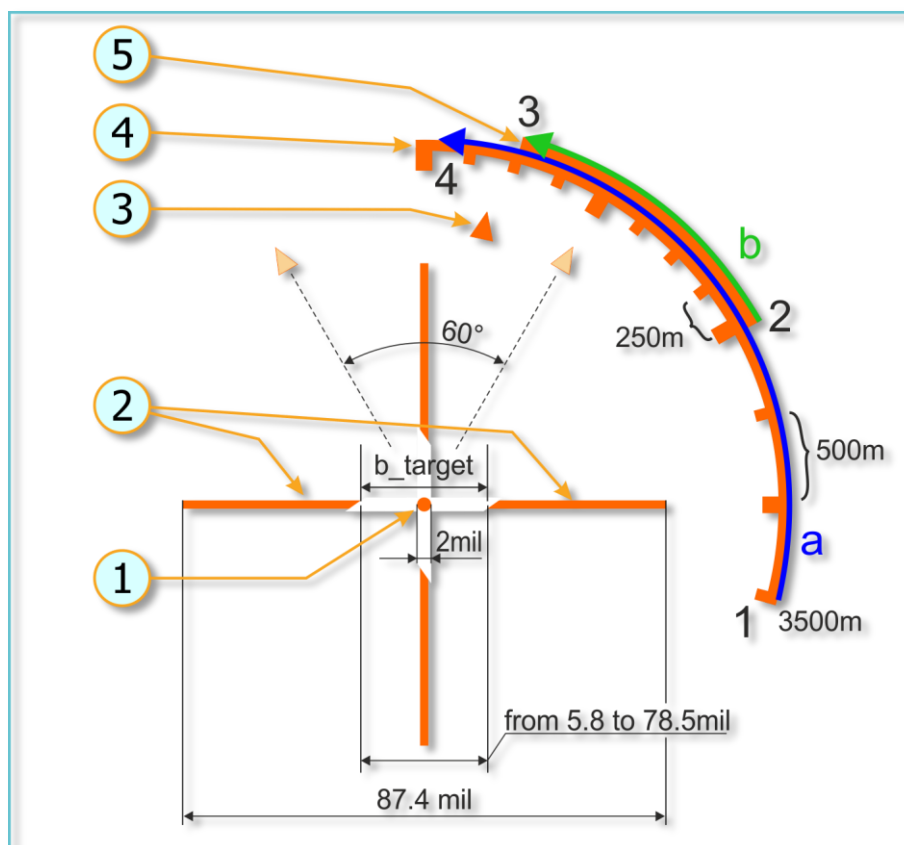


Fig. 4.8. Movable mark and indicators with marks and scales

1. Center point
2. Rangefinder strokes
3. Slip index
4. Sector (arc) of the current range
5. Sector (arc) of effective range

Note. The color of the PM in the diagram has been changed for clarity.

The arc of the current range decreases its size from point 1 to point 4. Effective range arc - from point 2 to point 3.

ANALOGO - DIGITAL CALCULATION (ACV U)

The analog-digital computing device ADSVU is intended for calculating the total angular correction of shooting, determining and issuing to the sighting head the indication parameters of the current target range, range of starting and stopping shooting, and performing built-in control of the sight.

The calculation is based on:

ballistics data for the selected weapon type (only for 7.62-mm, 12.7-mm machine guns, NAR S-5KO and S-8M, GSh-2-30K cannon); data from the RV-5 radio altimeter (for determining the range in the AVT range input mode); data from DISS-15 on ground speed components W_x , W_y and W_q ; data from the small-sized vertical gyro MGV-1SU (roll and pitch); data from the airspeed sensor DVS-24, data from the DUAS-V angle of attack and slip sensor.

4.5.5. Pilot armament control panel (PUVL)

Designed to select active weapons, control the modes of use of weapons and the ASP-17 sight. Located in the cockpit under the dashboard in the center. The elements of the UWL are shown in the diagram,



Fig. 4.9. Pilot armament control panel (PUVL)

Item name	Functionality
1. Enter switch RANGE AUT-MANUAL	to select a range input source in the ADC: either automatic calculation of the range by elevation method, or a fixed range set by the knob (27), (in the slang of specialists - "beak")
2. Switch QUEUE SHORT-LONG-MEDIUM	to select the amount of ammunition used per press of the "RS" combat button; (long bursts from a cannon, machine guns, the number of NAR in a salvo, the number of bombs that descend per click), see the table below
3. Four-position overcharge switch 12.7 LEV 1-2-3 middle off position	to turn on the squibs of reloading the machine gun 12.7 from the LEFT GUV-1 failures of the cartridge supply system when firing from the GUV in DCS: Mi-24P are not implemented

<p>4. Nine-position knob switch for selecting the type of active weapons</p> <p>OFF / URS-GM-30 - NPU 7.62 + 12.7 - NPU 12.7 - NPU 7.62 NPU-30 - NRS - AB - KMG</p>	<p>to select the weapon with which the weapon system will work:</p> <p>OFF / URS - the movable mark (PM) ASP-17 mates with the axis of the operator's guidance device (PN) when the operator turns on the PN. If the operator does not have PN enabled, no weapon is active;</p> <p>GM-30 - connection of GUV-1 grenade launchers (suspended handols); NPU 7.62 + 12.7 - connection of both machine guns from GUV-1 in the machine-gun version; NPU12.7 - connection of 12.7 machine guns from GUV-1 in the machine-gun version; NPU7.62 - connection of 7.62 machine guns from GUV-1 in the machine-gun version; NPU-30 - connection of the built-in cannon of 30 mm LRS - connection of the launch circuits of the NAR (UB-32A, B8V20A, B-13L1, S-24B); AB - connection of bomber armament circuits;</p> <p>KMG - connection of control circuits for Small Cargo Containers</p>
<p>5. Four-position switch COOLDOWN 12.7 RIGHT 1-2-3 with middle position off</p>	<p>to turn on the squibs of reloading machine gun 12.7 from RIGHT GUV-1 failures of the cartridge supply system when firing from the GUV in DCS: Mi-24P are not implemented</p>
<p>6. SIGHT ZERO button</p>	<p>when the button is held down, the movable mark of the ASP-17 sight and the fixed reticle are combined</p>
<p>7. SIGHT switch</p>	<p>turns on / off the ASP-17 sight</p>
<p>8. Switch SSh-45</p>	<p>turns on the SSh-45 aiming control device in readiness mode (when you press the combat button, the position of the sight is photographed) DCS: Mi-24P SSh-45 not installed</p>
<p>9. Switch NRS BOARD LEV-OBA-RIGHT</p>	<p>to select the NAR units connected for a salvo by pressing the combat button:</p> <p>LEV - connection of blocks only from the left side BOTH - connection of blocks of both sides at the same time</p> <p>RIGHT - connection of blocks only from the starboard side</p>
<p>10. Yellow board KMG WORK ENDED</p>	<p>lights up after complete "emptying" of the compartments of the KMGU containers</p>
<p>11. Yellow board KMG is LOADED</p>	<p>lights up when switch 4 is turned on in the KMG position and the "full" state of the compartments in the KMGU</p>
<p>12. Yellow board PUS INJECTED RIGHT BOARD</p>	<p>for signaling the occupation of the contact lamella in the PUS-3671 contact on the trunk No. 1 of the NAR B8V20 or UB-32 block from the starboard side</p>
<p>13. Yellow board PUS INLETED LEFT BOARD</p>	<p>for signaling the occupation of the contact lamella in the PUS-3671 contact on the trunk No. 1 of the NAR B8V20 or UB-33 block from the left side</p>
<p>14. INPUT START button</p>	<p>when the button is held in the pressed position, the contact lamellas in the PUS-3671 rotate from the current position to the position of the pin on the barrel No. 1. Rotation time around the whole circle 1.5 sec</p>

15. Switch "EMERGENCY RESET START. SET." under the protective cap	to reset ATGM launchers in case of an emergency. When the cap is closed, the switch assumes a forced DOWN position (turned off) pressing the switch up resets the launchers. The switch is spring-loaded: an upward position is only possible while maintaining the pushing force
16. Yellow lamp for signaling the loading of the 4th OBD	to signal the presence of a suspension on the locks of the beam holder No. 4 (more precisely, the closed state of the DB lock) to
17. Yellow lamp for signaling the loading of the 3rd OBD	signal the presence of a suspension on the locks of the beam holder No. 3
18. Switch "EMERGENCY SPECIAL LOAD." under the protective cap	for dumping any suspension from BD No. 1-4 in case of an emergency. When the cap is closed, the switch assumes a forced DOWN position (off) when the switch is pressed upwards, all controls at the DB No. 1-4 are opened. The switch is spring-loaded: an upward position is only possible while maintaining the pushing force
19. Yellow lamp for signaling the loading of the 2nd OBD	for signaling the presence of a suspension on the locks of the beam holder No. 2
20. Yellow lamp for signaling the loading of the 1st OBD	for signaling the presence of a suspension on the locks of the beam holder No. 1
21. Switch "EMERGENCY EXPLOSION-NON-EXPLOSION" under the protective cap	the lower position disables the explosion circuits from the bombs hanging on the BD 1-4 (in the case of their suspension). The upper position connects the emergency explosion circuits to the hanging bombs, if they are on the DB 1-4; when the cap is closed, the switch takes a forced position DOWN (off) after pressing the button, the cycle of programmed
22. STOP button WORK OF KMG	sequential opening of compartments on KMGU containers is terminated. It is used in the case when it is necessary to complete the discharge of objects from the compartments before working out a full cycle of opening all compartments at KMGU
23. Red board EXPLOSION	signals about activation of emergency explosion circuits (if switch 21 is on)
24. Button PEREZAR NPU-30	after pressing the button, the built-in GSh-2-30 cannon is reloaded with a squib in DCS: Mi-24P 30mm cannon failures are not implemented to
25. Switch TEMP LPU MORE-LESS	switch the rate of fire of the built-in GSh-2-30 cannon (more: pace 2000-2600 rpm, less - 300-400 rpm)
26. CONTROL switch. FIRE ON-OFF	completes the preparation of chains for launching, firing, dropping any type of weapon,
27. Knob for setting the estimated range entered in ADSVU	one division 100m; the value of the set range is taken into account in the MAN position of the RANGE INPUT switch AUT-MAN (1)

To use the elevation method for calculating the distance to the target, the INPUT RANGE switch on the RAN should be in the AUT position. The green signal lamp on the target will light up. The target range value is indicated by the current range scale on the movable aiming mark.

4.5.6. Switch BACKLIGHT SHIELD SPETSOBORUD. ON - OFF

Designed to turn on the alarm for the presence of suspensions under the BD1-4, as well as turn on the red illumination of the PUVL [Fig. 4.10](#)

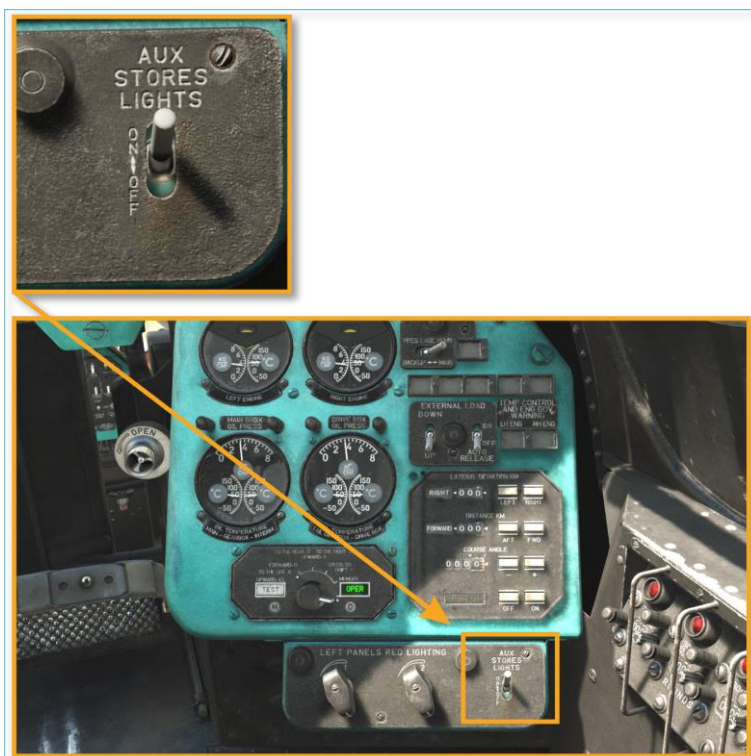


Fig. 4.10. Switch for illumination of the shield of special equipment.

4.5.7. Counter of cartridges USB-1-2A

(in DCS: Mi-24P has not been implemented yet)

The USB-1-2A universal counter is designed to determine the number of remaining cartridges in the power supply path and to signal the readiness of a cannon or machine gun for operation. To the right of the pilot's dashboard, 5 universal counters USB-1-2A are installed, Fig. 4.11



Fig. 4.11. Counter of cartridges USB-1-2A

Item name	Functionality
1. Display window for the remaining cartridges for the GUV grenade launcher on the BD-1 OR machine gun for the 7.62-mm machine guns on the BD-2 (counter USB-1-2A No. 1).	
2. Indicator lamp for readiness, ammunition availability and operation of the USB-1-2A meter No. 1	Continuous lighting of the light means that the product is ready to fire. When firing, the lamp flashes. Those. when the weapon system is ready to fire, regardless of the amount of current ammunition, the lamp will be on.
3. Knob for setting the number of cartridges for the USB-1-2A counter No. 1	rotates only to the right (in emergency). If "slipped" the desired value, then you need to scroll to the right again)) When equipping with weapons from the editor, the indicator is set by default: - for GUV with a 30-mm grenade launcher (9-A-800) on BD-1: "300" (which means 300x1 grenades left) OR - for GUV with machine guns on BD-2: "425" (which means 425x4 cartridges left for 9-A-622 LEFT machine guns)
4. Window indicating the remainder of cartridges for the GUV grenade launcher on the BD-2 OR machine gun for 12.7-mm machine guns on the BD-2 (counter USB-1-2A No. 2).	
5. Indicator lamp for readiness, ammunition availability and operation of the USB-1-2A meter No. 2	
6. Knob for setting the number of cartridges of the counter USB-1-2A No. 2	When equipping with weapons from the editor, the indicator is set by default: - for GUV with a 30-mm grenade launcher (9-A-800) on BD-2: "300" (which means 300x1 grenades left) OR - for the GUV with machine guns on the BD-2: "150" (which means 150x5 rounds left for the 9-A-624 machine gun)
7. Remaining display window shells for the built-in cannon 9A-623K (counter USB-1-2A No. 3)	
8. Indicator lamp for readiness, ammunition availability and operation of the USB-1-2A meter No. 3	
9. Knob for setting the number of cartridges for the USB-1-2A counter No. 3	When equipping with weapons from the editor, the indicator is set by default: for NPU 9-A-623K with 250 rounds of ammunition: "125" (which means 125x2 rounds left)
10. Window of indication of the remainder of cartridges for the GUV grenade launcher on the BD-3 OR machine gun for 12.7-mm machine guns on the BD-3 (counter USB-1-2A No. 4).	
11. Indicator lamp for readiness, availability of ammunition and operation of the USB-1-2A meter No. 4	

12. Knob for setting the number of cartridges for the USB-1-2A counter No. 4	When equipping with weapons from the editor, the indicator is set by default: - for GUV with a 30-mm grenade launcher (9-A-800) on BD-3: "300" (which means 300x1 grenades left) OR - for the GUV with machine guns on the BD-3: "150" (which means 150x5 rounds left for the 9-A-624 machine gun)
13. Window of indication of the remainder of cartridges for the GUV grenade launcher on the BD-4 OR machine gun for the 7.62-mm machine guns on the BD-4 (counter USB-1-2A No. 5)	
14. Indicator lamp of readiness, availability of ammunition and operation of the counter USB-1-2A No. 5	
15. Knob for setting the number of cartridges for the USB-1-2A counter No. 5	When equipping with weapons from the editor, set on the indicator by default: - for GUV with a 30-mm grenade launcher (9-A-800) on BD-4: "300" (which means 300x1 grenades left) OR - for the GUV with machine guns on the BD-3: "425" (which means 425x4 cartridges for the 9-A-622 LEFT machine guns)
16. Red backlight lamps	

The cartridge counter receives electrical impulses from the product sensor connected to one of its barrels. These pulses activate the counter mechanism and cause its light to flash when firing. Continuous lighting of the lamp indicates the readiness of the product for firing. The counter light is located in the upper part of the device body, the digital scale is in the middle, and the knob for setting the number of cartridges in the power path is on the right.

When equipping a helicopter with a cartridge tape, the number of pairs of cartridges is set on the digital scale of the counter.

The pilot multiplies the counter by 2 to determine the true number of cartridges in the gun feed path.

For the corresponding weapon with a full ammo, it is necessary to set the values indicated in Table 1 on the counter. 4.1

Tab. 4.1

№pp	Type of weapon	Full BC, number of cartridges (shells)	It is necessary install on counter in front application
one	Grenade launcher 30 mm (9-A-800)	300	300
2	Machine gun 7.62-mm (9-A-622)	1700 (for one machine gun of two!)	425 *
3	Machine gun 12.7 mm (9-A-624)	750	150
four	Cannon 30 mm (9-A-623)	250	125

* The counter only interacts with the left machine gun in the GUV. If firing is carried out from both 7.62-mm machine guns installed in one GUV, then it is assumed that the remainder on the right machine gun coincides with the counter readings.

4.6. Weapon system elements located in the cockpit

4.6.1. Safety switches and signaling boards of their state

Safety switches "SAFETY SWITCHES OF THE ARMAMENT CIRCUIT" are connected by a common bar and are designed to exclude the descent / firing of APS when equipping and checking the helicopter weapons systems on the ground. Included before takeoff.

Located on the left panel, Fig. 4.12.



Fig. 4.12. Safety switches and signaling boards of their state

In the on position, the red indicator "CAUTION! CHAINS OF THE ARM. UNDER ELECTRIC" lights up; when it is off - the green display "WEAPON CHAINS DISCONNECTED".

The red display is lit only when the landing gear is extended. Green - both in the extended and retracted position of the chassis.

4.6.2. Timer devices

DCS Mi-24P has not yet been implemented

Timer devices provide the operator with the possibility of combat dropping bombs with aiming angles of more than 35 ° when the target is "covered" by the helicopter fuselage.

Timer devices (2146.2147) are installed on a panel located under the left operator panel (see Fig.2.12) and are software-time microelectronic devices UVPM1-111, UVPM1-115, which differ from each other in the range of time delays set on them : UVPM1-111 - from 2 to 9.5s, UVPM1115 - from 8 to 35s.

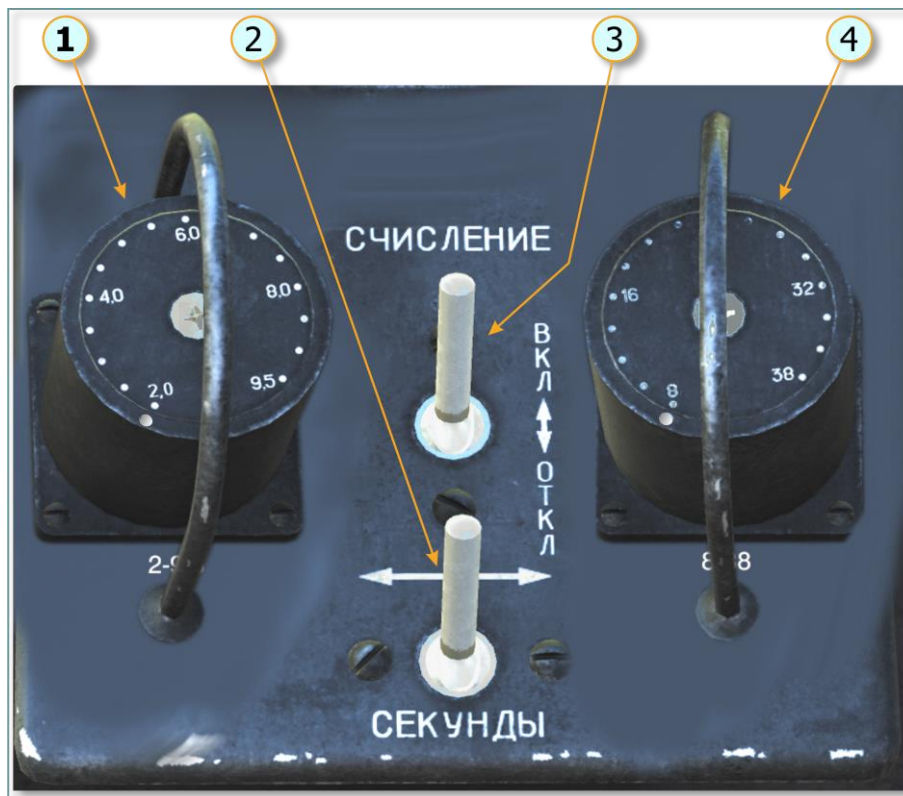


Fig. 4.13. Timer devices

- | | |
|---------------------------|---------------------|
| 1. Device UVPM1-111 | 3. Switch NUMBER |
| 2. Switch between devices | 4. UVPM1-115 device |

To drop bombs when the aiming angle is more than 35 ° and the target is "covered" by the fuselage, in addition to the above, the operator must:

- timing knob
- corresponding
- Pull the timer device and turn it until the mark (point) on it aligns with the mark on the dial of the device,
- corresponding to the calculated value of the time delay;
- set the "SECONDS" switch on the dashboard of the timer devices to position 2 - 9.5 s or 8 - 38 s (depending on the device on which the calculated value of the time delay is set);
- at the moment when the target leaves the sight of the sight ("closing" it by the fuselage), turn on the "COUNT" switch on the panel of the timer devices;
- at the moment when the yellow PC light signal on the PKI sight bracket lights up, press the PC button on the operator's RPA.

When the switch "COUNT" (2140) is turned on and the switch "SECONDS" (2142) is set to position 2 - 9.5s or 8.38s, the negative circuit of the corresponding timer device is closed. The timer device, on which the time delay is set, starts counting. Power on it

supplied from the battery bus II through the "ARMS: SIGNAL" gas station (2046) and "ARMS CIRCUIT SAFETY SWITCHES" (2047). Upon expiration of the set time delay in the timer device, a relay is triggered, which, when installed on self-feeding, connects contacts 3, 2, in connection with which the yellow PC light signal on the PKI sight bracket turns on. When the light comes on, the operator presses the PC button, while, as described above, one, two or four bombs are dropped.

To remove the timer device relay from self-feeding and bring the device to its initial state, turn it off by setting the "CALCULATION" switch to the off position.

4.6.3. Left panel of the operator's dashboard

The left shield of weapons on the operator's dashboard is designed to control the fire of the NAP, NAR, drop bombs, use KMGU, as well as emergency discharge, Fig. 4.14.

