Equipment
for indoor laser tag

Platform

G A L A X Y

Game kit ECLIPSE

User's manual

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TABLE OF CONTENTS

This manual is relevant for the following minimum firmware numbers for hardware microcontrollers and versions of computer programs:

- Blaster/vest kit 3.1
- Station SIRIUS – 5.1.15
- Multistation – 5.3.15
- Domination box Smart – 4.4.56
- Bomb SUPERNOVA – 1.9
- Program Lasertag Operator – 2.3.431
- Program LaserTagStatistic - 2.5.3

Indoor laser tag is one of the varieties of a fascinating and dynamic game of laser tag, taking place in real time and space. The difference of this type is that the games are held in closed darkened rooms, as a rule, anthurized under space wars. These conditions determine the specific indication - initially, at the start of the game, the vest and blaster sensors glow with the color of the team, and when an opponent's blaster beam hits them, they flash white briefly.

Aim of the Game is to hit by blaster's beam the sensors which are attached on opponent's vest or weapon (the sensors may be attached on extra equipment as well). Player and its team are earned points for each successful action (hit the opponent, base, domination box, etc. capture). Depending on the settings, points are deducted for opponent's hit into the sensors of opposite team player, respawn, unsuccessful shot, etc. Statistics are quickly transmitted to the control computer and can be displayed on a screen of a monitor, projector or television.

The minimum set for playing arena laser tag consists of sets of blaster + vest, router and chargers. Setup, management of the game kits, and also statistics accounting and broadcast is done through the Lasertag Operator program (Android operating system).

Blaster

Connection cable

Vest

General view of the kit

Also, for a variety of gameplay, electronic devices manufactured by our company can be used: Smart Domination Boxes, Multistations, SIRIUS station.

1. Blaster

The blaster is a simulator of "space" weapons emitting safe coded infrared rays with a modulation frequency of 56 kHz and a wavelength of 940 nm.

As emitters, Vishay's TSAL6100 IR diodes are used.

To increase realism, the IR beam during the shot is duplicated by a light beam like a laser pointer.

The blaster body is made of impact-resistant ABS-plastic. It has no moving parts, and it is designed to withstand large loads.

The main elements of the blaster

The bumper part of the body is made of expanded thermoplastic elastomer, which reduces the risk of physical injury in possible collisions.

The blaster is connected to the vest through a flexible cable, reinforced with a sleeve.

The blaster is equipped with a frontal hit sensor built into the bumper of the body, which allows the opponent to hit the player not only in the vest, but also in his weapon. Flashing white RGB LEDs on this sensor and a sound signal informs the player that he has been hit.

In addition to the hit sensor in the front of the