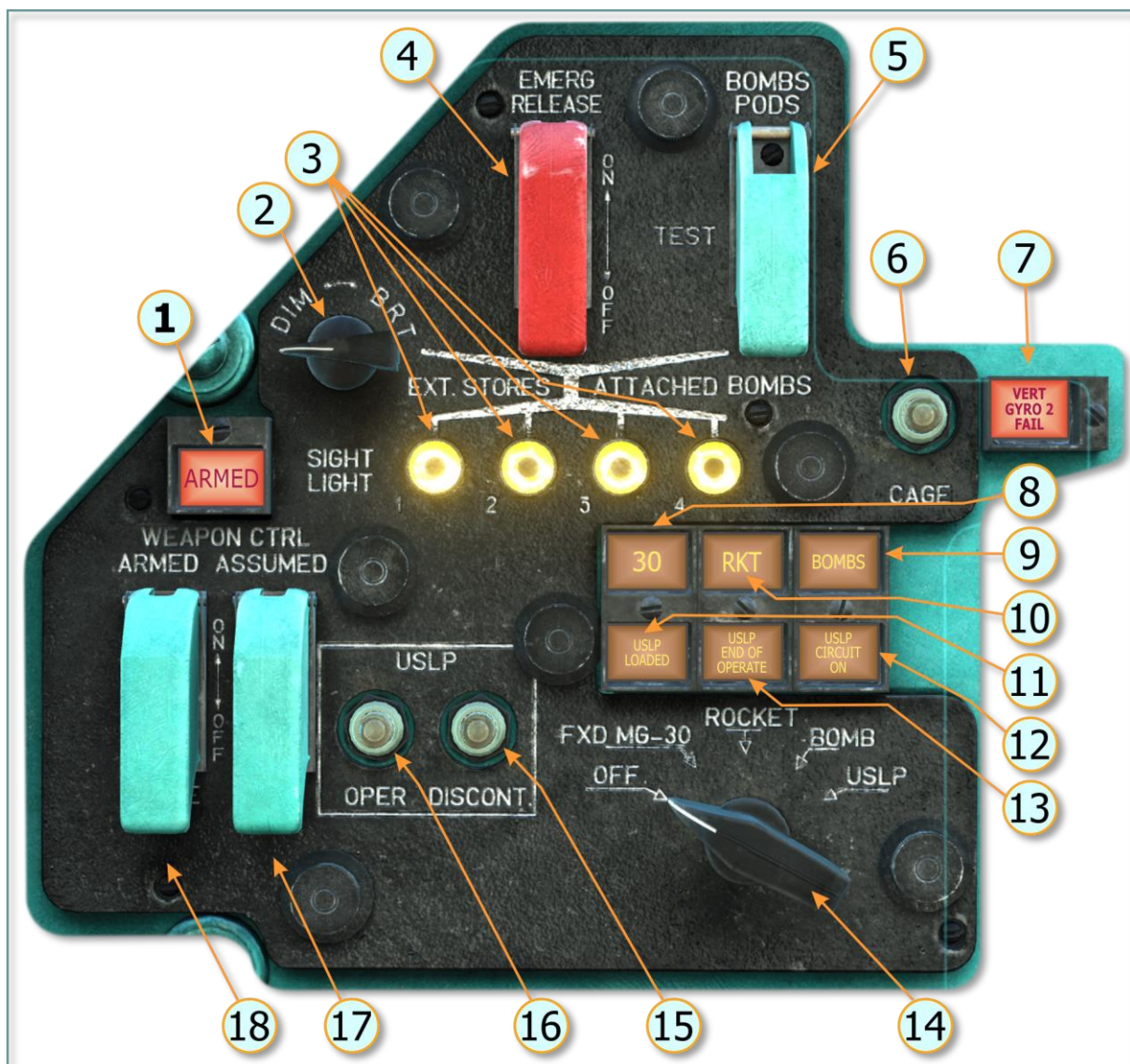


Fig. 4.14. The left panel of the operator's dashboard.

Item name	Functionality
-----------	---------------

1. Placard of red color "EXPLOSION"	lights up when the weapon circuits are on and signals the activation of the emergency explosion circuit using the switch (18)
2. Knob rheostat "ILLUMINATED PKI"	to regulate the illumination of the PKI grid. The handle rotates 180 degrees (from the "9 o'clock" position to the "3 o'clock" position)
3. Four yellow warning lamps SPECIAL CARGO SUSPENSION "1" - signaling the loading of the 1st DB	for signaling the presence of a suspension on the locks of the beam holder No. 1
"2" - signaling of loading of the 2nd DB	for signaling the presence of a suspension on the locks of the beam holder No. 2
"3" - signaling of loading of the 3rd database	for signaling the presence of a suspension on the locks of the beam holder No. 3
"4" - signaling of loading of the 4th DB	for signaling the presence of a suspension on the locks of the beam holder No. 4
4. "EMERGENCY RESET ON-OFF" switch under the protective cap	for dumping any suspension from BD No. 1-4 in case of an emergency. When the cap is closed, the switch assumes a forced DOWN position (off) when the switch is pressed upwards, all the controls at BD No. 1-4 are opened when the chassis is in the retracted position. With the chassis extended - only with BD # 1 and BD # 4. Switch spring-loaded: upward position is only possible while maintaining the pushing force
5. Switch " BOMB BLOCKS " " CHECK - BOMBS " under safety cap	Cap with a slot at the top for fixing both the position of the BLOCK BOMB and the position of the BOMB
switch	three position switch: BOMBS (the weapon system is "informed" that all DBs = BOMBS, that is, if the rocker switch is set to the "AB" position, then after pressing the "RS" button after 4 clicks, all cargo ships suspended under the DB will go off, regardless of whether bombs or blocks) 0.0 - CHECK in this position, pressing the PC causes the reset of all half-weights from the database 1-4; 1.0 - BOMB-BLOCKS (the weapon system is "informed" that BD-1 and 4 = BOMBS, BD 2 and 3 = BLOCKS, thus, in the "AB" position, the blocks will not go off at the third and subsequent pressings) to lock the control panel
6. "CASE" button	-72M. Locking is performed only while the button is held down.
7. Red board "GV-2 REFUSAL"	lights up when there is no power supply to the vertical gyro No. 2
8. Placard yellow "30"	lights up in the position of the switch (14) in "NPU-30" lights up in the position of the switch (14) in "AB"
9. Placard yellow "BOMBS"	
10. Placard of yellow color "HPC"	lights up in the position of the key switch (14) in the "NRS" lights up in the position of the key switch (14) in the "KMG" and in the presence of unopened compartment dampers in the KMGU
11. Yellow board "KMG is LOADED"	lights up in the position of the key board
12. Yellow panel "KMG NETWORK ON"	switch (14) in "KMG"

13. Yellow placard "KMG WORK ENDED"	lights up in the position of the key switch (14) in the "KMG" and with all the open doors of the compartments in the KMGU
14. Five-position switch for selecting the type of active weapons OFF. - NPU-30 - NRS - AB KMG	to select the weapon with which the weapon system will work: 0.0 - OFF 0.1 - NPU-30 - connection of the built-in 30 mm cannon 0.2 - NRS - connection of NAR units 0.3 - AB - connecting the chains of bomb weapons 0.4 - KMG - connection of control circuits for Small Cargo Containers
15. Button "KMG-STOP,"	to interrupt the process of opening the gates of the KMGU compartments. When the button is pressed (for 0.5-1 sec), the power supply of the dampers opening mechanism to the KMGU is blocked.
16. "KMG-WORK" button	for connecting power to the mechanism for opening the gates of the KMGU compartments. When pressed for more than 0.5 seconds, the programmed mechanism for opening the dampers is activated. The end of the program mechanism operation occurs either when all 8 compartments of the KMGU container are opened, or by pressing the "KMG-STOP" button. (fifteen)
17. Switch "CONTROL WEAPONS. - ON - OFF "under the protective cap: the cap	a lowered protective cap forcibly sets the "WEAPONS. SELF" switch to the OFF position
switch	in the "ON" position (top), the operator gets the opportunity to use some types of weapons from his workplace
18. Switch "EXPLOSION-NON-EXPLOSION - ON OFF" under the protective cap: cap	a lowered protective cap forcibly sets the "EXPLOSION-NON-EXPLOSION" switch to the OFF position
switch	for switching on the emergency explosion circuit in case of emergency dropping of bombs

4.6.4. Button "PC" on the operator's manual transmission

4.6.5. Sight of the PKI operator

4.6.6. Right panel of the operator's dashboard

The right armament shield on the operator's dashboard is designed to control the fire of the NPU, NAR, switch on equipment for the use of ATGM, as well as emergency reset of ATGM launchers.

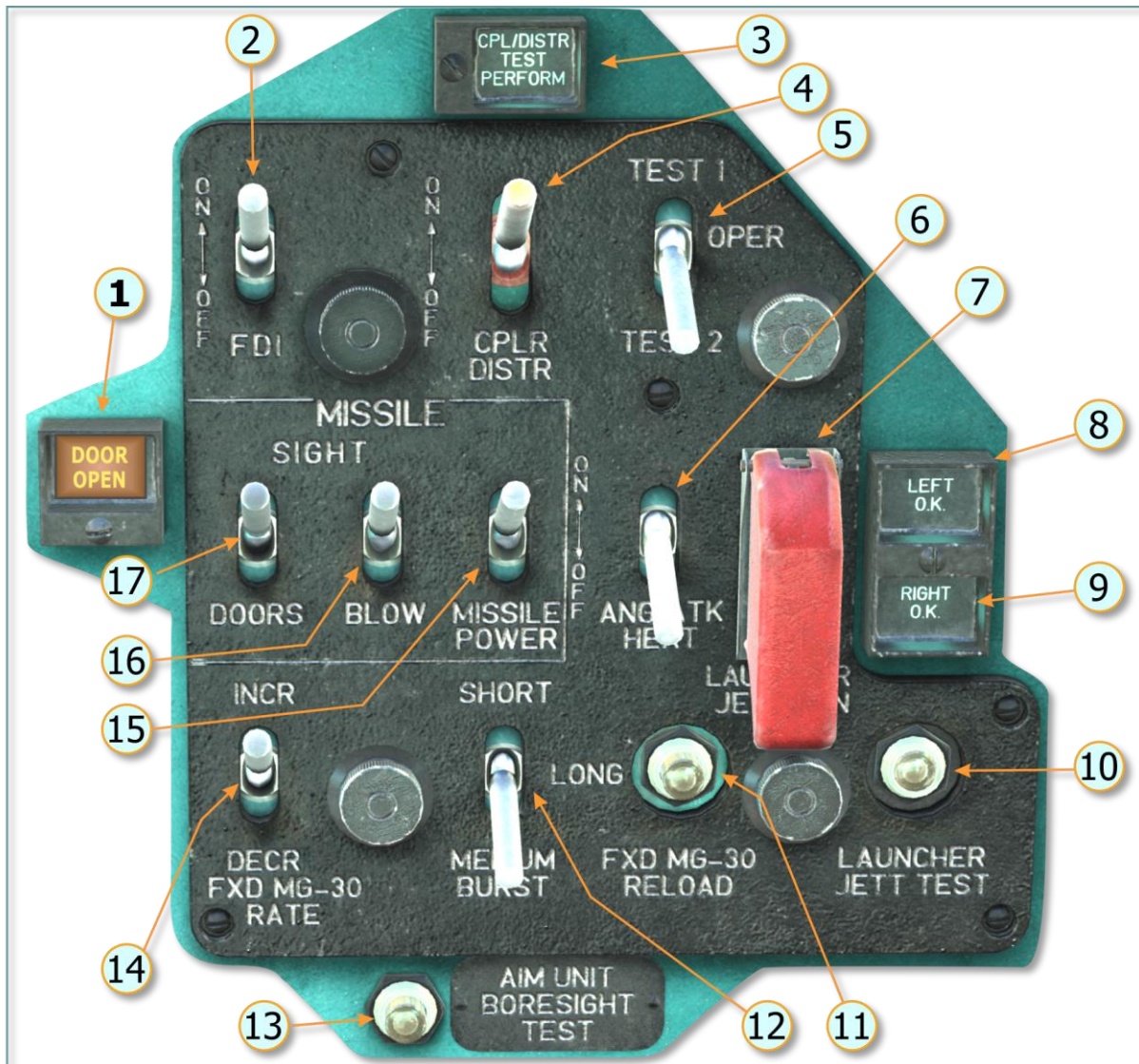


Fig. 4.15. The right panel of the instrument panel of the pilot-operator

1. Yellow placard "LEVES OPEN"	signals the opening of the INNER doors of the Guidance Device
2. "Control panel - ON-OFF" switch	to turn on the PKP-72M operator
3. Placard of green color "CONTROL OF THE USR PERFORMED"	for signaling the passage of built-in control by the Communication and Distribution Device (USR-24M) USR-24M is a device for processing and multiplying signals received from onboard equipment and sensors, which are then used in helicopter weapons systems
4. Switch "USR-ON-OFF."	for switching on the USR-24M
5. Switch "CONTROL 1 - OPERATION CONTROL 2"	for connecting circuits of built-in control USR-24M
6. Switch "HEATING DUAS-ON OFF."	to turn on the heating DUAS-V (Angle of Attack and Slip Sensor)
7. Switch "EMERGENCY RESET PU ON-OFF" under the protective cap:	for dumping any suspension from BD No. 1-4 in case of an emergency. When the cap is closed, the switch assumes a forced DOWN position (off)

switch	when the switch is pressed upwards, all controls at the DB No. 1-4 are opened. The switch is spring-loaded: the upward position is possible only if the pushing force is maintained to signal the serviceability of the display
8. Green board "LEFT CORRECT."	lamp and the circuit of the squib firing the PU from the left wing (by pressing the button (10))
9. Green board "RIGHT CORRECT."	to signal the serviceability of the panel lamp and the circuit of the squib for firing the PU from the right wing (by pressing the button (10))
10. Button "CHECK RELEASE PU"	when the button is pressed, the serviceability of the filaments of the PP-9 pyrotechnic cartridges installed in the emergency release units of launchers and the reliability of their contact is checked
11. Button "PEREZAR NPU-30"	after pressing the button, the built-in GSh-2-30 cannon is reloaded
12. "QUEUE SHORT LONG-MEDIUM" switch	to select the length of the queue from a cannon, machine guns, the number of NAR in a
13. Button "CHECK MOUNTING MOUNT"	salvo for ground debugging of the PN, not used in the game
14. Switch "TEMP LPU MORE"	to switch the rate of fire of the built-in cannon GSh-2-30
15. Switch "URS - POWER SUPPLY URS"	to turn on the power circuits of the Guided Weapon
16. Switch "URS SIGHT - BLOW"	to turn on the blowing of glass PN
17. Switch "URS SIGHT LEAF"	for opening doors PN

4.6.7. Control panels and objects of the URV 9K113 complex.

Shit about co o p e r a t o r a



Fig. 4.16. Operator's panel (SCHO) (Power on-off and selection missile panel)

1. Switch (B1) PIT	When you turn on the switch (B1) PIT. general power is supplied to the equipment 9C475, 9C476, 9C477, - - on the SCHO signal lamps (L4) ON. COMP, and PU OFF. - continues to burn, - - the program mechanism is started (210 seconds are counted, apparently to warm up the equipment of the 9C477 command radio link ...)
2. Button (B3) CONTROL LAMP	for the control of lamps on this plate is spring-loaded.
3. Lamp-signaling ON KOMPL.	for signaling voltage supply to equipment 9S475, 9S476, 9S477
4. Indicator lamp PU OFF	for signaling the off position of the rocker switch (9)
5. Lamp-signaling KONTR	to signal the activation of the control mode on the PC (when the equipment is in the CONTROL mode) or the CONTROL mode on the ShTV-91
6. Signaling lamp READY	for signaling that the equipment is in the readiness mode for launching the UR
7. Signaling lamp AVAILABLE. VOL.	for signaling the presence of UR on the selected Launcher (PU) by switch (9)
8. Signaling lamp PERMISSION START	to signal the presence of conditions for the descent of the UR (when the LV PN is parallel to the GFS within no more than 1 °)
9. Nine position switch (B2) PU OFF - 1-2-3-4-5-6-7-8	to connect the starting circuits to the SD on the PU: - PU OFF - none of the PU is connected to the equipment - 1 - launcher # 1 with an anti-tank missile system on it are connected to the starting circuits (if there is an anti-tank guided missile on the launcher); - 2 - launcher # 2 with an anti-tank missile system on it are connected to the starting circuits (if there is an anti-tank guided missile on the launcher); - 3 - PU # 3 with an anti-tank missile system on it are connected to the starting circuits (if there is an anti-tank guided missile on the PU); - 4 - launcher # 4 with an anti-tank missile system on it are connected to the starting circuits (if there is an anti-tank missile system on the launcher); - 5 - PU No. 5 with PUTR on it are connected to launch circuits (if there is an ATGM on the launcher); - 6 - PU # 6 with an anti-tank missile system on it are connected to the starting circuits (if there is an anti-tank guided missile on the PU); - 7 - PU # 7 with an anti-tank missile system on it are connected to the starting circuits (if there is an ATGM on the PU); - 8 - PU No. 8 with anti-tank guided missiles on it are connected to the starting circuits (if there is an anti-tank guided missile on the PU)

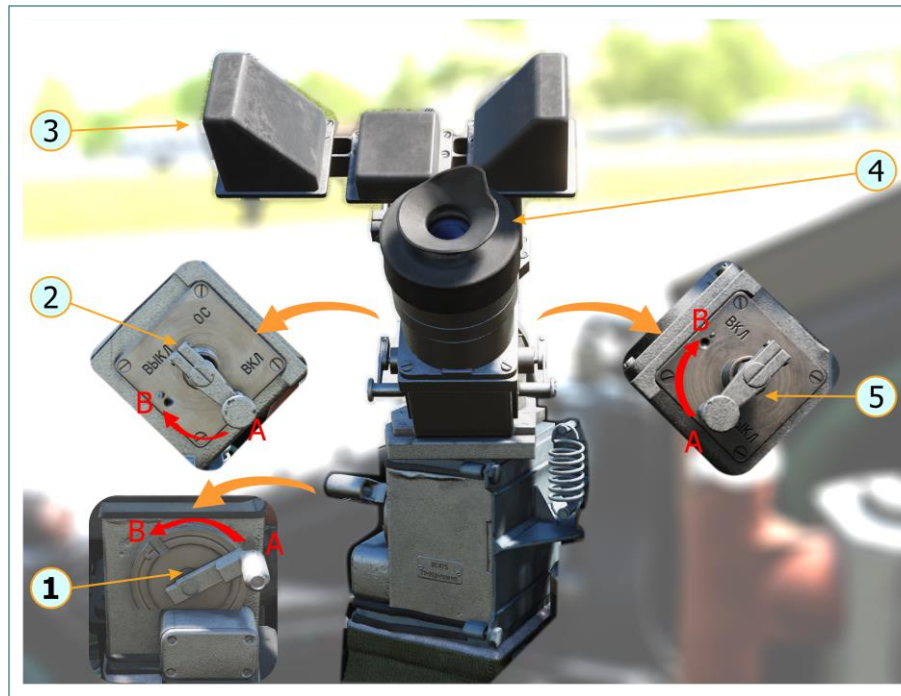
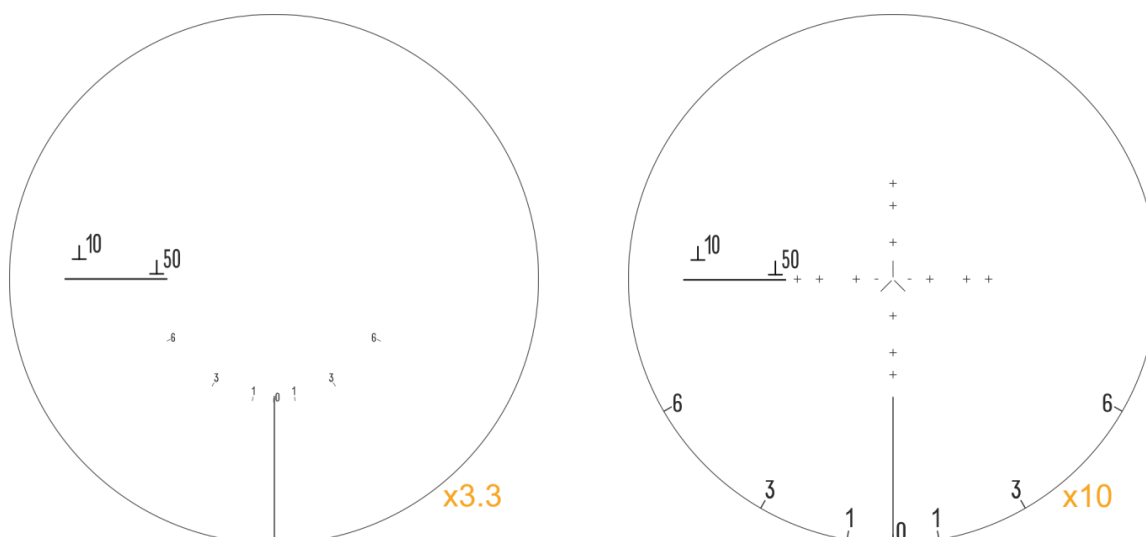


Fig. 4.17. Guidance device (PN)
(guidance unit)

1. Knob for switching the multiplicity of magnification (x3.3-x10)	to switch the multiplicity of the sighting system of the guidance device: - x3.3 - position A, - x10 - position B
2. Orange filter input knob	to turn on the orange filter in hazy conditions, poor target contrast due to weather. - position B according to the scheme - OFF; - position A according to the scheme - ON
3. Headband	for fixing the operator's head when using the PN eyepiece.
4. Eyepiece PN with rubber shock absorber	to ensure a clear view of the image from the optical system of the PN
5. Knob for inserting a light filter to protect against light radiation (blinding by a laser beam)	to turn on the SZS (green) light filter designed to protect the eyes from laser radiation. - position A according to the scheme - OFF; - position B according to the scheme - ON

In and out of the field of view

The PN field of view has two magnifications: x3.3 and x10.



ELEMENTS OF AREA OF VIEW MON PRI C RATN O s t i x 1 0

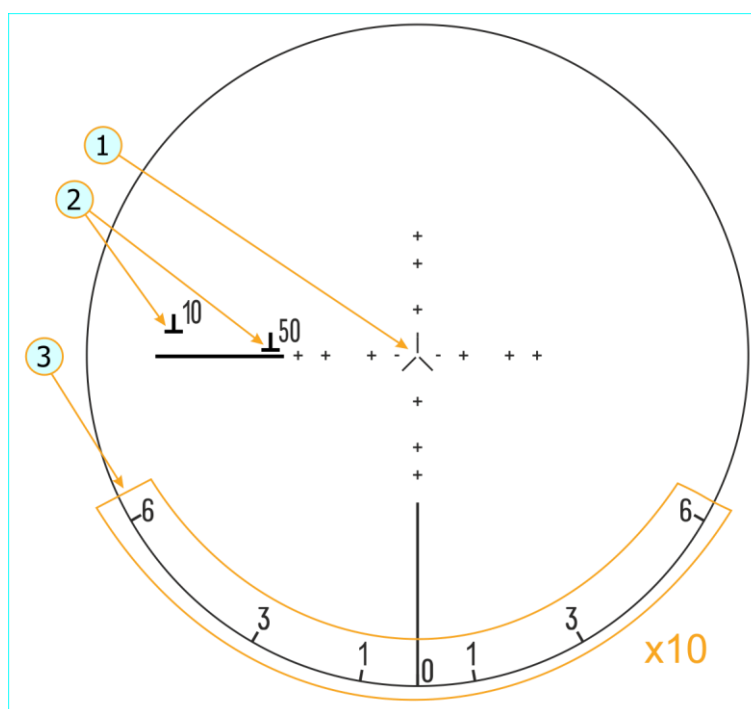


Fig. 4.18. Elements of the field of view PN at multiplicity x10

- one. Aiming mark 3. Scale of rotation angle of rotation of PN according to
2. Rangefinder strokes: direction relative to GFS

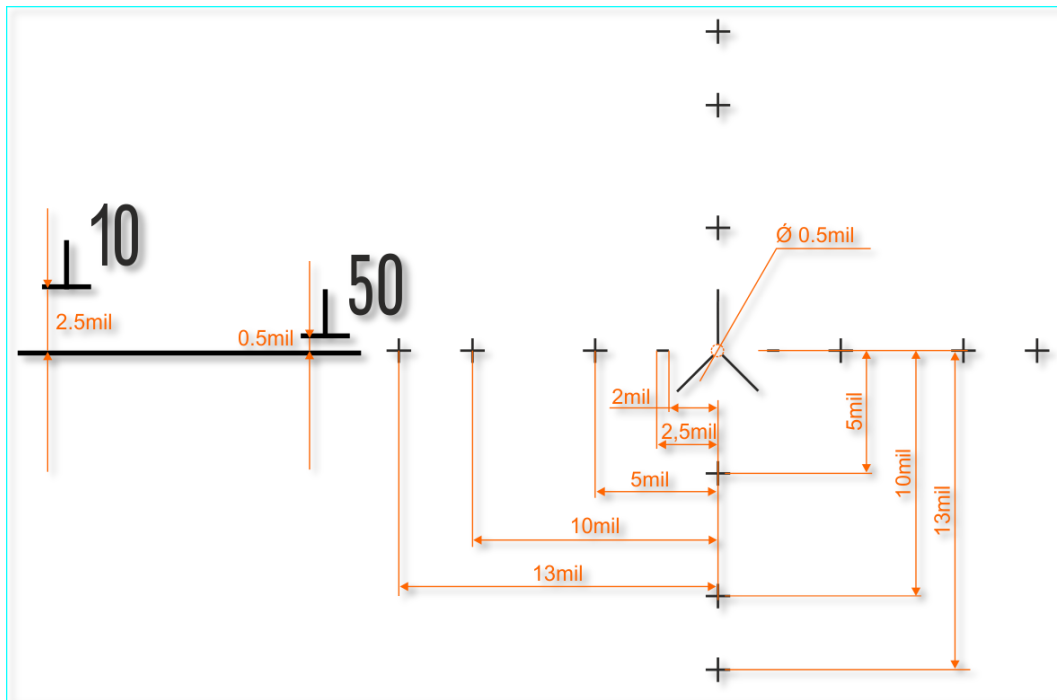
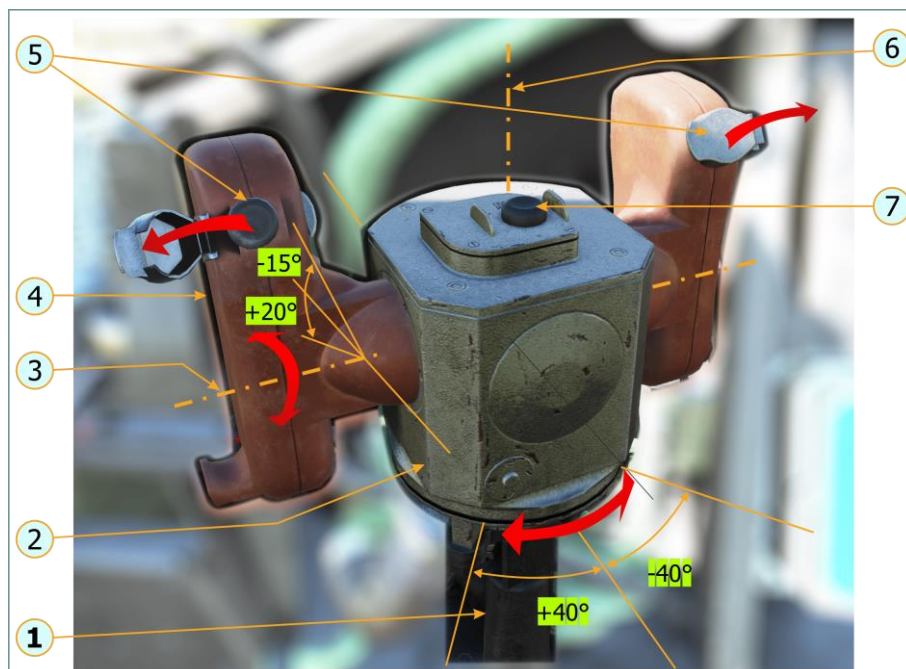


Fig. 4.19. The dimension of the strokes of the grid PN

"50" - indicates a range of 5000m, if the target with a height of 2.5m will be located between the horizontal line and the bottom of the line "50", touching both lines;

"10" - indicates a distance of 1000m, if the target with a height of 2.5m will be located between the horizontal line and the bottom of the line "10", touching both lines;

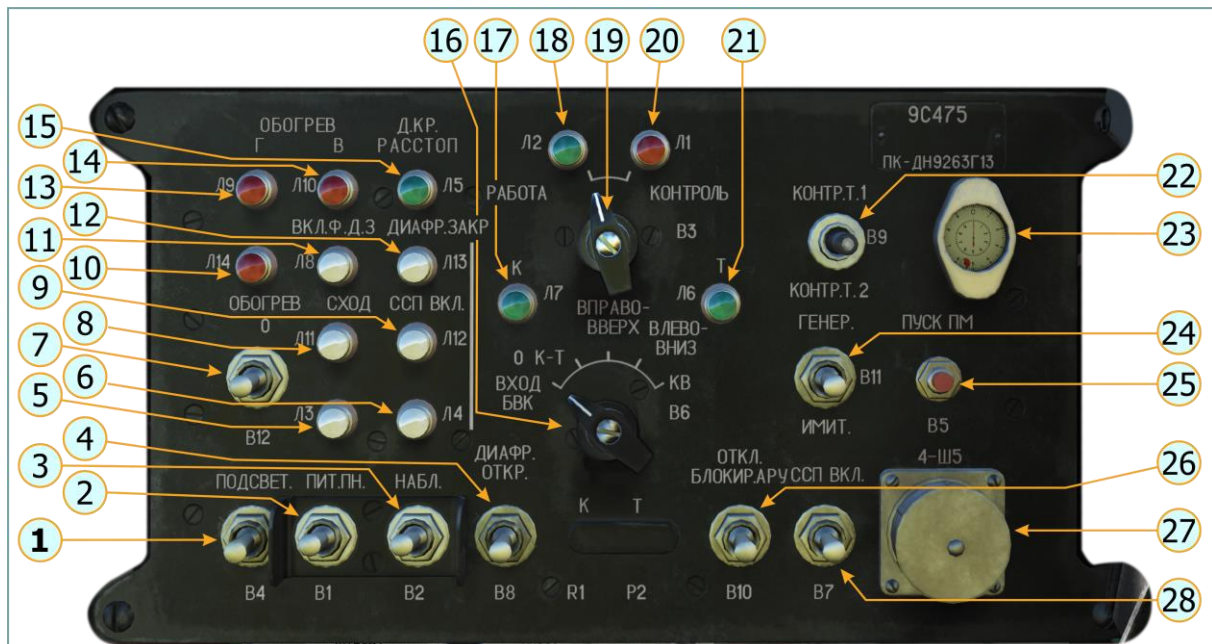
Poultupultuprandomnandent (PU PN)



**Fig. 4.20. Guidance device control panel (PU PN)
(missile control console)**

1. Bracket for attaching PU to the floor of the helicopter	
--	--

2. PU swivel head	to control the Line of Sight (LOS), or Line of Sight (LOS), in the horizontal plane. The head rotates about the axis (6) and is spring-loaded: when the force disappears, it returns to its original position (as in the diagram), which provides stress relief from the electric drives of the PN optical head rotation in the horizontal plane, thus the LP takes a certain constant angular position relative to the GFS in the horizontal plane
3. The axis of rotation of the rotary handles PU	the handles (4) rotate around this axis when the LV is controlled in the vertical plane
4. PU rotary handles	to control the LV in the vertical plane. The handles rotate about the axis (3). The left and right handles are connected to each other, and are spring-loaded: when the force disappears, they return to the horizontal position, which provides stress relief from the electric drives of rotation of the PN optical head in the vertical plane, thus the LV takes some constant angular position relative to the GFS in the vertical plane
5. START buttons under protective caps: - left button with protective cap	to launch the software mechanism of the URV equipment, which provides the launch of the UR at fulfillment of all other necessary conditions. The button is spring-loaded, when the force disappears, it takes the upper position itself
- right button with protective cap	functionally the same as the left button
6. The axis of rotation of the head PU PN	the head (body) PU PN rotates around this axis (2) when the LV is controlled in the horizontal plane
7. BEAM RESET button	to stop the radiation of the radio transmitter before the end of the full cycle of operation of the radio control equipment and to activate the preparation of the equipment for the launch of the next guided missile. When you press the "CLEAR RADIATION" button, the equipment will stop generating control commands ahead of schedule. At the same time, the equipment is quickly prepared for launching the next missile (within 6 seconds), the equipment is automatically switched to the "Ready" mode. In addition, the cessation of command generation occurs "as planned" - after 20 seconds after the descent of the UR, and 6 seconds after the expiration of 20 seconds) the apparatus is again ready to launch the next missile.



**Fig. 4.21. Control panel (PC)
(launch control test panel)**

1. Switch (B4) BACKLIGHT.	to turn on the illumination of the PN brand
2. Switch (B1) PIT.PN.	to turn on the power supply of the 9C475 equipment. In this case, the gyromotors are overclocked, the stabilizer gyroscopes are heated, the amplifiers of the monitoring systems of the PN and the power supply unit of the BVK enter the operating mode. The LZ lamp signals the switching on of the equipment under current, and the heating of the gyroscopes of the L9 and L10 lamps with the inscriptions HEATING G V
3. Switch NABL.	to turn on the complex equipment in the review and tracking mode. When the OBS switch is turned on: _ the lamp L4 lights up and the OUTER doors of the PN open (if there is pressure in the Hydro !!), (and the inner ones open from the switch URSA-AIM-LEAF, while the panel LEAF OPENED on the PDLO will light up, the display should not light up, if only the outer doors are open) _after 10 - 15 seconds, signal lamp D. KR-DISTANCE lights up. (L5), signaling the roll sensor release * when the "OBS." on a PC is automatically provided the sequence of closing the inner flaps, then the outer
4. Switch DIAFR.OPEN.	to check the opening of the diaphragm of the IR direction finder PN during the built-in control
5. Signaling lamp (L3)	for signaling the power supply of the PN:
6. Alarm lamp (L4)	to signal the activation of the monitoring mode on the PN (if the outer doors have opened, then the limit switches have worked, the lamp has lit up)

7. Switch (B12) HEATING	to turn on the heating mode of the PN eyepiece.
8. Lamp-signaling device (L11) EXCHANGE	to signal the ignition of the UR engine to signal the
9. Signaling lamp (L12) SSP ON.	inclusion of the Direction Finder Tracking System during the built-in control
10. Alarm lamp (L14)	for signaling that the heating of the PN eyepiece is turned on
11. Signaling lamp (L8) ON.F.D.Z.	for signaling about turning on the photodiode of the capture channel. When the direction finder is switched to tracking mode, it goes out. Lights up after switching ON the POWER SUPPLY switch (2)
12. Lamp-signaling device (L13) DIAPHR.CLOS.	for signaling the position of the IR direction finder diaphragm in the range of values 8-16 'of the angle of "sighting" of the diaphragm. This is done to reduce the influence of interference and enemy defense systems based on the emission of IR "markers", which are intended for false recognition in the IR direction finder of such a marker instead of the standard marker on the UR
13. Warning lamp (L9) HEATING G	for signaling the inclusion of heating of the gyromotor stabilization of horizontal guidance
14. Signaling lamp (L10) HEATING In guidance	for signaling the inclusion of heating of the gyromotor stabilization of the vertical
15. Alarm lamp (L5) D.KR. DISTANCE.	for signaling the roll sensor disconnection for switching
16. Gallet switch (B6) INPUT BVK - 0K-T - RIGHT-UP - LEFT-DOWN - KV	circuits when checking the input signals and commands from the BVK output in the course and pitch channels, as well as the command value to compensate for the rocket weight. When the checked parameters are within the tolerances, the lamps K (L7) and T (L6) light up. - INPUT BVK - the signal of the LV (LP) position is fed to the command generation unit, the main operating position - 0 K-T - enter the conditions of the control problem with zero parameters for the heading and pitch - RIGHT-UP - entering the conditions of the test task, where the position of the LP (LP) is simulated to the right-top - - LEFT-DOWN - enter the conditions of the control tasks where the position of the LP (LP) is simulated at the bottom left - KV - entering the conditions of the control task Weight Compensation (KV)
17. Alarm lamp (L7) K	to signal the alignment of the axis of the transmitting antenna (9C812) with the line of sight (LOS) in the course channel (since the movement of the antenna lags slightly behind the movement of the LW (LF), the lamps light up with a delay of 2-3 seconds (depending on the value of the misalignment angle)
18. Alarm lamp (L2)	for signaling the current operating mode of the equipment 9C475

19. Gallet switch (B3) OPERATION - CONTROL	to select the OPERATION or CONTROL mode of the 9C475 equipment (in the operation mode when using the complex in combat or in the control mode when checking the equipment operability by the built-in control). The switching on of one or the other mode is signaled by lamps L2 and L1
20. Alarm lamp (L1)	for signaling the current mode KONROL equipment 9C476
21. Warning lamp (L6) T	for signaling alignment of the antenna transmitting axis with the line of sight in the pitch channel
22. Three position switch (B9) CONTROL T.2 -neutral-CONTROL T.1	to stop at the corresponding control point of the 9C475 hardware software mechanism during checks in the CONTROL hardware operating mode (19) -
23. Electro-mechanical counter of the operating time of the stabilizer gyromotors (ESV-3):	to take into account the operating time of gyro-stabilizer gyro motors in hours for the period between repairs
24. DIP switch (B11) IMIT. - GENER.	for switching the direction finder test from an internal generator or from an external transponder simulator in the operating mode of the CONTROL equipment (19)
25. Button (B5) START PM	to start the BVK software mechanism in the CONTROL equipment operating mode (19) to disable the automatic
26. Switch (B10) OFF BLOCK. AGC	gain control mode lock (used for checks in the CONTROL mode (19) during checks by the built-in control of equipment 9C475)
27. Plug connector 4-Ш5 under the protective cover	for connecting external control equipment to turn on the
28. Switch (B7) SSP ON.	Direction Finder Tracking System when checking the 9C475 equipment (in CONTROL mode (19)). When you turn on the SSP ON. signal lamp SSP ON is on. (L 12), 9 on the diagram

PUI t SHT V - 9 1

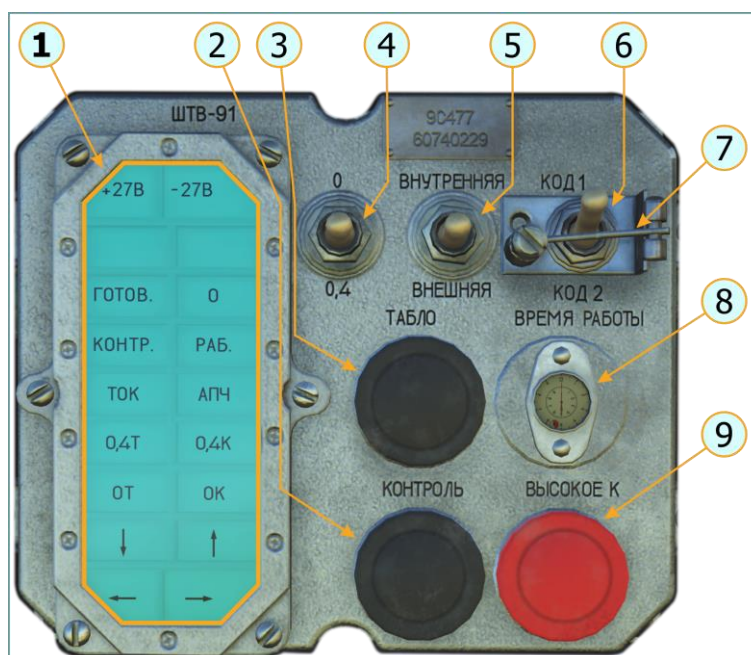


Fig. 4.22. ShTV-91 panel (Test panel of Radioguidance Unit)

1. Block of placards-transparencies:	designed to indicate the current values of the parameters of the command radio link equipment and the position of the 9S812 antenna drive
- 27V	
+ 27V	
READY.	lights up after 3 minutes after turning on the PIT. PN, when the stabilizer gyro motors are spinning
0	display 0 lights up when the aiming line of the PN is aligned with the axis of the antenna mirror
COUNTER. RAB. TOK, AFC, 0.4T, 0.4K, OT, OK	Display board for test and operating modes, display boards with arrows light up when the antenna is in the corresponding extreme positions
down arrow, up arrow, left arrow, right arrow	
2. CONTROL button	to transfer the 9C477 equipment (command radio link) from the "Readiness" mode to the "Control" mode. By pressing the button of the board RAB. goes out, and the board KONTR, lights up
3. SCALE button	to check the serviceability of the lamps of the display unit (1) when you press and hold the DISPLAY button, all the lamps of the display unit will light up (except for the second row, the lamps are not used there), when the button is released, only those that will signal the current mode of the command radio line equipment will remain lit
4. Switch 0.4 - 0	for setting the level of the simulated signal in pitch and heading in the equipment control mode for checking the 9C477 equipment from external or internal control signals in the equipment control mode
5. Switch EXTERNAL INTERNAL	
6. Switch CODE 2 - CODE 1	to set the work code (1 or 2) of the IR receiver on the on-board equipment and at the same time the IR transponder on the UR

7. Code switch position lock flag	to lock the selected value of the hardware code. Toggle the code with switch (5) without unchecking (not used in the game)
8. Electro-mechanical counter of the operating time of the command radio line (ESV-3):	to account for the operating time of the command radio link in hours for the period between repairs,
9. HIGH K button	to transfer the 9S477 equipment to the radiation mode during ground control. When the button is pressed, the displays AFC and TOK light up, as well as OK and OT or 0.4K and 0.4T, depending on the position of the switch 0 - 0.4 in the CONTROL mode (which on ShTV-91).

4.7. Subsystems of weapons and aircraft weapons of destruction (ASP)

4.8. Blocks and devices for receiving, processing and transmitting data necessary for the operation of weapons

For the weapon system to work, it is necessary to receive, process and transmit to consumers (subsystems) data on the angular position of the helicopter, flight altitude, its speed along all three axes, wind speed and direction, angles of attack, slip and other data.

Such devices on board a helicopter include:

communication and distribution device USR-24M;
angle of attack and sliding sensor DUAS-V.

M o c t i o n s t i n o s t i n o s i s a n d d i s t r i b u t i o n o f U S R - 2 4 M

Includes two blocks BSR1-V and BSR2-V and is a device for processing and multiplying signals received from onboard equipment and sensors, which are then used in helicopter weapons systems

D a t a a n d a n g l e o f a t t a c k a n d s l i p s e n s o r I D U A S - V

The DUAS-V angle of attack and slip sensor is used to measure the angles of attack α and slip angles β relative to the longitudinal axis of the helicopter and generate electrical signals in the form of relative resistance (voltage) proportional to these angles.

4.9. Fixed built-in cannon installation

4.9.1 Purpose

The fixed gun mount (NPU) GSh-2-30K (9-A-623K) is designed to engage lightly armored ground and surface targets, manpower, as well as enemy air targets in the front hemisphere of the helicopter when using its maneuverability.

The gun with the "K" index in its name differs from the same one, but without the index, by the increased barrel length (by 900mm), and, as a result, by the increased initial velocity of the projectile - from 870 m / s to 940 m / s. The payment for increasing the energy of the projectile is the increased recoil.

4.9.2. Structure

The fixed gun mount includes:

- double-barreled aircraft cannon 9-A-623K;
- sight ASP-17VP;
- PKI sight;
- cartridge box-carriage;
- supply sleeve;
- pilot's armament control panel (PUVL);
- counter of the remainder of cartridges USB-1-2A;
- left operator panel;
- operator's dashboard;
- photocontrol device SSh-45A-1-100-OS (not implemented in DCS: Mi-24P);

"RS" buttons on the commander's and pilot-operator's relay.

The 9-A-623K cannon is located on the starboard side of the helicopter's bow.

4.9.3. Basic data of the aircraft gun 9-A-623K

- caliber, mm	thirty
- rate of fire, in min,	large
	2000.. ... 2600
	small
	300.. ... 400
- initial velocity of the projectile, m / s	940 + 10 -20
- gun travel in recoil, mm	thirty
- gun travel in rollout, mm	twenty
- gun weight (packed), kg	200
- DC voltage, V	27 ± 10%
- type of cartridge	AO-18
- cartridge weight, kg	0, 832.. 0.836
- cartridge length, mm	269.8. ... 292.8
- weight of one link to cartridges, kg	0.114
- shooting control	electric
- means of ignition of the cartridge	from the electro-ignition cap EKV-ZOM
- ammunition, pcs:	
- in combat version	250
- in the landing or transport	124

The work of the automatic gun is based on the use of the energy of powder gases, which are discharged through special openings of the barrels into the gas cylinders.

When you press the firing button, the electric current through the contactor, bracket and the contact of the shutter enters the electro-capsule sleeve of the cartridge. A shot occurs. Firing stops when the firing circuit is de-energized.

For the pyrorecharging of the gun in the event of a misfire-type delay, a squib (PPL) is used.

contact electric capsule igniter should be let down electric current with a voltage of 27-29V.

The electrical circuit of the NPU provides the ability to:

- switching on the 9-A-623K cannon at high and low rates of operation in short, medium and long bursts and reloading the gun by both the pilot and the operator;
- signaling of the selected type of weapon;
- control of the remainder of the ammunition.

4.9.4. Rate of fire and choice of burst length

Several combinations of the positions of the switches TEMP NPU-30 LESS-MORE and the SEQUENCE NPU having the positions SHORT - MEDIUM - LONG are available for use.



It should be borne in mind that a change in the rate of the arrow also leads to a change in the number of shells in the queue, despite the unchanged position of the switch LEFT LINE, SHORT - MEDIUM - LONG.

The number of shells in the queue and the queue time are presented in Table. 4.2.

Tab. 4.2

Switch positions		The result of a single long press on the PC button
Switch TURN OF NPU SHORT LONG MEDIUM	switch TEMP NPU MORE- LESS	
SHORT	LESS (300 rpm)	when you set the TEMP NPU-30 switch to the LESS position, the NPU QUEUE switch to the SHORT position and press and hold the PC button once until the projectiles stop firing, the gun works at a low rate at flow 2.5 s = 12-13 cn
SHORT	MORE (2600rpm)	when the TEMP NPU-30 switch is set to the MORE position, the NPU QUEUE switch is set to the SHORT position and the PC button is pressed once, the 9-A-623K cannon operates at a high rate in currents 0.25 s = 10..11 shells

MEDIUM	LESS	when the "TEMP NPU-30" switch is set to the "LESS" position, the "NPU QUEUE" switch is set to the "MEDIUM" position and the PC button is pressed once, the gun works for 10s = 50 cn at a slow pace of work
MEDIUM	MORE	when the "TEMP NPU-30" switch is set to the "MORE" position, the "NPU QUEUE" switch is set to the "MEDIUM" position and the PC button is pressed, the gun works at a high rate for 1s = 43 cn
LONG	LESS	when the PC button is pressed, the time relay does not turn on, the 9-A-623K cannon works as long as the PC button is pressed
LONG	MORE	when the PC button is pressed, the time relay does not turn on, the 9-A-623K cannon works as long as the PC button is pressed

The procedure for turning on the weapon system for the use of the NDU is described [here](#).

4.10. Suspended small arms and cannon armament

Dependence of the number of cartridges per press of the RS button on the position of the switches on the control unit:

PUVL biscuit	Switch QUEUE SHORT LONG MEDIUM	Should be
NPU 7.62 SHORT	SHORT	when you set the "LPU QUEUE" switch (2489) to the "SHORT" position and press the "PC" button (2077) once, the 9A-622 products operate for 0.25 s = 20..25 bullets
NPU 7.62 MEDIUM	MEDIUM	when you set the switch "LPU QUEUE" (2489) to the "MEDIUM" position and press the "PC" button (2077) once, the 9-A622 products operate for 0.6 s = 50..60 bullets
NPU 7.62 LONG	LONG	If the switch "LONG QUEUE" (2489) was set to "LONG", i.e. to the neutral position, then when the "PC" button (2077) is pressed due to the open state of the contacts of this switch, both time relays (2370,2371) do not turn on and the 9-A-622 products work as long as the "PC" button is pressed
NPU 12.7 SHORT	SHORT	when you set the "LPU QUEUE" switch (2489) to the "SHORT" position and press the "PC" button (2077) once, the 9A-624 products operate for 0.25 s = 17..21 bullets
NPU 12.7 MEDIUM	MEDIUM	when you set the switch "LPU QUEUE" (2489) to the "MEDIUM" position and press the "PC" button (2077) once, the 9-A624 products operate for 0.6 s = 40..50 bullets
NPU 12.7 LONG	LONG	If the switch "LONG QUEUE" (2489) was set to "LONG", i.e. to the neutral position, then when the "PC" button (2077) is pressed due to the open state of the contacts of this switch, both time relays (2370,2371) do not turn on and the 9-A-624 products work as long as the "PC" button is pressed
NPU 7.62 + 12.7		the operating time is the same, the rate of fire does not change, both products fire
GM-30 soon- page = 470)	SHORT	when you set the "QUEUE LPU" switch (2489) to the "SHORT" position and press the "PC" button once

		(2077) 9-A-800 products operate for 0.25 s = 2 grenades
GM-30	MEDIUM	when you set the switch "LPU QUEUE" (2489) to the "MEDIUM" position and press the "PC" button once (2077) 9-A-800 products operate for 0.6 s = 5 grenades
GM-30	LONG	If the switch "LONG QUEUE" (2489) was set to "LONG", i.e. to the neutral position, then when the "PC" button (2077) is pressed due to the open state of the contacts of this switch, both time relays (2370,2371) do not turn on and the 9-A-800 products work as long as the "PC" button is pressed

4.11. Guided missile weapons

4.12. Unguided missile weapons

Dependence of the number of released NARs per press of the RS button on the position of the switches on the PUVL:

Operation, position switches		The result of a single long press on the PC button
PUVL biscuit	Switch QUEUE SHORT LONG MEDIUM	quantity and sequence
LDC (S-5) SHORT		4 missiles from each UB-32AX24 unit (16 missiles in a salvo: first from the 1st, then - 4, 2, 3 for all variants QUEUE
LDC (S-5) MEDIUM		8 missiles from each UB-32AX24 unit (32 missiles in a salvo)
LDC (S-5) LONG		16 missiles from each UB-32AX24 unit (64 missiles in a salvo)
LDC (S-8) SHORT		2 missiles from each B8V20-A unit (modes of 8 missiles in a salvo)
LDC (S-8) MEDIUM		5 missiles from each B8V20-A unit (modes of 20 missiles in a salvo)
LDC (S-8) LONG		10 missiles from each B8V20-A unit (modes of 40 missiles in a salvo)
LDC (S-13) SHORT		1 missile from each B-13L unit, 2 missiles
LDC (S-13) MEDIUM		from each B-13L unit
LDC (S-13) LONG		5 missiles from each B-13L unit (all)
NRS (24B) SHORT		if 4 S-24B are suspended one by one S-24B: first from APU # 1, the next press - from APU # 4, then from APU # 2 and finally from APU # 3
NRS (24B) MEDIUM		two each: first with APU No. 1, 4, then with APU No. 2, 3 between missiles in a salvo 0.16 sec
NRS (24B) LONG		two each: first with APU No. 1, 4, then with APU No. 2, 3 between missiles in a salvo 0.16 sec

4.13. Bomber weapons

The electrical circuit of the bomber armament provides:

the possibility of using bombs with both mechanical and electrical pyrotechnic fuse cocking devices;

opportunity combined pendants bombs and blocks
unguided rockets (bombs on blocks beam holders no. 1, 4 and
on holders No. 2, 3);

the possibility of combat and emergency dropping of bombs by both the operator and
the pilot;

the possibility of combat dropping of bombs in short, medium and long
bursts (respectively: one, two bombs and four bombs at once);

combat dropping of bombs in a certain sequence (when dropping bombs
one by one, first the bombs are dropped from the beam holder No. 1,
then from the beam holder No. 4, then from the holder No. 2, and then
from the holder No. 3; when dropping bombs, two at a time, bombs are
first dropped from beam holders No. 1, 4, and then from holders No. 2,
3; when dropped, four bombs are simultaneously dropped from all beam
holders);

impossibility of combat dropping of bombs ("to explode") from beam
holders No. 2, 3 when the landing gear is in the extended position in order
to prevent bombs from colliding with the chassis structure elements;

the possibility of emergency dropping of bombs from beam holders No. 2, 3 by the
pilot regardless of the position of the chassis;

impossibility of emergency dropping of bombs from beam holders No. 2, 3 by the
operator when the chassis is in the extended position;

the impossibility of dropping unguided missile blocks by the operator with
their combined suspension with bombs;

the possibility of emergency dropping of unguided missile blocks by the
pilot;

signaling to the pilot and the operator about the suspension of special cargo or
bombs on the locks of the beam holders, the selected type of weapon, the
release of bombs "to explode", as well as signaling to the operator that the
disabled state of arms chains;

the ability to drop bombs operator at corners
aiming more than 35 ° when the target is "closed" by the fuselage
helicopter.

Dependence of the number of bombs dropped per press of the RS button on the
position of the switches on the PWL and on the left panel of the PDLO armament:

Operation, switch position			The result of a single long press on PC button
PUVL biscuit	Arrival board operator, LevPnlVoor, switch BOMB BLOCKS CHECK- Bombs	Switch QUEUE SHORT LONG MEDIUM	Should be (quantity and sequence)

AB	Bombs	SHORT	<p>one by one AB: first press - from BD-1, second - BD-4, third - BD-2, fourth - BD-3</p> <p>* when the chassis is extended, reset from DB 2 and 3 - BLOCKED!</p> <p>If UB-32A is hanging instead of a bomb, it will go off like bombs.</p> <p>if B8V20, or B13L1, or GUV, or S-24B, or KMGU, or RP-2-149 are hanging - NO EXPOSURE (the sign (conditional) is transmitted to the SUV - "do not reset")</p>
AB	Bombs	MEDIUM	<p>by two AB: first pressing - from BD-1 and BD-4 simultaneously, second - BD-2 and BD-3 at the same time</p> <p>* when the landing gear is extended, the drop from points 2 and 3 is BLOCKED!</p> <p>If UB-32A is hanging instead of a bomb, it will go off like bombs.</p> <p>if B8V20, or B13L1, or GUV, or S-24B, or KMGU, or RP-2-149 are hanging - NO EXPOSURE (the sign (conditional) is transmitted to the SUV - "do not reset")</p>
AB	Bombs	LONG	<p>by 4 - from all at the same time</p> <p>* when the landing gear is extended, the drop from points 2 and 3 is BLOCKED!</p> <p>If UB-32A is hanging instead of a bomb, it will go off like bombs.</p> <p>if B8V20, or B13L1, or GUV, or S-24B, or KMGU, or RP-2-149 are hanging - NO EXPOSURE (the sign (conditional) is transmitted to the SUV - "do not reset")</p>
AB	CHECK	SHORT	<p>one by one AB: first press - from BD-1, second - BD-4, third - BD-2, fourth - BD-3</p> <p>* reset occurs REGARDLESS of the released chassis</p> <p>* * If UB-32A is hanging instead of a bomb, it will be go off like bombs.</p> <p>if B8V20, or B13L1, or GUV, or S-24B, or KMGU, or RP-2-149 are hanging - NO EXPOSURE (the sign (conditional) is transmitted to the SUV - "do not reset")</p>
AB	CHECK	MEDIUM	<p>by two AB: first pressing - from BD-1 and BD-4 simultaneously, second - BD-2 and BD-3 at the same time</p> <p>* reset occurs REGARDLESS of the released chassis</p> <p>* * If UB-32A is hanging instead of a bomb, it will be go off like bombs.</p> <p>if B8V20, or B13L1, or GUV, or S-24B, or KMGU, or RP-2-149 are hanging - NO EXPOSURE (the sign (conditional) is transmitted to the SUV - "do not reset")</p>
AB	CHECK	LONG	<p>by 4 - from all at the same time</p> <p>* reset occurs REGARDLESS of the released chassis</p> <p>* * If UB-32A is hanging instead of a bomb, it will be go off like bombs.</p> <p>if B8V20, or B13L1, or GUV, or S-24B, or KMGU, or RP-2-149 are hanging - NO EXPOSURE (the sign (conditional) is transmitted to the SUV - "do not reset")</p>
AB	BOMB BLOCKS	SHORT	<p>one by one AB: first press - from BD-1, second - BD-4, third (any) - NOTHING</p> <p>If UB-32A is hanging instead of a bomb, it will go</p>

			like bombs. if B8V20, or B13L1, or GUV, or S-24B, or KMGU, or RP-2-149 are hanging - NO EXPOSURE (the sign (conditional) is transmitted to the SUV - "do not reset")
AB	BOMB BLOCKS	MEDIUM	two AB simultaneously (on the first press) - with BD-1 and BD-4, the second (and any subsequent) - NOTHING * when the landing gear is extended, the drop from points 2 and 3 is BLOCKED! If UB-32A is hanging instead of a bomb, it will go off like bombs. if B8V20, or B13L1, or GUV, or S-24B, or KMGU, or RP-2-149 are hanging - NO EXPOSURE (the sign (conditional) is transmitted to the SUV - "do not reset")
AB	BOMB BLOCKS	LONG	two AB simultaneously (on the first press) - with BD-1 and BD-4, the second (and any subsequent) - NOTHING * when the landing gear is extended, the drop from points 2 and 3 is BLOCKED! If UB-32A is hanging instead of a bomb, it will go off like bombs. if B8V20, or B13L1, or GUV, or S-24B, or KMGU, or RP-2-149 are hanging - NO EXPOSURE (the sign (conditional) is transmitted to the SUV - "do not reset")

4.14. Small cargo discharge system KMGU-2

(WIP)

4.15. Emergency release system

An emergency discharge can be carried out both from the commander and from the pilot-operator.

Can be performed on EXPLOSION and NON-EXPLOSION. Can be performed either from the operator or from the commander. The position of the EXPLOSION-NON-EXPLOSION switch at the commander does not affect the result of the emergency reset from the operator and vice versa. The emergency reset is not related to the position of the weapon select switches.

An emergency reset from the operator takes into account the position of the switch BOMBS / BLOCKS - CHECK - BOMBS (on the left panel of the operator's pilot's dashboard), the sign "this cargo is not a bomb", which is transmitted to the SUV from B8V20A, B-13L1, KMGU, S-24B (with APU-68UM3), RP2-149TK, as well as the position of the chassis (released or not). Thus, only bombs or UB-32A units can be dropped from the operator.

The emergency reset from the commander DOES NOT take into account the position of the switch BOMBS / BLOCKS - CHECK - BOMBS and the sign "this load is not a bomb", as well as the position of the chassis.

In addition, during an emergency reset from the operator, the state of the chassis is taken into account: released or not.

An emergency reset from the operator when the chassis is RELEASED will also reset only points 1 and 4 (even in the "bomb" position). An emergency reset from the commander resets all points without looking at the extended landing gear.

There is also a feature with "explosion-not explosion". Unlike the Mi-8MT, the commander and the operator independently choose the option of releasing the bombs. Those. if the operator chose an "explosion" in himself and pressed an emergency release in himself, the bombs will go to the explosion, even if the commander had "no explosion". Those. there are 2 completely separate emergency discharge control loops. Whoever folds is the same dad.

For emergency discharge of special cargo or bombs "for no explosion", it is necessary to set the "EMERGENCY DISCHARGE OF SPECIAL CARGO" switch (2027) to the on position on the pilot's armament control panel. , in connection with which the bombs are dropped "for no explosion", and contacts 1-2 7-3 of this switch turn on the emergency windings of the electromagnets of the lock trigger mechanisms.
battery bus 1, circuit breaker "ARMS EMERGENCY RESET" (2022), safety switch (2023), contacts 1-2 or 7-8 of the specified switch

(2027), " contact 7 SHR of each lock BDZ-55TN, contacts 1-2 of the microswitch D701 of its follower mechanism, the indicated winding of the lock electromagnet, contact 5 of its SHR and the helicopter body. The electromagnet triggers the trigger, opens the lock and drops the bomb "without exploding", and in case of a combined suspension of bombs and blocks, emergency dropping of blocks of unguided rockets and bombs.

For emergency dropping of bombs "to explode", set the "EXPLOSION-NON-EXPLOSION" switch (2028) to the "EXPLOSION" position on the pilot's weapon control panel and the "EXPLOSION" switch (2027) to the "ON" position. In this case, the power supply from the battery bus I through the "BOMBOVOE ARMS" circuit breaker (2021), the safety switch (2023), the specified switch (2028) and pin 6 of the SHR of each lock goes to the electromagnet of its MVN-56N mechanism, as well as to a red light "EXPLOSION" (2029) on the pilot's armament control panel. When the electromagnet of the MVN-56N mechanism is triggered

the bomb is dropped "on explosion". In this case, through its contacts 4,5, the voltage is supplied to the mechanism for supplying a current pulse of the MPI.

Unlike the pilot, the operator **can not** to carry out emergency dropping of unguided rockets blocks when combined with their suspension with bombs.

With the combined suspension of bombs on beam holders No. 1, 4 and blocks on holders No. 2, 3 in the process of preparing the circuit for action, switch "BOMBS-BLOCKS-CHECK-BOMBS" (2043) on the operator board is set to the "BOMB-BLOCKS" position. As a result, the relay (2033) is triggered, the negative winding circuit of which is closed by contacts 1-2 of the specified switch (2043). This relay picks up and opens the relay enable circuit (2031), and therefore when the operator sets the EMERGENCY RESET switch (2026) to the ON position, the relay (2031) does not operate and power is supplied through its contacts 2-3 on the windings of the emergency release electromagnets located in the 6DZ-55M locks of the beam holders No. 2.3.

Thus, with a combined suspension of bombs with unguided missile blocks, the operator, unlike the pilot, can only drop bombs in an emergency.

CHECK = BOMBS, but does not include landing gear.

4.16. The peculiarity of the operation of the weapon system when switching the weapon control between the cockpits of the pilot and the operator

1. After selecting WEAPON CONTROL from the operator, the following are disconnected from the weapon system circuits:

- indication VG-17;
- PUVL;
- commander's PC button.

those. on the VG-17, all indication that was when working with the commander's weapon goes out, and the operator's choice of weapon does not connect to the VG-17.

2. Feature of the KMGU application

the inclusion of the possibility to apply KMGU can only be done by the commander.

For what:

- on PUVL set KMG + FIRE CONTROL set to ON.
- at the same time, the operator (simultaneously with the commander!) has the opportunity to control the KMGU, but on condition that the operator also chooses KMG;
- if the operator after all this sets the WEAPON CONTROL ON HIMSELF in ON - then the PUVL is completely disabled, and the KMGU cannot be used from anyone.



five

COMBAT APPLICATION
MI - 24P



5. COMBAT APPLICATION of the Mi-24P

5.1 Preparation for combat use of the module

5.1.1. Equipping the helicopter with weapons from the mission editor

In the case of an independent creation of a mission with combat use, it is necessary, after installing the helicopter on the map in the mission editor, to equip it with weapons. To equip a helicopter in a mission with the necessary weapons, use the PAYLOAD tab in the mission editor



... Suspension capability of various weapons on beam holders 1–4 and guided missiles of the 9M114 and 9M120 (WIP) families on the launching frames of the wing pylons are schematically shown in Fig. 5.1.

All versions provide for equipping a stationary cannon installation (NPU) in the amount of 250 shells.



Fig. 5.1. Equipping the Mi-24P module with weapons from the mission editor

1. Numbering of suspension points in the edit missions

2. Recommended options for helicopter equipment (for bombs and RBKs, symmetrical interchanges are possible within the calibers indicated on the diagram)

The diagram shows the following pendants ([Tab. 5.1](#)):

Tab. 5.1

No. nn	Icon in Editor missions	Description
one		Launch frame with two ATGM 9M114 or 9M120
2		Block NAR UB-32 (S-5 missiles)
3		block NAR B8V20 (S-8 missiles)
four		Block NAR B-13L (missiles S-13)
five		Rocket S-24B (for APU-68UMZ)
6		universal helicopter gondola GUV-1 with one 12.7 machine gun and two 7.62 machine guns
7		universal helicopter gondola GUV-1 with one 30-mm grenade launcher
eight		bomb caliber 500kg
nine		bomb caliber 250kg
10		bomb caliber 100kg
eleven		container KMGU
12		hanging tank PTB-450 for 500 l

For more details on mission development, see DCSW \ Doc \ **DCS User Manual EN (RU) .pdf**

5.1.2. Setting up "quick views" for ergonomic actions with the cockpit equipment during the mission

Described in section

5.2. The peculiarity of piloting with suspended weapons

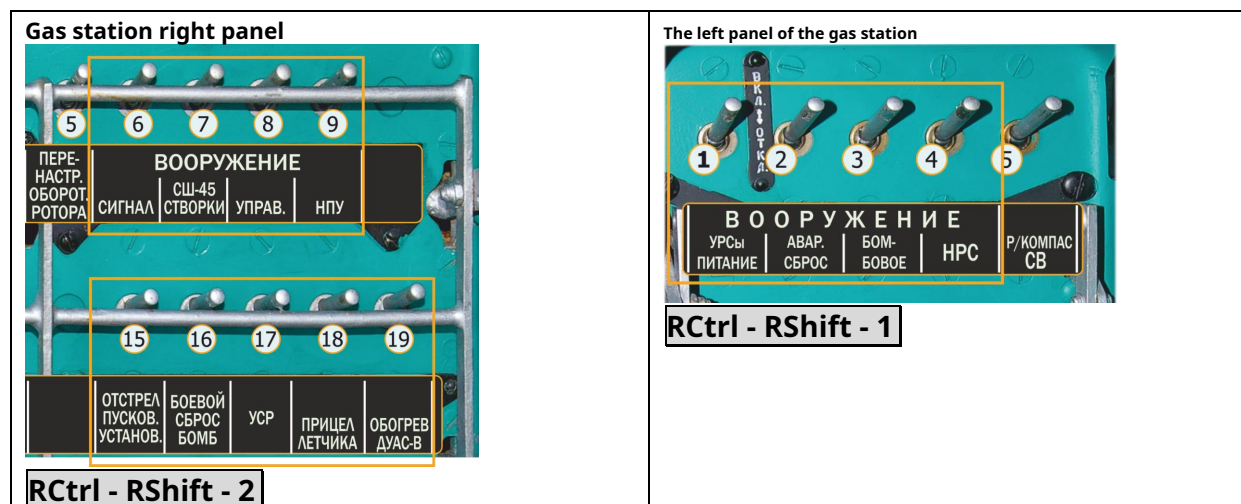
After the suspension of weapons (for example, 2 blocks B8V20), the centering of the helicopter is shifted slightly backward (approximately 40mm). This leads to a slight change in the flow rate of the missile launcher (on the joystick in the region of 1 cm) and the pitch angle in the main flight modes, in comparison with a helicopter, in which only the NPU is loaded (250 shells). In this case, in horizontal flight, the forward balancing position of the RPA is 1 / 5..1 / 6 of a stroke more than when flying without blocks. "Unloading" blocks (dropping bombs, shooting heavy NAR S-24B) leads to a shift (return) of the centering slightly forward, which reduces the required forward flow rate of the RPPU. However, shooting a 1/2 BK gun shifts the centering back, by about the same as shooting two NAR C-8 blocks shifts it forward. In addition, the shot of long bursts from the NPU-30 at a high rate creates a tangible dive moment,

5.3. The order of inclusion of subsystems of weapons

In clause 5.3, the procedure for working with equipment for the use of each type of weapon is considered, from turning on the gas station to pressing the firing / start / reset button. The inclusion of equipment by stages of a combat flight is considered in cl.0...

5.3.1. Turning on the gas station of the weapon system

The gas stations of weapons systems are switched on on the left and on the right panels of the gas station. Turning on all of the following gas stations ensures the use of all sights, subsystems and all suspended weapons.



5.3.2. Switching on the ASP-17 sight and setting the aiming angle (for all types of weapons)

For the ASP-17 sight to work, you must:

1. Switch on the SIGHT on the PWL:



on VG-17 should
will be displayed
fixed mesh (NS)
and the movable mark (PM) of
the sight in the glass
reflector

* The type and position of the PM may differ
from that shown in the diagram



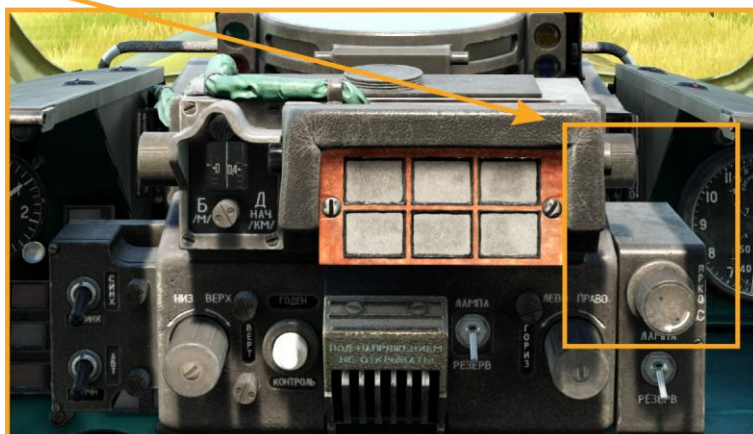
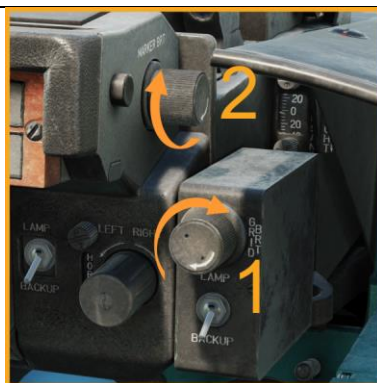
2. Further on VG-17:

2.1. Adjust the position of the reflector
as convenient: LMB on the lower
adjustment knob (1), then, by rotating
the mouse wheel, set the desired
position (2), fix the position of the LMB
(3)



2.2. Adjust the brightness of the reticle and scope mark by rotating the knobs:

- (1) - for NS,
- (2) - for PM



2.3. Select the scope operation mode:

switch AVT. -

MANUAL (2):

AVT - aiming angle is entered automatically from ATsVU (for a limited list of weapons);

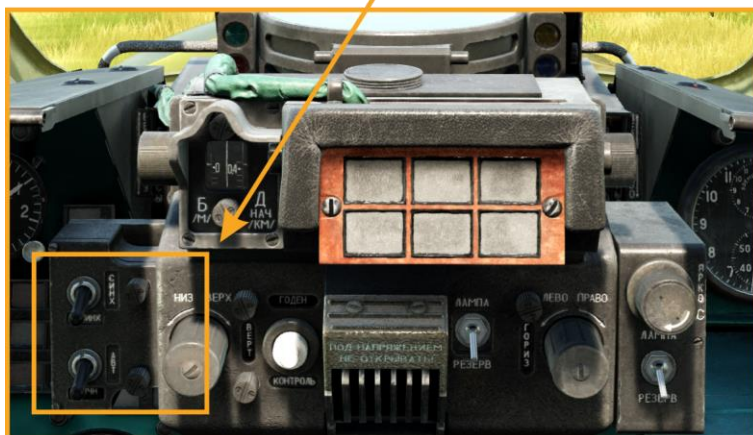
RUCHN - corrections are entered by handles according to tabular data;

switch SYNC -

NESINKH (2):

SYNCH - for firing at moving targets in AVT mode; NESINKH - for shooting at stationary targets in AVT mode

* SYNCH-NESYNCH - works only in the mode of the lower switch AUT

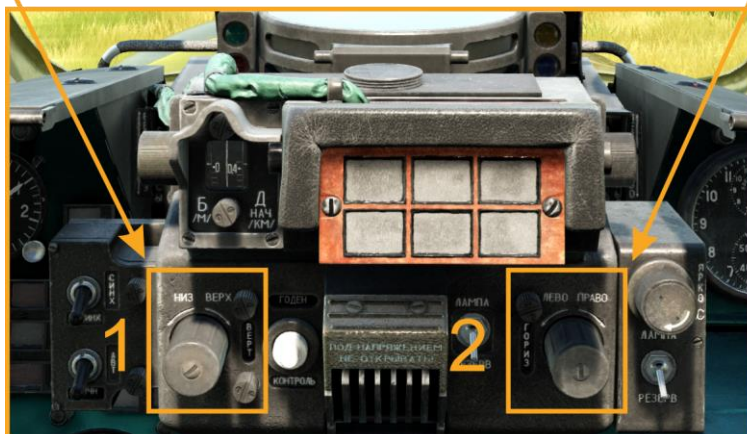


3. If the AVT mode is selected on the VG-17, then the preparation of the sight is completed

4. If the MANUAL mode is selected, then it is necessary to manually set the aiming angle and the correction to wind:

- vertically by handle
BOTTOM-UP (1);
- horizontally - with the LEFT-
RIGHT handle (2)

Note. In the MANUAL mode, it is possible to use weapons without using the PM, in this case the aiming angles are measured by the pilot on the NS scales




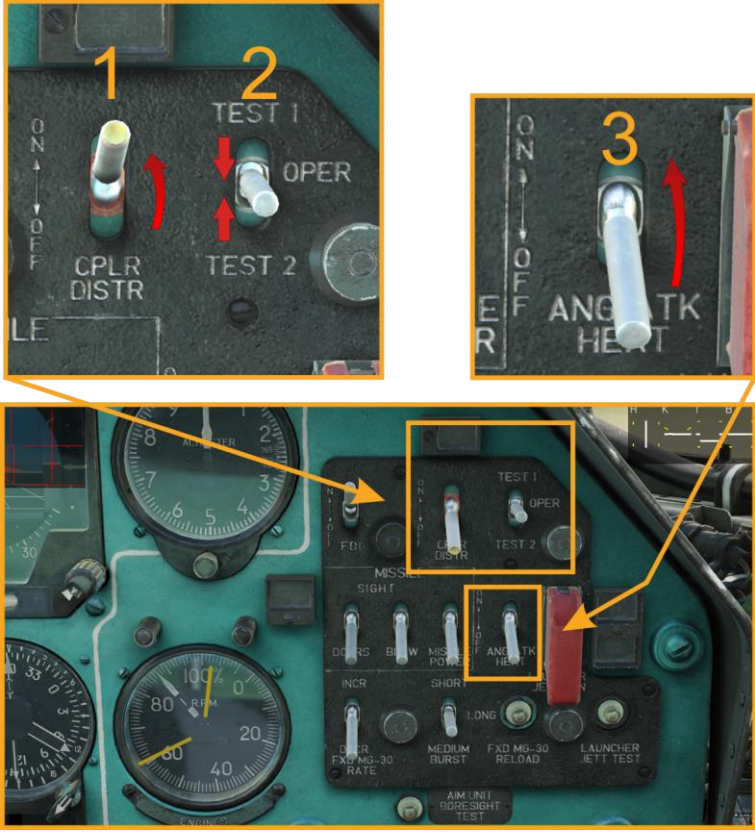
5. The sight is ready for use.

5.3.3 For the use of 30mm stationary cannon installation (NPU)

When the helicopter is running, there is voltage on the VU tires and the petrol stations are switched on, it is necessary:

[turn on the sight as described above;](#)

[Aiming Angle Chart](#) [for NPU](#)

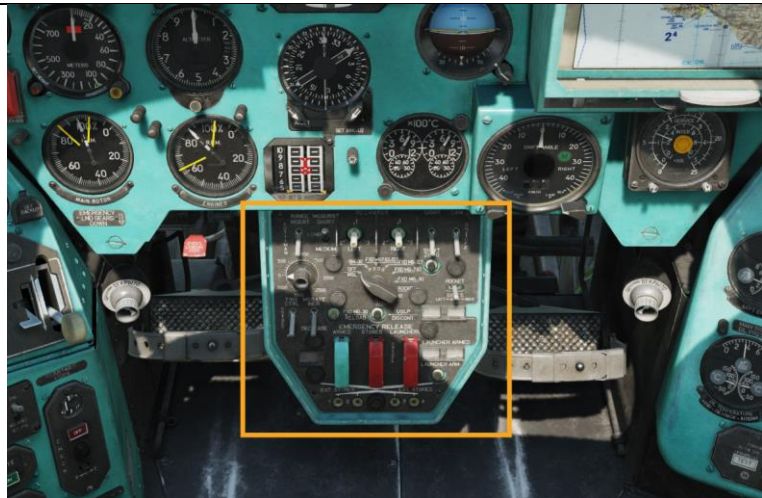
<p>in the cockpit operator:</p> <p>1. On the left operator panel, turn on "SAFETY CIRCUIT SWITCHES ARMS "; connected by a common bar, in the ON position.</p> <p>Green board "WEAPON CHAINS DISCONNECTED" - will go out (when the switch is in the lower position, this board is lit both when the chassis is released and when the chassis is retracted); the red display "CAUTION! CIRCUIT WEAPONS UNDER ELECTRIC! " (lights up only when the landing gear is extended)</p>	
<p>2. On the right panel of the operator's dashboard:</p> <p>turn on USR-24 (1), check position switch CONTROL1- OPERATION- CONTROL2 (2) in WORK position;</p> <p>*USR-24M converts signals from DUAS, air (indicated) speed sensor and MG-1. Without it, ACVU works incorrect for automatic sighting mode. For the AVT sight mode and the MANUAL range input (on the PUVL), it is not necessary to include</p> <p>at a temperature of + 5 ° C and below, turn on the HEATING DUAS</p> <p>* when the DUAS sensors freeze, the ADSVU will no longer receive actual data on the angles of attack and slip</p>	

in the cockpit:

3. On the right front panel turn on "BACKLIGHT OF SPECIAL EQUIPMENT PANEL ON - OFF" In the ON position (signalization of the presence of pendants and a red illumination of the PUVL is provided)




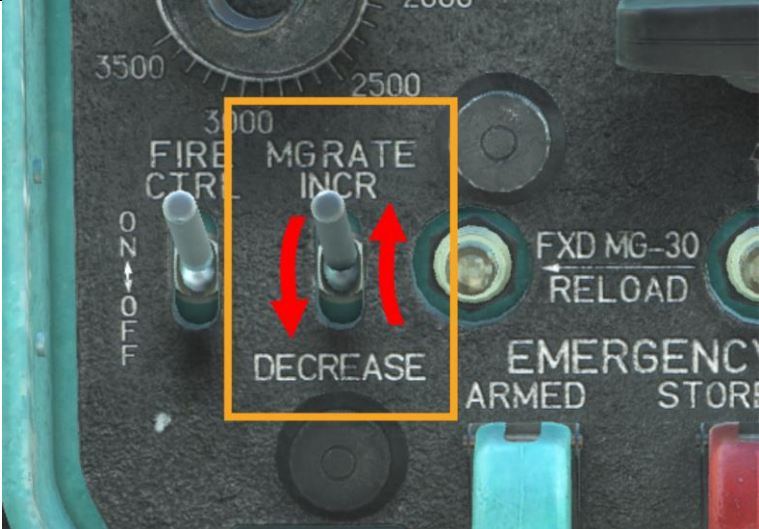
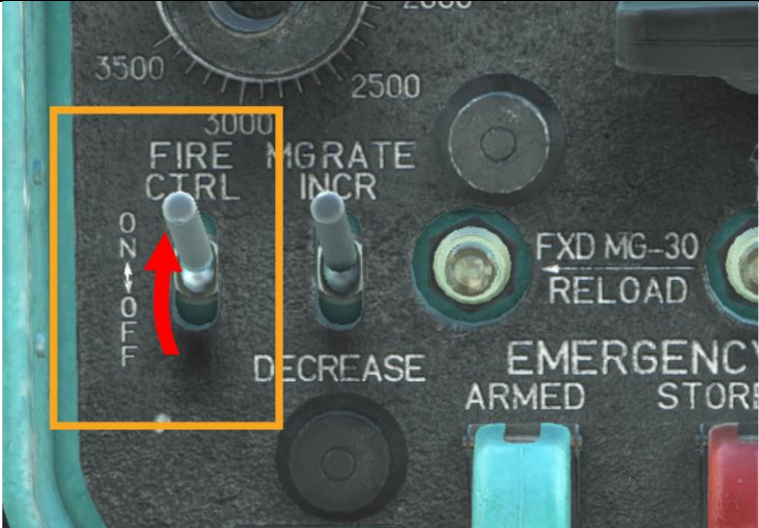

4. At the UWL:



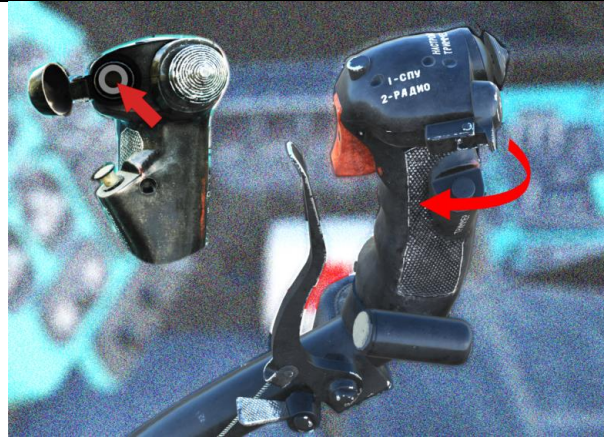
4.1.

install biscuit select switch type of weapons in position "NPU-30";



<p>4.2.</p> <p>to install switch "QUEUE NPU "having provisions "SHORT, MEDIUM, LONG "in required position</p>	
<p>4.3.</p> <p>to install TEMP switch NPU-30, which has LESS provisions - MORE as required position</p>	
<p>4.4.</p> <p>turn on the switch CONTROL FIRE</p>	
<p>4.5.</p> <p>on VG-17 the board "30" will light up</p>	

5. On RPPU open the safety cap and press the PC (fire) button (pressing the button with the mouse is not simulated) - the built-in cannon will fire



5.3.4. For the use of NAR S-5, S-8, S-13, S-24

When the helicopter is running, there is voltage on the VU tires and the petrol stations are switched on, it is necessary:

[turn on the sight as described above;](#)

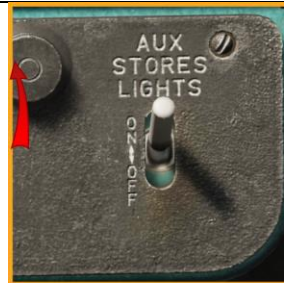
[NAR aiming angles table](#)

in the cockpit operator:
1-2

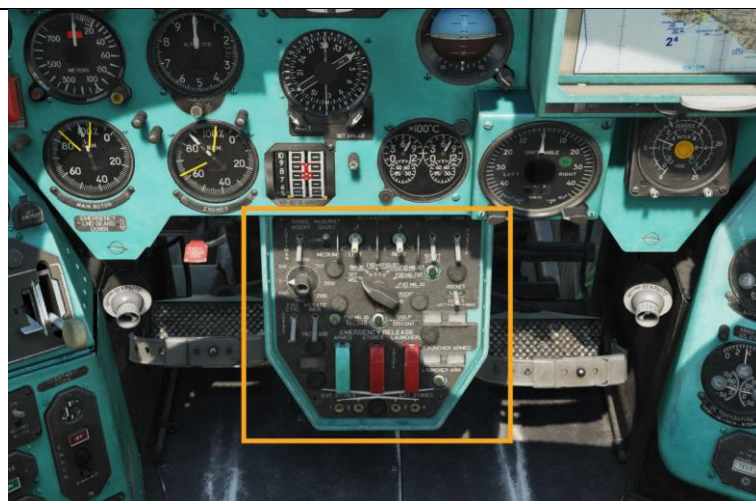
Procedure in the operator's cab (clauses 1-2, [5.3.3](#)) does not change

in the cockpit:

3. On the right front panel turn on "BACKLIGHT OF SPECIAL EQUIPMENT PANEL ON - OFF" In the ON position (signalization of the presence of pendants and a red illumination of the PUVL is provided)



4. At the UWL:



4.1.

install biscuit
select switch
type of weapons in
LDC position;



4.2.

cock the PUS, if the
signaling board is
cocking does not light, for
which:
to install
LDC switch
BOARD LION-OBA-RIGHT in
position BOTH (1)
push the button
PUSH INTRODUCTION for 2-3
sec (2)

* PUS can not be cocked, but in this
case firing may not start from barrel
1, and the number of NAR in
salvoes may be different



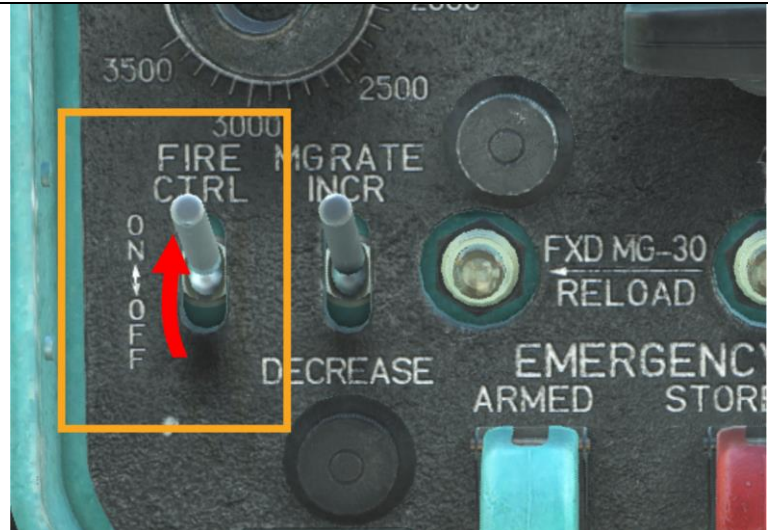
4.3.

to install
switch "QUEUE
NPU "having
provisions "SHORT,
MEDIUM, LONG "in
required position



4.4.

turn on the switch
CONTROL FIRE



4.5.

on VG-17 the "NRS" board will
light up




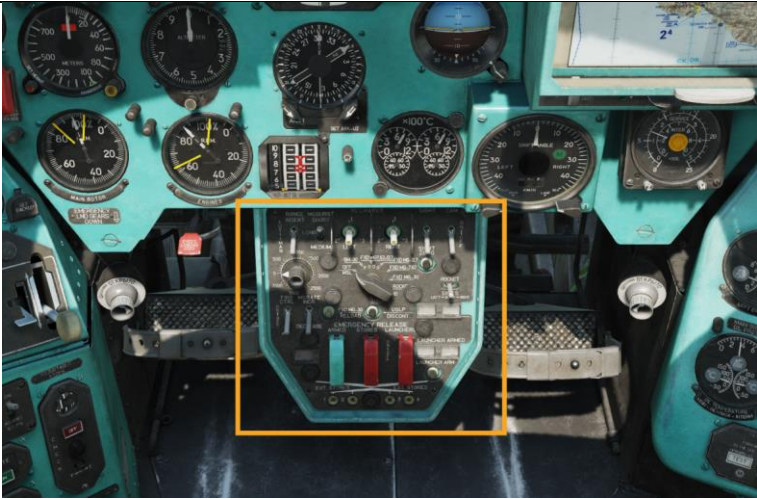

5. On RPPU open the protective
cap and press the PC (fire) button
(pressing the button with the
mouse is not simulated) - the NAR
will fire (descend)



5.3.5. To use the GUV-1 handgun (12.7 mm (7.62 mm) machine guns and 30 mm grenade launchers)

When the helicopter is running, there is voltage on the VU tires and the petrol stations are switched on, it is necessary:

[turn on the sight as described above:](#)

<p>in the cockpit operator: 1-2</p>	<p>Procedure in the operator's cab (clauses 1-2, 5.3.3) does not change</p>
<p>in the cockpit: 3. On the right front panel turn on "BACKLIGHT OF SPECIAL EQUIPMENT PANEL ON - OFF" In the ON position (signalization of the presence of pendants and a red illumination of the PUVL is provided)</p>	
<p>4. At the UWL:</p>	
<p>4.1. install biscuit select switch type of weapon in one of four positions for the GUV: "GM-30 - NPU 7.62 + 12.7 - NPU 12.7 - NPU 7.62";</p>	

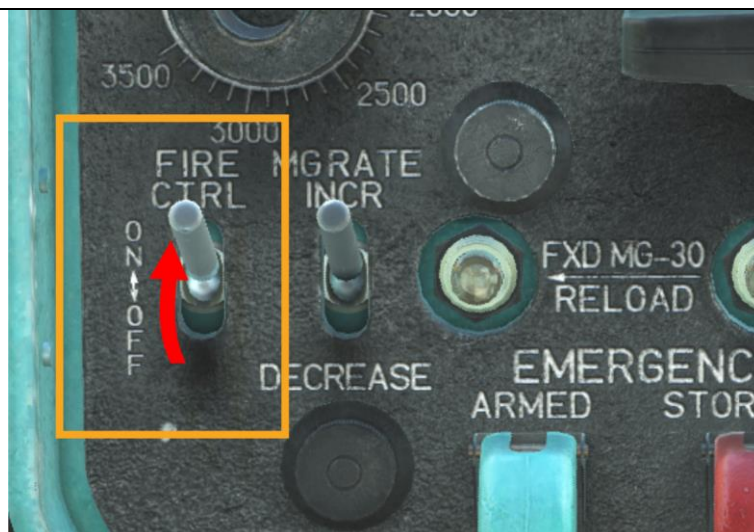
4.2.

to install
switch "QUEUE
NPU "having
provisions "SHORT,
MEDIUM, LONG "in
required position



4.3.

turn on the switch
CONTROL FIRE



4.4.

on VG-17 the "GUV" board will
light up



5. On RPPU open the protective
cap and press the PC (fire) button
(pressing the button with the
mouse is not simulated) - the
GUV-1 will be fired




5.3.6. For the use of small arms from the cargo compartment

You don't need to include anything. WIP[here](#)

5.3.7. For the use of bomber weapons

When the helicopter is running, there is voltage on the VU tires and the petrol stations are switched on, it is necessary:

[turn on the sight as described above;](#)

in the cockpit operator:	
<p>1. On the left operator panel, turn on "SAFETY CIRCUIT SWITCHES ARMS"; connected by a common bar, in the ON position.</p> <p>Green board "WEAPON CHAINS DISCONNECTED" - will go out (when the switch is in the lower position, this board is lit both when the chassis is released and when the chassis is retracted);</p> <p>the red display "CAUTION! CIRCUIT WEAPONS UNDER ELECTRIC! " (lights up only when the landing gear is extended)</p>	

2. On the left panel of the operator's dashboard:

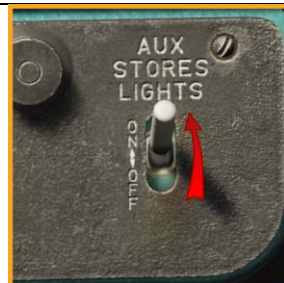
switch
BOMBS / BLOCKS -
CHECK - BOMBS
set to required
position

* BOMBS - must be selected when hanging on bombs on each of the 1-4 databases. When the landing gear is released, bombs from DB 2 and 3 will not be dropped;
CHECK - the same as BOMBS, but does not take into account the position of the chassis (used for checks on the ground);
BOMBS - BLOCKS - needed choose with mixed suspension: on DB 1-4 bombs, on DB 2 and 3 - "not bombs" (excludes the reset of "non-bomb" suspensions when accidentally pressing the reset button)

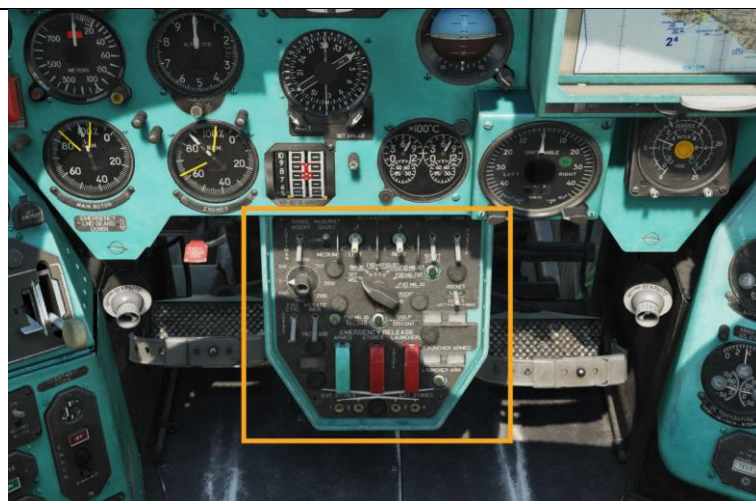


in the cockpit:

3. On the right front panel turn on "BACKLIGHT OF SPECIAL EQUIPMENT PANEL ON - OFF" In the ON position (signalization of the presence of pendants and a red illumination of the PUVL is provided)



4. At the UWL:



4.1.

install biscuit
select switch
type of weapon
position "AB";



4.2.

to install
switch "QUEUE
NPU "having
provisions "SHORT,
MEDIUM, LONG "in
required position
(to set the number of bombs
per click) ^^

SHORT - one bomb descends per
press, sequence - 1-4-2-3;

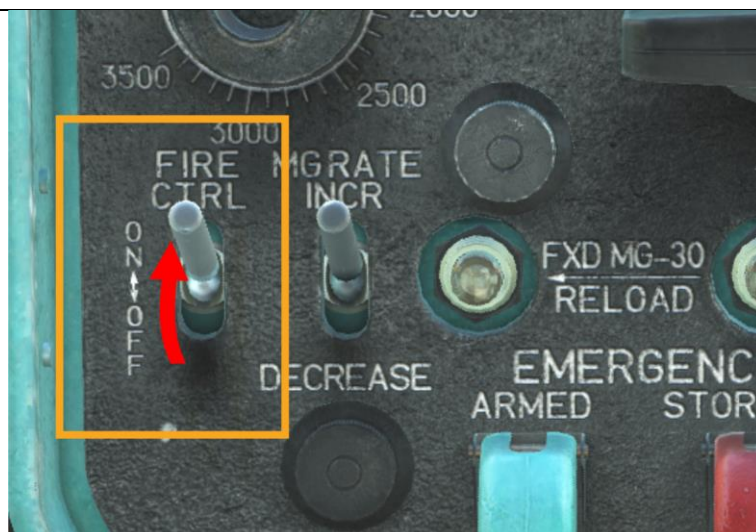
MEDIUM - 2 bombs per click,
sequence - 1 + 4, 2 + 3;



LONG - all bombs go off at the
same time



4.3.



turn on the switch
CONTROL FIRE



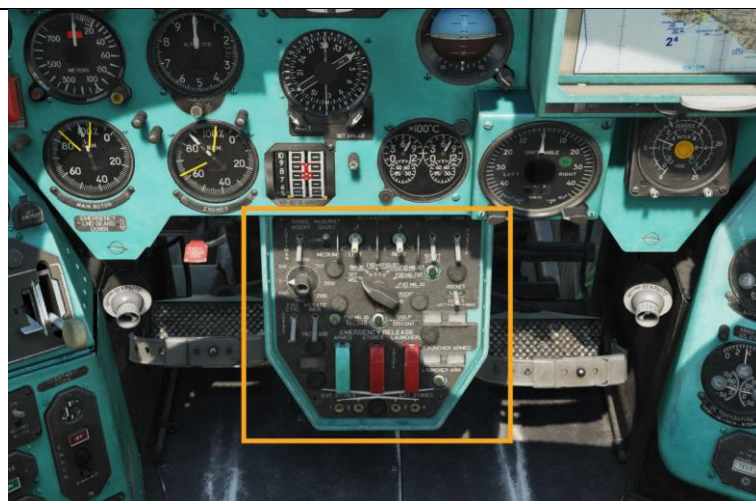
<p>4.4.</p> <p>on VG-17 the "BOMBS" display will light up</p>	
<p>5. On RPPU open the safety cap and press the PC (reset) button (pressing the button with the mouse is not simulated) - the bombs will be dropped</p>	

5.3.8. For the use of anti-tank guided missiles (ATGM)

When the helicopter is running, there is voltage on the VU tires and the petrol stations are on it is necessary:

<p>in the cockpit:</p> <p>1. On the right front panel turn on "BACKLIGHT OF SPECIAL EQUIPMENT PANEL ON - OFF" In the ON position (signalization of the presence of pendants and a red illumination of the PUVL is provided)</p>	 
--	--

2. At the UWL:



2.1. Turn on the SIGHT:

* for ATGM descent it is not "electrically" necessary

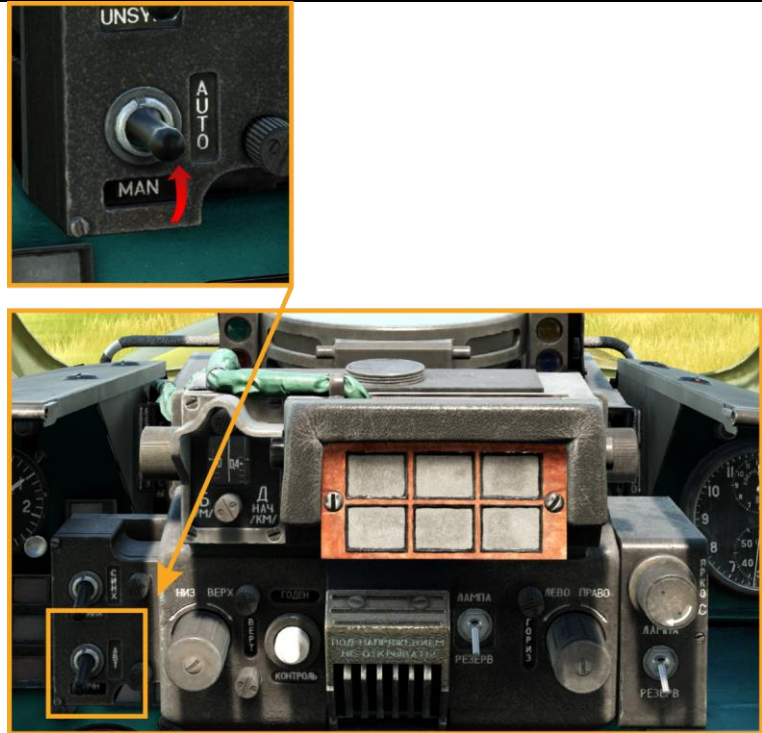


2.2. Set the rocker switch for selecting the type of weapon in the "OFF (URS)" position

* this is necessary for communication and display of the position of the operator's LP



3. On VG-17 of the ASP-17 sight, set the AVT. – MANUAL sight mode switch to AVT
 * this will provide control of the PM of the ASP-17 sight according to signals from the 9K476 ballistic computer, i.e. the pilot will see the position of the operator's line of sight



in the cockpit operator:

4. On the left operator panel, turn on "SAFETY CIRCUIT SWITCHES ARMS "; connected by a common bar, in the ON position.

Green board "WEAPON CHAINS DISCONNECTED" - will go out (when the switch is in the lower position, this board is lit both when the chassis is released and when the chassis is retracted);
 the red display "CAUTION! CIRCUIT

WEAPONS UNDER ELECTRIC! "
 (lights up only when the landing gear is extended)



5. On the Control Panel (PC) - make sure that the OPERATION - CONTROL switch is set to the OPERATION position



6. On the right panel of the operator's dashboard: turn on the switch URS POWER SUPPLY URS



7. On the Operator's Panel (SCHO) turn on the PIT (1).

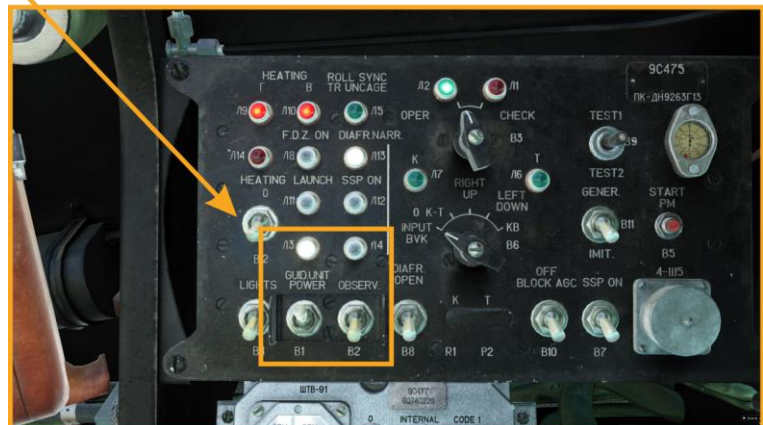
When you turn on the switch (B1) PIT. signal lamps (L4) light up on the SCHO

ON COMP., PU OFF (2), the software mechanism starts (it counts down 210 seconds, to warm up the equipment

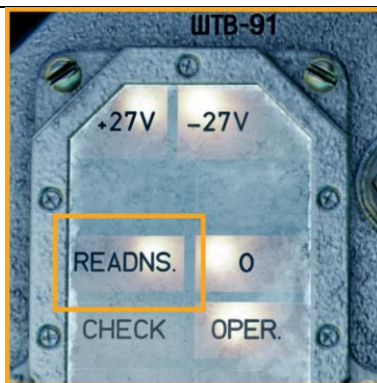
command radio link)



8. On the PC, turn on the PIT PN (1); lamp L3 (2) PIT will light up. PN (in full heat); the lamps also light up the lamps HEATING G and V light up (on this PC above)



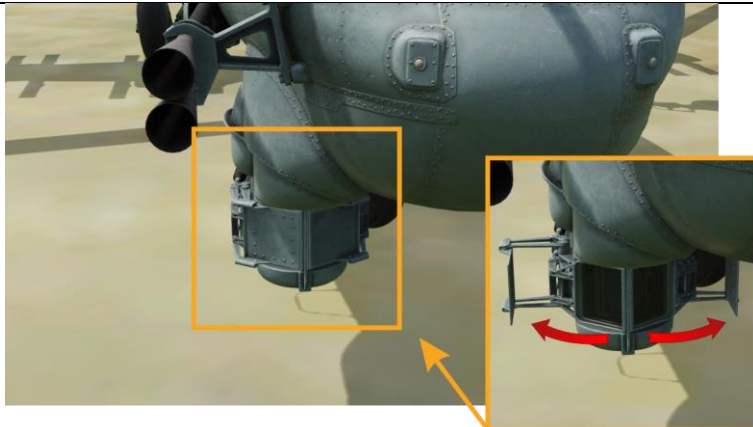
9. After 3-4 minutes:
9.1.
on SHTV-91 lights up
placard-banner
READINESS;



9.2.
green lamp lights up on the
SCHO. READY

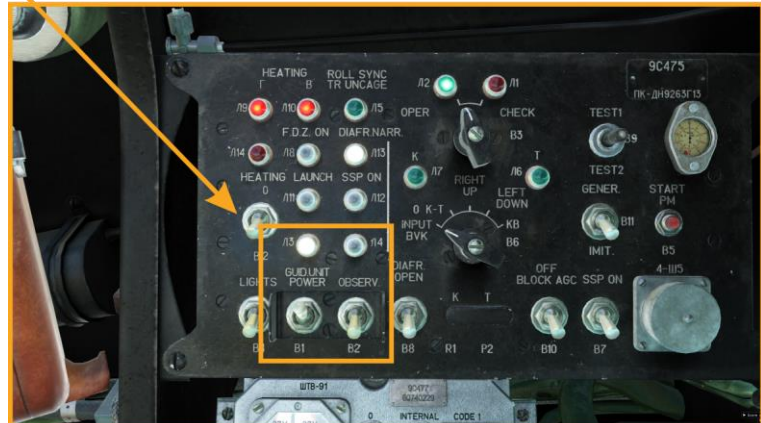


10. On the PC, turn on
the NABL switch.
Wherein:
10.1.
will open OUTDOOR
sash PN;



10.2.

signal lamp PIT.
MON (above power off)
should switch and
burn "half-burnt" (1) (in the
DCS implementation
flickers a little);
after that, after 10-15 seconds on
the PC, they light up
signal lamps NABL.
(2) and D. KR. DISTANCE
(roll sensor
unstoppable);



10.3.

* if necessary, you can (but not
necessarily):
open internal
sash: URS-SIGHT-
LEAVES - switch on (1), the
panel LEAVES OPEN (2) will
light up;
turn on glass blowing
MON:
URS-SIGHT-BLOWER (3)
turn on heating
eyepiece PN (on a PC, not
simulated)



11. Select the launcher (PU), for which on the SCHO with the biscuit switch, set the desired position (from 1 to 8, where there is a TPK with an ATGM, for example -1

(one);

the green signal light BALANCE (2) will light up



12. Snuggle up to the eyepiece PN (nestle close to)

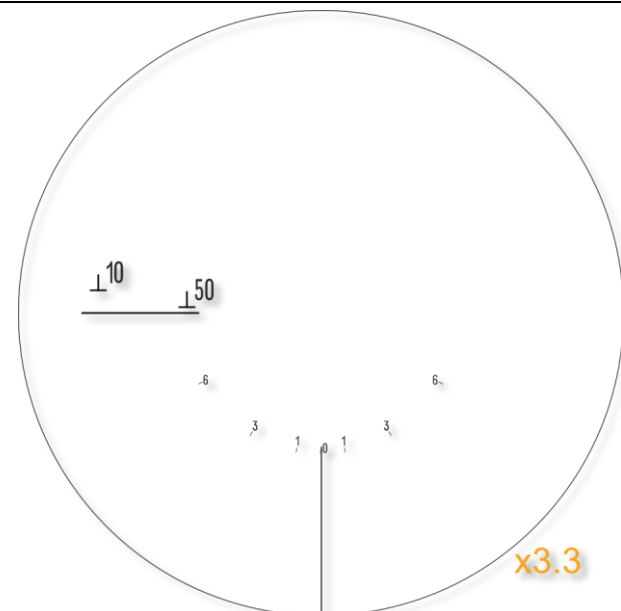
[LAlt + A]

* if at the same time the LV PN is parallel to the GFS or is close to this position, then in the field of view of the PN, a red signal will be on from above and a buzzer will sound in the headphones (see below), which means that the conditions for launching permission (the conditions for firing the rocket into radio control beam after ATGM exit from TPK). After deviation of the LV PN at an angle of more than 0.86° from the GFS conditions fires disappear, indication and signaling disappear.

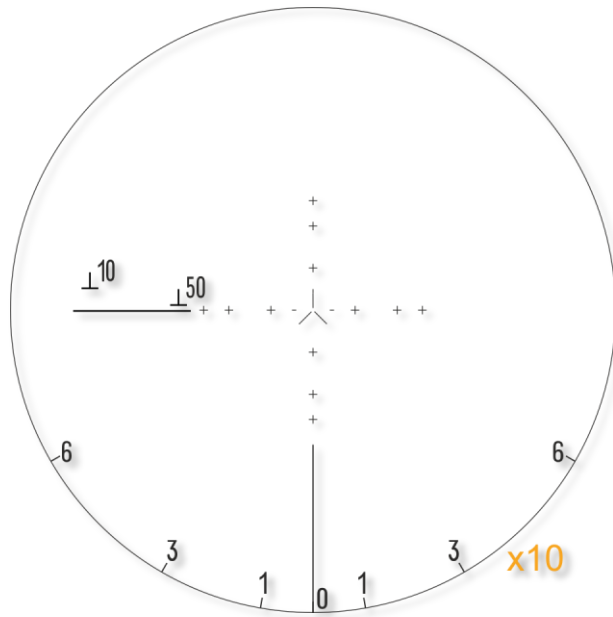


13. Find the goal. When searching and identifying a target, use the x3.3 and x10 x3.3 magnification factors

[LCtrl + X]



x10 [LCtrl + X]



14. After selecting the target, the operator hold the PN mark on the target with small movements with the Control Panel (PY)PH-weI sew, keyboard ([<] [>] [E] [J]) or with a joystick, report to the commander that the mark is on the target.

* It must be remembered that the operator controls not the angular position of the LV PN, but the angular velocity of the LV PN. Those. when moving the mouse or joystick, the direction and speed of movement of the LV PN relative to the GFS are set. The more the joystick is deflected, or the further the mouse is moved, the faster the reticle begins to move. The same applies to key control.



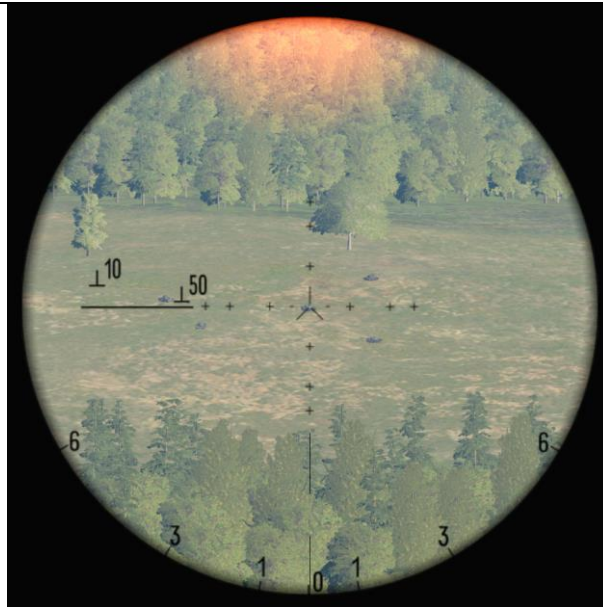
15. To the captain of the crew

by maneuvering the helicopter, install the PM within the small ring of the NS (on the ASP-17),



16.1 after which an alarm appears about the fulfillment of the conditions for firing an ATGM into the radio beam after the missile has descended (signalization of launch permission):

RED lights up in the field of view of PN sector;
in headphones sound signal (continuous buzzer)

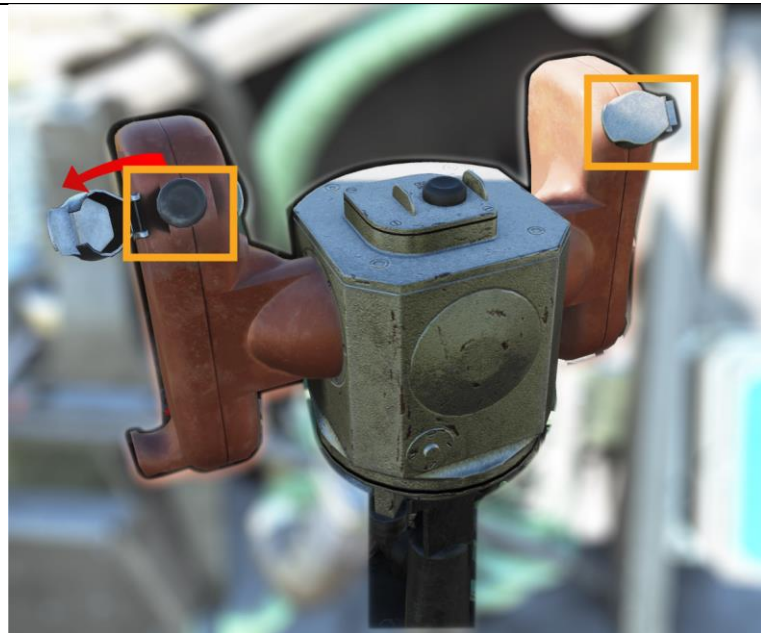


16.2.

on the SCHO - a red lamp lights up
ALLOW START



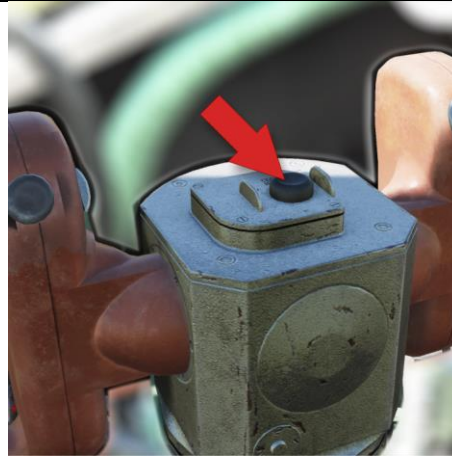
17. Operator press START button **RCtrl + Space** (on the control panel PN start works from any button - either on the left or on the right, in DCS: Mi24P pressing the START buttons on the control panel PN is not simulated)



18. The rocket descends in 0.9 seconds after pressing the button



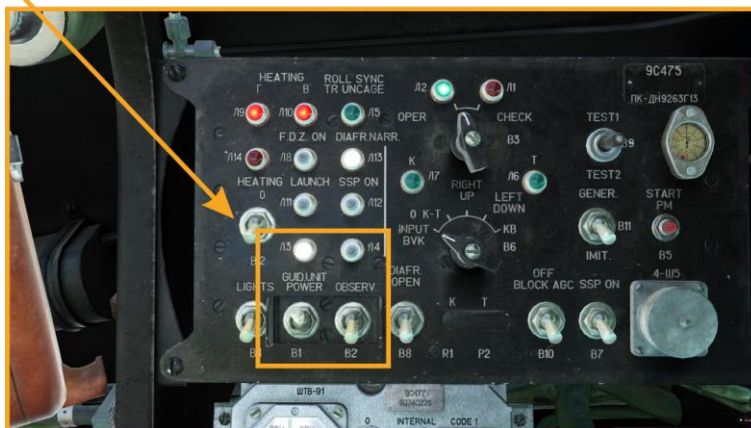
19. After hitting the target, or missing, or leaving the rocket to self-destruct, press the button on the RADIATION RELEASE PU. **[LAlt + R]**:



20. Choose the next rocket, for which there is a biscuit on the SCHO set the switch to the new PU. If there is a TPK with a rocket, then the STOCK PRODUCT lamp on the SCHO will light up. (2)



21. Before leaving the attack, if it is necessary to maneuver with a roll (pitch) of more than 25 ° on the PC, turn off the NABL, this is will provide electrical retracting system gyroscopes stabilization of PN (for a time from 2 to 8 sec), state electrical arresting is determined by the moment of continuous (non-flickering) combustion of the PIT.PN (L3) lamp.



22. Repeat the steps to launch the next missile

Notes. 1. Before switching off the PIT PN or performing maneuvers with high angular velocity, it is necessary to perform electrical arrest of the gyro platform. The uncaged state of the gyro platform is accompanied by the burning of the PIT PN lamp "half full" (in DCS - blinking).

2. In the case of a maneuver with a high angular velocity (more than 10gr / s) and when the NABL is on, a "blockage" of the PN gyro platform is possible, which is accompanied by a tilting of the PN visual field and a lack of response to control signals from the PN launcher. To restore functionality, you must:

Set NABL to OFF position - an attempt is made to electric arrest, but the gyro platform, which in attempts to compensate for the intensive rotation of the helicopter, took a new position and remained in it, everything remains "overwhelmed", because gyroscopes now support this new (incorrect) position.

Install PIT. Mon in off position. This achieves the return of the gyro platform to its original state as the gyroscopes run out (3-4 min) after switching off the PIT PN.

After the gyroscopes run out and the platform occupies the initial (good) position, you can again start preparing the system for use in the usual way.

5.3.9. For the application of KMGU


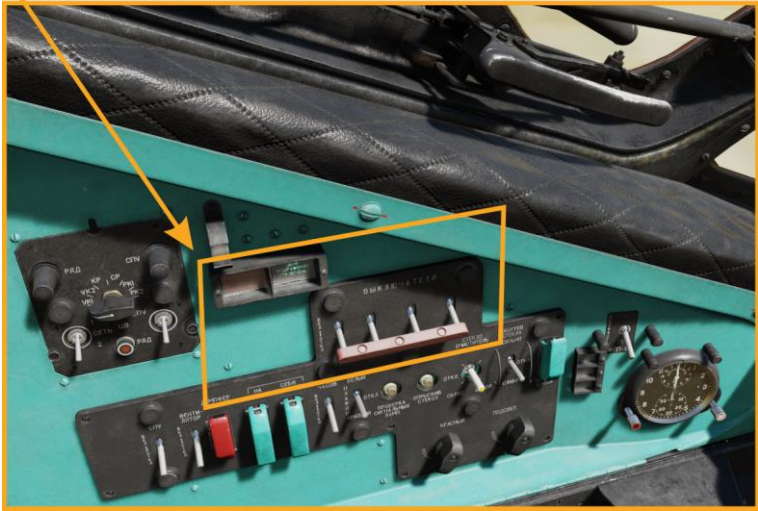


A feature of the electrical connection of the KMGU system is that the KMGU circuits are not controlled from the WEAPON CONTROL switch at the operator. The commander performs the entire activation until the state of readiness for use. However, the operator has the opportunity, together with the commander, after turning on the system, to control the discharge of blocks from the AO-2.5 RT ASP from the KMGU containers.

Note. DCS has not yet implemented sequential block firing, but simultaneous firing (WIP) is in progress. In the case of sequential shooting, the shooting interval for DCS is set to 0.5 seconds between blocks in one KMGU (i.e., the time to fire blocks from one KMGU will be 4-5 seconds, taking into account the opening of the flaps). The doors are opened and the blocks are fired first from the left, then from the right container.

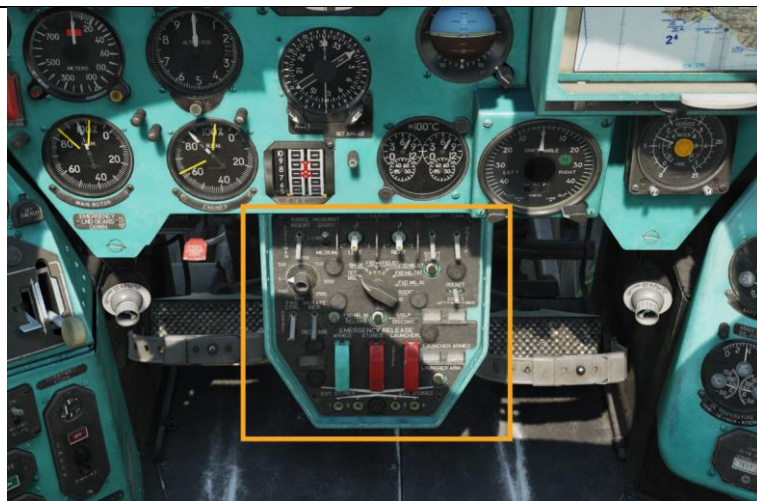
When the helicopter is running, there is voltage on the VU tires and the petrol stations are switched on, it is necessary:

[turn on the sight as described above;](#)

Aiming angles table KMGU (WIP)

<p>in the cockpit operator:</p> <p>1. On the left operator panel, turn on "SAFETY CIRCUIT SWITCHES ARMS "; connected by a common bar, in the ON position.</p> <p>The green board "WEAPON CHAINS DISCONNECTED" - will go out (at the lower position of the switch, this board is lit both when the chassis is released and when the chassis is retracted);</p> <p>the red display "CAUTION! CIRCUIT WEAPONS UNDER ELECTRIC! " (lights up only when the landing gear is extended)</p>	 
<p>in the cockpit:</p> <p>2. On the right front panel turn on "BACKLIGHT OF SPECIAL EQUIPMENT PANEL ON - OFF" In the ON position (signalization of the presence of pendants and a red illumination of the PUVL is provided)</p>	 

3. At the UWL:



3.1.

install biscuit
select switch
type of weapons
in position of KMG (1);
turn on
FIRE CONTROL (2);
the board will light up
KMG LOADED (3)



four.

on VG-17 will light up
scoreboard "KMG"



four. **On the left
dashboard
operator:**

the board will light up
KMG is LOADED (1);
and after installation
biscuit
switch in
position KMG (2) - KMG
MAINS ON,



5. Weapon system

prepared for the use of KMGU (starting the process of resetting blocks, stopping the reset, resuming the reset) from both workplaces at the same time (you can start from the operator, and stop from the commander, for example)

* so far, the blocks are reset simultaneously, not sequentially, so the reset cannot be stopped, WIP

5. Starting the reset process from the commander:

on the RPPU open safety cap and press the PC (reset) button (pressing the button with the mouse is not simulated) - the container doors will open and the blocks from the ASP will be fired

* Sequential block firing is not yet implemented in DCS, simultaneous firing is performed, (WIP).



6. Stop dumping from the commander

on PUVL, press the STOP KMG button to resume reset - press the PC button on the RPPU again

* DCS serial reset not yet implemented (WIP)



7. Start and stop

reset process **from operator**

launch is carried out by pressing a button KMG WORK (1); termination of discharge carried out by pressing the button KMG WORK STOP (2); to resume reset - press the KMG OPERATION button again (1)



8. The end of the KMGU operation is signaled by:

from the commander - on the control panel by means of lighting up the KMG display panel. WORK IS ENDED;

at the operator - on the left panel of the dashboard by lighting up the KMG display. WORK IS ENDED



5.3.10. Emergency reset

When the helicopter is running, there is voltage on the VU tires and the petrol stations are switched on, it is necessary:

1. On the left operator panel, turn on

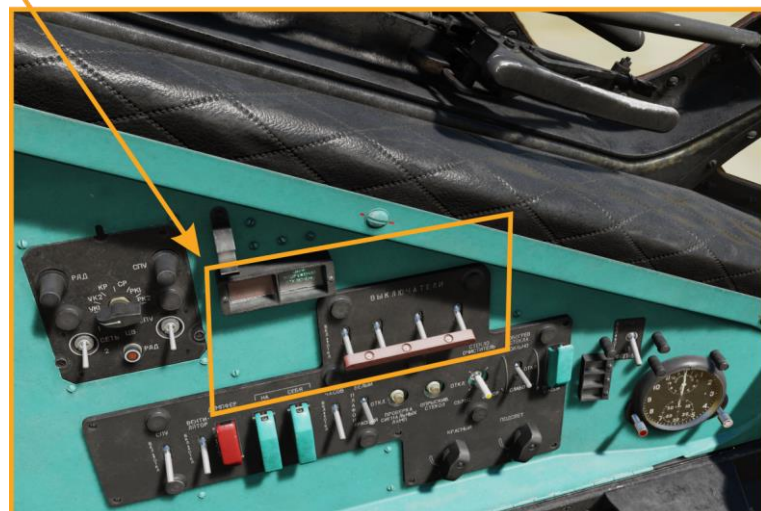
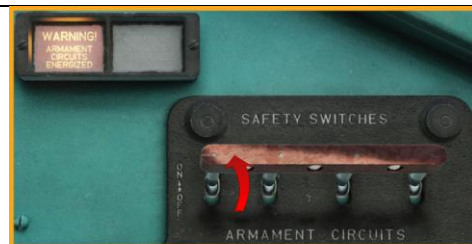
"SAFETY CIRCUIT SWITCHES ARMS "; connected by a common bar, in the ON position.

The green board "WEAPON CHAINS DISCONNECTED" - will go out (at the lower position of the switch, this board is lit both when the chassis is released and when the chassis is retracted);

the red display "CAUTION! CIRCUIT

WEAPONS UNDER ELECTRIC! "

(lights up only when the landing gear is extended)

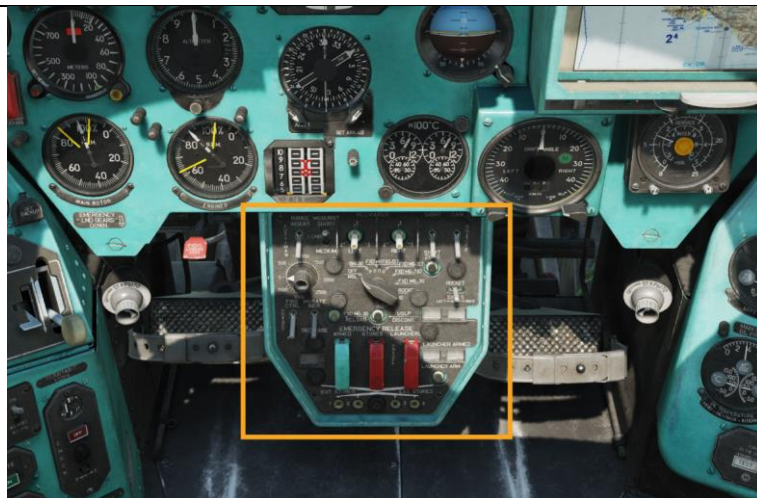


2. On the right front panel turn on "BACKLIGHT OF SPECIAL EQUIPMENT PANEL ON - OFF" In the ON position (signalization of the presence of pendants and a red illumination of the PUVL is provided)



Emergency reset from commander
(all suspensions under BD1-4 are reset regardless of the position of the chassis)

3. At the UWL:



3.1. Select the option of dropping - with the explosion of bombs after dropping or without explosion, for which:

- open
- safety
- switch cover
- EXPLOSION - NON-EXPLOSION,
- to install
- switch in
- appropriate
- position (1);
- when choosing EXPLOSION
- lights up red
- EXPLOSION display (2)



3.2. Reset the suspensions, for which:

open
safety
switch cover
EMERGENCY RESET
SPECIAL CARGO ON - OFF;
translate
switch to the top
position (1)
(switch
push type, with
disappearance of effort
occupies the bottom
position);
all will be reset
suspensions with BD1-4,
alarm lamp
DB downloads should
go out (2)



4. Emergency reset from the operator

(only bombs and UB-32 blocks are dropped according to BOMB / UNITS switch position - CHECK - BOMBS and the state of the chassis - when the chassis is extended, there is no reset from BD2 and BD3)



five. On the left dashboard operator:

5.1. Select the option of dropping - with the explosion of bombs after dropping or without explosion, for which:

open
safety
switch cover

EXPLOSION - NON-EXPLOSION,

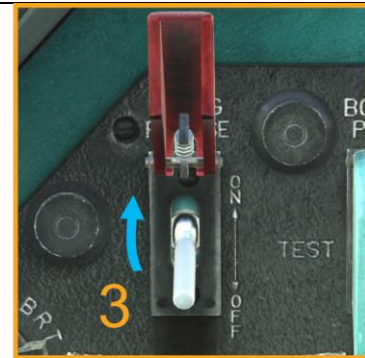
to install
switch in
appropriate
position (1);

when choosing EXPLOSION
lights up red

EXPLOSION display (2)

5.2. Perform a reset to
what:

translate
switch (3) in
top position
(switch
push type, with
disappearance of effort
occupies the bottom
position);



5.3. Reset will occur
pendants, the loading signaling
lamps of the corresponding OBD
should go out



5.4. Features of using the modes of operation of the ASP-17 sight and entering the range into the ADSVU

Proceeding from the two modes of operation of the sight AVT.-MANUAL, as well as two modes of entering the range on the PWL, ENTERING THE RANGE AUT.-MANUAL. Four combinations of modes are possible and, accordingly, four options for using the sight data, aiming and using APS, see Table. 5.1.

Tab. 5.1

switch position, description, display description display	
1. ASP-17 - MANUAL , PUVL RANGE ENTRY - MANUAL	
<p>on PUVL: set the specified firing range (potentiometer (27) or "beak") for example = 1500m, and the potentiometer handle BASE (5), located on VG-17, on the scale (6) sets the base target size B (in m), taking into account the angle.</p> <p>The set range is sent to the ADC as a constant, but the PM does not move vertically / horizontally. The pilot determines the exit to a given firing range by the equality of the angular size of the target ("base" of the target) and the angular size L of the gap between the inner edges</p> <p>rangefinder horizontal strokes (2, figure on the left), corresponding to the established target base and firing range.</p> <p>The range can be determined "stepwise": according to the known and given target base (5), the horizontal strokes will "disperse" in accordance with the angular size of the base (indication in meters in window 6) and for the range set by the beak (27). Approaching the target, the pilot periodically "frames" the base with horizontal strokes of the PM, which is observed in front of the target by rotating the beak. The current range bracket will move and show the range value, the same value will be read from the scale opposite the "beak"</p>	<p>By changing the set range with the potentiometer (26) on the PUVL, the value of the gap between the horizontal rangefinder strokes of the PM changes (with a constant value of B on VG-17), also in accordance with the value of the range set on the PUVL potentiometer, the range that is displayed by the arc (sector) of the current range in the upper right quarter of the PM. Arc length</p> <p>(sector) of the current range depends only on the position of the "beak". Pitch change has no effect on display of the current range. When the value of the current range is within:</p> $D_{end_fire} < D_{curr} < D_{start_fire}$ <p>for the selected type of weapon (see below) on the VG-17, a yellow light will be on. When the value of the current range goes beyond the specified limits the light goes out</p>
<p>on VG-17: the PM moves only from the rotation of the knobs for setting the aiming angle and the wind correction (target movement), the installation angles of the PM relative to the NS are visible on the rotating scales for displaying the specified angles up-down (degrees) and left-right (thousandths), values sighting angles are indicated in the tables. In addition, on the VG-17 handle (5) the target BASE is set (the better is the known distance between landmarks near the target, the larger this value, the more accurate ranging)</p>	<p>The PM moves from the BOTTOM-UP and LEFT-RIGHT handles on the VG-17 and does not move from a change in the pitch angle.</p> <p>On PM_range_scales: the jackal of the current range will be at "1500" (for example), the scale (bracket) remains stationary, if you do not move the initial range setting knob on the RWL</p> <p>(27) or target base on VG-17 (5).</p>

2. ASP-17 - MANUAL , PUVL RANGE ENTRY - AVT	
description	display
<p>AVT on PUVL: the range is determined by the elevation method (from the pitch and radio altitude) and is entered into the ATsVU, but there it is used only to indicate the arc (sector) of the current range.</p> <p>MANUAL on VG-17: PM is located where the pilot set its position with the handles BOTTOM-UP, LEFT-RIGHT. Thus, the correction of the position of the PM in the distance from the ADSVU (ie, "working off" the sight of the movable mark up and down) is not used.</p>	<p>Immediately when the AVT position is switched on on the PUVL, a GREEN light signal lights up on the VG-17.</p> <p>On PM_scales_range: The value of the target's range is automatically indicated by the arc (sector) of the current range (in the figure, arc a)) in the upper right quarter of the movable aiming mark. Those. when the helicopter is deflected in pitch, the arc will change in accordance with the measured range by elevation method.</p> <p>PM: does not deviate when changing the pitch, but remains in accordance with the values of the angles on the scales VG-17 DEGREES and THOUSANDS.</p> <p>When the value of the current range is within: $D_{end_fire} < D_{curr} < D_{start_fire}$ for the selected type of weapon (see below) on the VG-17, a yellow light will be on. When the value of the current range goes beyond the specified limits the light goes out</p>

3. ASP-17 - AVT , PUVL RANGE ENTRY - MANUAL	
description	display
<p>MANUAL on PUVL: the specified firing range is set (for example, 1500m), and the base size of the target B, taking into account the angle, is set on the scale with the handle of the BAZA potentiometer located on the VG-17.</p> <p>The established range is fed to the ADSU for automatic determination of the required deflection angles of the movable mark precisely for this range, but with automatic consideration of other influencing parameters. Pilot reaching the set firing range</p> <p>determines by equality of the angular size of the target and the angular size L of the gap between the inner edges of the rangefinder strokes corresponding to the established target base and firing range.</p> <p>AVT on VG-17: all data necessary for aiming are automatically taken into account except for range: wind, ground / air speed, glide, ASP ballistics (through the position of the wafer on the PUVL). The range is entered by a potentiometer ("beak")</p>	<p>PM: does not move up and down when changing the pitch, but takes a position in accordance with the ballistic characteristics of the selected ASP and the range set by the potentiometer ("beak") on the control system. Thus, the PM will auto-move when changing wind vectors, or ground speed, or slip angle, or choosing another weapon (for example, instead of NAR - NPU)</p> <p>On PM_scales_range: the scale of the current range will "freeze" at the mark "1500" (for example), if you do not move the handle-"beak" of setting the initial range on the PWL (27)</p> <p>When the value of the current range is within: $D_{end_fire} < D_{curr} < D_{start_fire}$ for the selected type of weapon (see below) on the VG-17, a yellow light will be on. When the value of the current range goes beyond the specified limits the light goes out</p>

4. ASP-17 - AVT , PUVL RANGE ENTRY - AVT	
description	display
<p>AVT on PUVL: the range is determined by the elevation method (from the pitch and radio altitude).</p> <p>AVT. on VG-17: the correction is generated by the ADS according to the current range (obtained automatically), wind vectors, ground speed and ballistics of the ASP selected on the control system and, accordingly, rejects the PM</p>	<p>Immediately when the AVT position is switched on on the PUVL, a GREEN light signal lights up on the VG-17.</p> <p>On PM_scale_range: The value of the target's range is indicated on the scale of the current range (in the figure, scale a)) on a movable aiming mark.</p> <p>PM: deviates in accordance with the current pitch, radio altitude, wind vectors and ground speed (i.e., taking into account sliding), showing where the ASPs will fall, which are selected by the wafer on the PUVL. When the value of the current range is within: $D_{end_fire} < D_{curr} < D_{start_fire}$ for the selected type of weapon (see below) on the VG-17, a yellow light will be on. When the value of the current range goes beyond the specified limits the light goes out</p>

5.5. Aiming angles for manual use of the scope

Aiming angles tables for NAR launches from horizontal flight

Speed flight km / h	Range up to Type goals in moment launch, m	of NAR							
		S-8M, S-8OF, S-8KO	S-8B	S-8D	S-8KOM		S-8TS	S-13D	S-24B
100	1000	-	-	-	1000	-	-	-	-
	1500	3 ° 00 '	3 ° 35 '	3 ° 00 '	1500	1 ° 56 '	2 ° 50 '	3 ° 20 '	6 ° 30 '
	2000	3 ° 25 '	4 ° 50 '	3 ° 45 '	2000	2 ° 39 '	4 ° 20 '	3 ° 50 '	7 ° 30 '
	2500	4 ° 00 '	6 ° 20 '	4 ° 40 '	2500	3 ° 37 '	-	4 ° 20 '	8 ° 00 '
	3000	4 ° 50 '	8 ° 00 '	5 ° 50 '	3000	5 ° 01 '	-	5 ° 00 '	9 ° 00 '
	3500	5 ° 45 '	9 ° 40 '	7 ° 05 '	3500	6 ° 28 '	-	5 ° 40 '	-
150	1000	-	-	-	1000	-	-	-	-
	1500	2 ° 25 '	2 ° 45 '	2 ° 25 '	1500	1 ° 24 '	2 ° 04 '	-	5 ° 55 '
	2000	2 ° 45 '	4 ° 00 '	3 ° 00 '	2000	2 ° 05 '	3 ° 40 '	-	6 ° 45 '
	2500	3 ° 15 '	5 ° 25 '	3 ° 55 '	2500	3 ° 01 '	-	-	7 ° 25 '
	3000	4 ° 00 '	7 ° 00 '	5 ° 00 '	3000	4 ° 16 '	-	-	8 ° 25 '
	3500	5 ° 30 '	8 ° 40 '	6 ° 50 '	3500	5 ° 43 '	-	-	-
200	1000	-	-	-	1000	-	-	-	-
	1500	1 ° 20 '	1 ° 35 '	1 ° 20 '	1500	0 ° 51 '	1 ° 20 '	1 ° 50 '	5 ° 15 '
	2000	1 ° 45 '	2 ° 50 '	2 ° 00 '	2000	1 ° 31 '	3 ° 00 '	2 ° 20 '	6 ° 00 '
	2500	2 ° 20 '	4 ° 10 '	3 ° 00 '	2500	2 ° 25 '	-	2 ° 50 '	6 ° 45 '
	3000	3 ° 00 '	5 ° 35 '	4 ° 00 '	3000	3 ° 30 '	-	3 ° 20 '	7 ° 45 '
	3500	3 ° 50 '	7 ° 15 '	5 ° 10 '	3500	4 ° 57 '	-	4 ° 00 '	-

		S-8M, S-8OF, S-8KO	S-8B	S-8D	S-8KOM		S-8TS	S-13D	S-24B
250	1000	-	-	-	1000	-	-	-	-
	1500	- 0 ° 25 '	- 0 ° 25 '	- 0 ° 25 '	1500	- 0 ° 11 '	0 ° 00 '	-	3 ° 15 '
	2000	- 0 ° 10 '	0 ° 50 '	0 ° 10 '	2000	0 ° 26 '	1 ° 35 '	-	4 ° 00 '
	2500	0 ° 25 '	2 ° 05 '	1 ° 00 '	2500	1 ° 18 '	-	-	4 ° 45 '
	3000	1 ° 00 '	3 ° 25 '	2 ° 00 '	3000	2 ° 20 '	-	-	5 ° 40 '
	3500	1 ° 50 '	5 ° 05 '	3 ° 10 '	3500	3 ° 42 '	-	-	-
300	1500	- 2 ° 35 '	- 2 ° 45 '	- 2 ° 35 '	1500	- 1 ° 13 '	- 1 ° 20 '	- 0 ° 35 '	-
	2000	- 2 ° 20 '	- 1 ° 30 '	- 2 ° 00 '	2000	- 0 ° 39 '	0 ° 15 '	- 0 ° 12 '	-
	2500	- 1 ° 45 '	- 0 ° 15 '	- 1 ° 00 '	2500	0 ° 09 '	-	0 ° 15 '	-
	3000	- 1 ° 10 '	1 ° 00 '	- 0 ° 10 '	3000	1 ° 10 '	-	0 ° 40 '	-
	3500	- 0 ° 25 '	2 ° 35 '	1 ° 00 '	3500	2 ° 27 '	-	1 ° 20 '	-

Aiming angles tables for NAR launches from a dive

Angle pitch, hail	Speed entering into dive , km / h	Speed helicopter in starting moment, km / h	Range to the goal in moment launch, m	NAR type						
				S-8M, S-8OF, S-8KO	S-8B	S-8D	S-8KOM	S-8TS	S-13D	S-24B
10	150	180	1000	-	-	-	-	-	-	-
			1500	-	-	-	0 ° 51 '	1 ° 15 '	2 ° 05 '	5 ° 15 '
			2000	-	-	-	1 ° 25 '	2 ° 30 '	2 ° 30 '	5 ° 45 '
			2500	-	-	-	2 ° 08 '	-	3 ° 00 '	6 ° 30 '
			3000	-	-	-	3 ° 05 '	-	3 ° 30 '	7 ° 20 '
			3500	-	-	-	4 ° 15 '	-	4 ° 05 '	8 ° 15 '
twenty	150	200-210	1000	-	-	-	-	-	-	-
			1500	1 ° 00 '	1 ° 30 '	1 ° 00 '	0 ° 30 '	0 ° 50 '	1 ° 10 '	4 ° 45 '
			2000	1 ° 35 '	2 ° 45 '	1 ° 45 '	1 ° 03 '	2 ° 15 '	1 ° 35 '	5 ° 15 '
			2500	2 ° 30 '	4 ° 10 '	2 ° 50 '	1 ° 40 '	-	2 ° 00 '	5 ° 55 '
			3000	3 ° 15 '	5 ° 45 '	3 ° 45 '	2 ° 26 '	-	2 ° 30 '	6 ° 45 '
			3500	4 ° 10 '	7 ° 15 '	4 ° 50 '	3 ° 26 '	-	3 ° 00 '	7 ° 20 '
thirty	100	180-200	1000	-	-	-	-	-	-	-
			1500	0 ° 25 '	0 ° 40 '	0 ° 25 '	0 ° 08 '	0 ° 20 '	1 ° 10 '	2 ° 00 '
			2000	0 ° 40 '	1 ° 25 '	0 ° 50 '	0 ° 35 '	1 ° 20 '	1 ° 30 '	2 ° 30 '
			2500	0 ° 55 '	2 ° 10 '	1 ° 10 '	1 ° 09 '	-	1 ° 55 '	3 ° 00 '
			3000	1 ° 15 '	3 ° 15 '	1 ° 45 '	1 ° 53 '	-	2 ° 30 '	3 ° 45 '
			3500	1 ° 45 '	4 ° 30 '	2 ° 30 '	2 ° 42 '	-	3 ° 00 '	4 ° 45 '

Corners aiming at shooting of cannons 9-A-623K from level flight

Range to the goal in moment shooting, m	Aiming angle (degrees) for flight speeds, km / h							
	0		100		200		300	
	thous.	deg / min	thous.	deg / min	Thousand.	deg / min	thous.	deg / min
500	12.5	0 43 '	10.5	0 36 '	6.5	0 22 '	0.5	0 02 '
1000	15.5	0 53 '	13.5	0 46 '	9.5	0 32 '	3.5	0 12'
1500	21.5	one fourteen'	19.5	one 07 '	15.5	0 53 '	10.5	0 36 '
2000	29.5	one 41 '	26.5	one 31 '	22.5	one 17 '	17.5	one 00 '

Lead angles when bombing with the ASP-17V sight bombs P-50-75 (= 21.5 s) at a speed of 250 km / h

H, m	T, s		W, km / h										
			200	210	220	230	240	250	260	270	280	290	300
twenty	2.52	3	four	3 40 '	3 twenty'	3	2 40 '	2 thirty'	2 10'	one 45 '	one thirty'	one twenty'	fifty'
40	3.14	four	nine fifteen'	eight thirty'	eight	7 thirty'	7 10'	6 fifty'	6 10'	five 40 '	five twenty'	five 10'	four 40 '
60	3.49	five	13 thirty'	12 40 '	12	eleven 10'	10 thirty'	10	nine thirty'	nine	eight thirty'	eight	7 40 '
80	4.01	five	sixteen	fifteen 10'	fourteen thirty'	13 10'	12 thirty'	12	eleven 40 '	eleven 10'	10 thirty'	10	nine 40 '
100	4.53	6	eighteen fifteen'	17 10'	sixteen thirty'	fifteen fifty'	fourteen 40 '	13 fifty'	13 twenty'	12 40 '	12 10'	eleven thirty'	eleven
150	5.52	10	22 twenty'	21 fifty'	21	nineteen thirty'	eighteen fifty'	eighteen	17	sixteen thirty'	fifteen 40 '	fifteen 10'	fourteen thirty'

6. HOW TO PLAY

[TO preface](#)

6.1 General

The game is a helicopter simulator in which a first-person player controls this helicopter, cockpit equipment and the position of the virtual pilot's head using game input devices (joysticks, pedals, touch pads, etc.), keyboard and mouse.

In addition, it is possible to install an external (in relation to the aircraft cockpit) camera to any place in the play space for observation from both your own helicopter and other objects in the world.

The essence of the game is that the player must simulate in real time the basic actions of the pilot when working with the cockpit equipment, as well as the distribution of attention between the outside of the cockpit and the cockpit at each stage of the flight mission (from starting the engine to taxiing into the parking lot). In addition, with the complication of the game scenario, the player must control (make decisions and issue commands) his subordinate crews (pilots of his unit).

The game can be single-player (there is only one player in the game world, the rest of the objects are controlled by AI) or network (in the game world there are more than one player who enter the game through the LAN interfaces, the rest of the objects are controlled by the AI).

After purchasing the game, it must be installed as a module for DCS World and activated. The main documents describing the procedure for activating the game, the functions of the main window, game settings, working with the mission editor, setting up game devices are located in the DOC folder located in the installed game directory. Each of them describes a certain part of the game functionality:

- a) how to install and activate the game - in the DCS World Installation Guide RU.pdf;
- b) a description of the main window functions, game settings and work with the mission editor - in the manual DCS User Manual EN.pdf;
- c) the procedure for configuring gaming devices - in the DCS World Input Controller Walk Through EN.pdf;
- d) the data of the radio equipment of the aerodromes used in the game are indicated in the handbook DCS World List of all available Beacons EN.pdf.

To find yourself in the helicopter cockpit, you need to launch the corresponding mission (scenario) under the control of the DCS World shell. Missions can be built into the game (supplied with the module installation package), downloaded from the Internet, or developed independently. A set of story-related missions is called a campaign. The user can independently create a mission (campaign) using the tools of the Mission Editor (MISSION EDITOR). How to work with the Mission Editor tools is described in the DCS User Manual EN.pdf.

Possibility of playing in the cabins

While in the cockpit, the player can **control the helicopter, cockpit objects and the position of the head of the virtual pilot (species)**. All of the above possibilities can be implemented either only with the keyboard, mouse, joystick, or in their various combinations. Of course, it is recommended to use a joystick for a high-quality game when controlling a helicopter.

The mouse can be used in two modes:

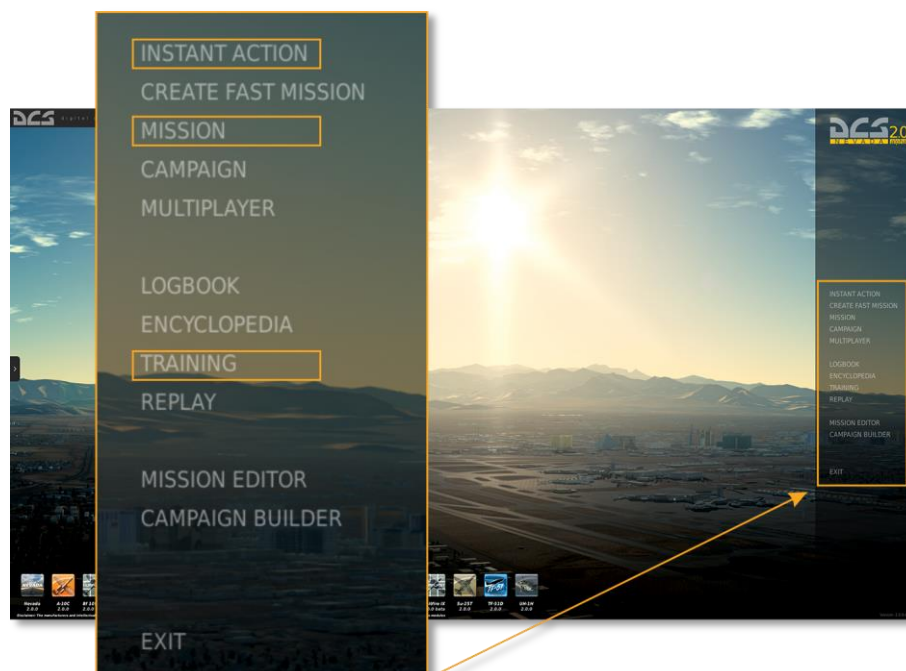
- control of objects of a clickable cockpit;
 - control of the position of the head of the virtual pilot (control of views).
- Switching between modes is carried out
key combination **[LAlt + C]** or by double clicking on the mouse wheel.

6.2. Launching built-in missions

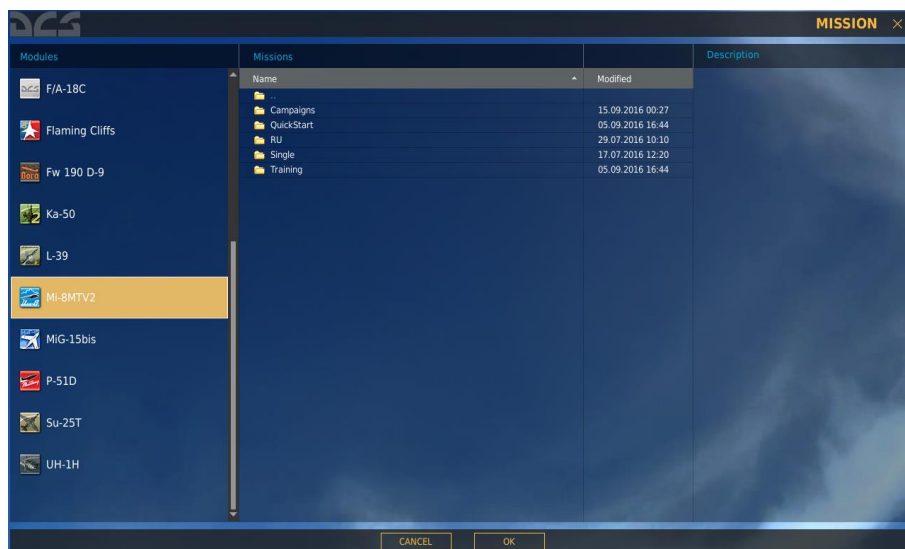
The game is purchased with a certain set of missions. These are training missions and the actual game missions (or campaign). Game missions (campaigns) assume that the player has already become familiar with the features of helicopter control and is ready to try himself in using the helicopter on his own in the game scenario.

PERIOD OF USER USER PREPARATION OF START-UP MISCELLANEOUS :

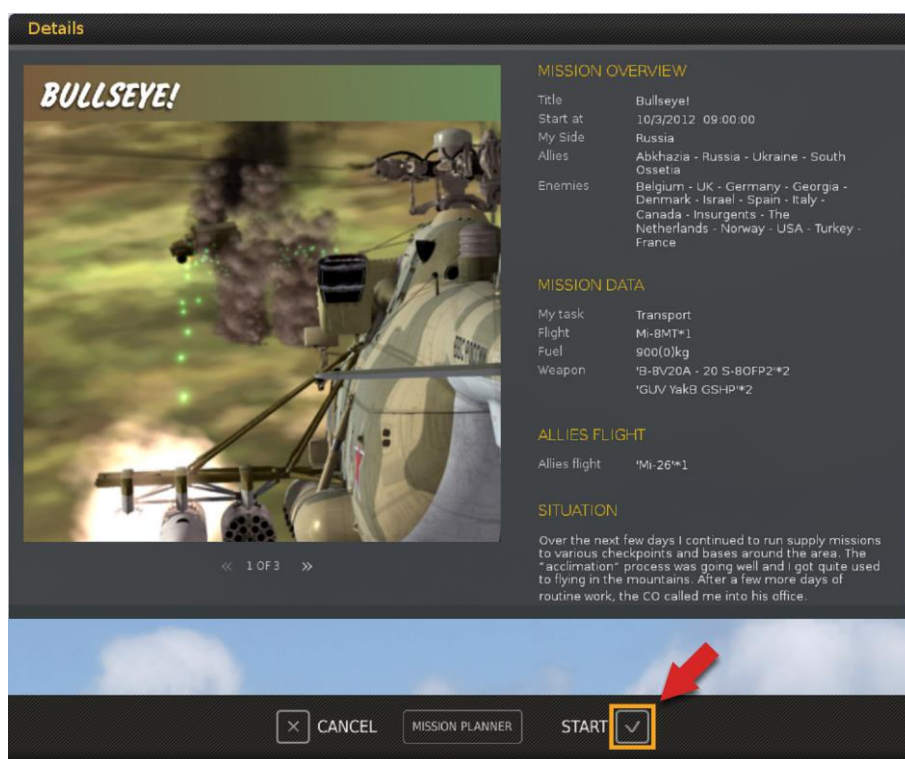
1. Start the game (DCS World shell). After starting the main window of the program, you can start either training missions by entering the TRAINING menu, or immediately game missions by entering the INSTANT ACTION or MISSION menu:



2. To select a mission, you must select the type of module and then the missions offered for it from the corresponding folder (in the example below, these are the Training, QuickStart or Single folders):



3. After selecting the mission, a description window will appear and the START button will be available, which launches the mission for a virtual flight:



6.3. Controlling the helicopter and cockpit objects in the game

The main controls of the helicopter include **aircraft control stick** (for a helicopter - a longitudinal-transverse control stick or RPPU, for an aircraft - an airplane control stick or an RSS), **the handle (lever) of the power plant control** (for a helicopter - a common pitch lever or ROSH, it controls the NV thrust and engine power at the same time, for an airplane - a handle (lever) for engine control or throttle control), and **pedals**. RPPU (RUS) is used to control the aircraft by roll (tilting the aircraft to the left and right) when making turns and pitch (raising the aircraft's nose up and down) to transfer the aircraft to descend or climb, and in the case of a helicopter, to accelerate or extinguish speed. ROSH (throttle) is used to control the NV thrust (engine power) if necessary to increase or decrease the horizontal or vertical flight speed. The pedals are used to

yaw control (turning the aircraft nose to the right and left) and slip compensation using the rudder. In addition, on airplanes, they can be used during taxiing to separately brake the wheels of the main landing gears to make turns (simultaneously with the rudder).

6.3.1. Controlling the aircraft (helicopter, airplane) using the joystick



If equipped with a joystick, it can be equipped with a thrust stick and / or a rotary knob (can be any joystick axis) that controls the thrust (common pitch for helicopters), as well as a rotary knob to operate the pedals.

During piloting from the cockpit, you can turn on the control position indicator using the key combination **[RCtrl + Enter]** to see

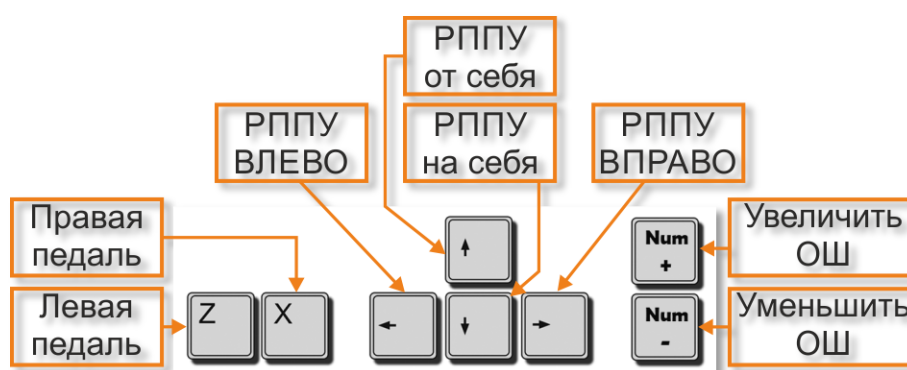


helicopter controls position

...

6.3.2. Helicopter control from the keyboard

If the player controls the helicopter only from the keyboard, then the main control keys are: **arrow keys** for roll and pitch control, **[Numpad +]** and **[Numpad -]** to control the thrust, the **[Z]** and **[X]** to operate the pedals.



6.3.3. Controlling cockpit objects with the mouse

All objects of the clickable cockpit can be controlled with the mouse. This is the main mouse mode in the game. For this, the left, right buttons and the mouse wheel are used.

As a rule, all switching on of the switches is performed with the left button, the switch switches (rotation knobs with fixed intermediate positions) - in one direction with the left button, in the opposite direction - with the right mouse button. Cockpit objects providing on / off

when you hover over them, are marked with a symbol.



Rotary knobs are rotated by the mouse wheel. Cockpit objects that can rotate when you hover over them,



marked with the symbol ...

To speed up the rotation of the handles from the mouse wheel, press [**LShift**] and rotate the mouse wheel. Then the handle will rotate x10 times faster. By default, the mouse is included in the cockpit object control mode.

6.4. Virtual Pilot Head Position and Cockpit Views 6DOF

6.4.1. Controlling the position of the head of the virtual pilot in the 6DOF cockpit

Controlling the position of the virtual pilot's head in the 6 DOF cockpit assumes the ability to move the head along all three axes (OX, OY, OZ), as well as turn the head around these axes (Figure 6.1).

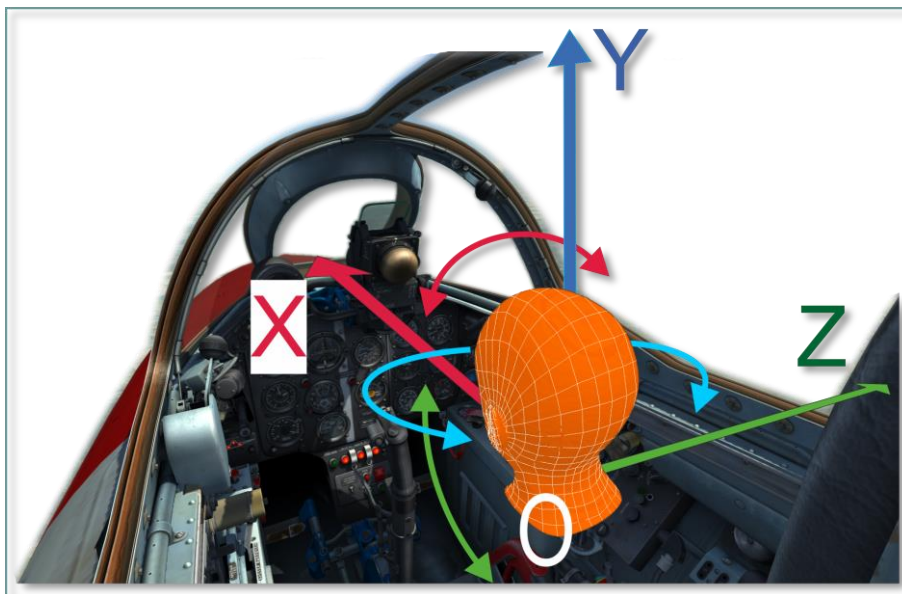





Figure 6.1. Position of the axes of the cab 6DOF

Head position control can be performed by all input devices: keyboard, mouse, joystick, user's head tracking devices (such as TrackIR). It should be noted that rotation of the virtual head around the OX axis (curved red arrow) is usually not used, therefore it is not available for keyboard and mouse control.

In addition to moving and turning the head, there is also a zoom function (reducing the angle of the cockpit field of view).







Those only objects entering the field of view are displayed on the working area of the screen. Because as the field of view narrows when zooming, objects become larger in the same area. This can be compared to using a spotting scope. Moreover, all objects located on the gaze axis are visible at any magnification.

The speed of moving the gaze from the mouse can be adjusted from the keyboard:

LShift + 	Mouse, high speed
LCtrl + 	Mouse, slow speed Mouse,
LAlt + 	normal speed

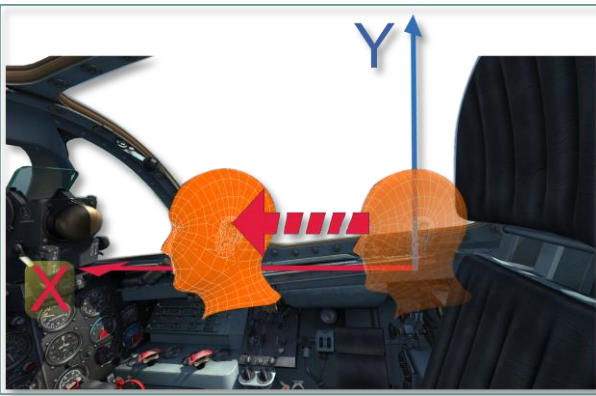
*Destivicia and with the mouse and with the mouse for it
m about in about ro about in about in and on and on and on*

Symbols on the diagrams for using the mouse:

	Press and hold the wheel down below
	Double click WHEEL
	Execute a click, keep the wheel down and rotate
	Rotate the mouse wheel
	Movements of the head along the corresponding axes
	Rotation of the head around the corresponding axes

The mouse is by default included in *CABIN CONTROL MODE*, and to switch it to *VIRTUAL PILOT HEAD CONTROL MODE* (and back) you must use the key combination **[LAlt + C]** or **double click on the wheel** mouse.

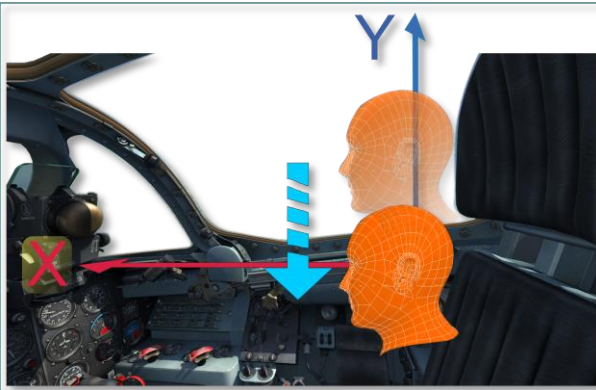
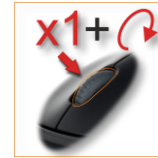
Type of action	Keyboard and Mouse Implementation
----------------	-----------------------------------



Keyboard:

[RCtrl + RShift + *] or [RCtrl + RShift + /]

Mouse:



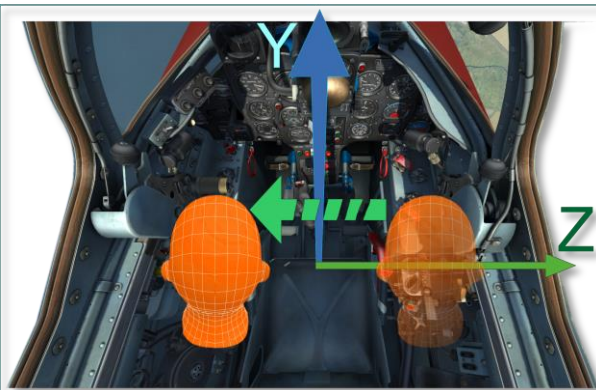
Keyboard:

[RCtrl + RShift + Num2] or [RCtrl + RShift + Num8]

Mouse:



and



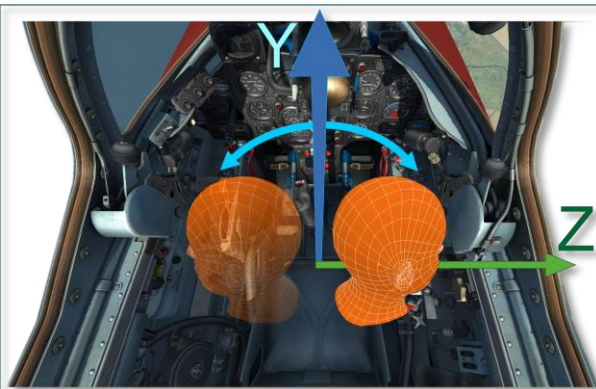
Keyboard:

[RCtrl + RShift + Num4] or [RCtrl + RShift + Num6]

Mouse:



and

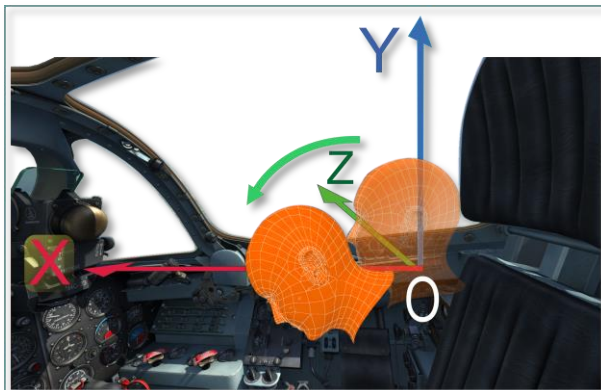


Keyboard/tour:

[Num4] or [Num6]

Mouse:





Keyboard tour:

[Num2] or [Num8]

Mouse:



ZDUMMING (ZOOM).

Keyboard tour:

[Num *] or [Num /]

Mouse:



The guide will be supplemented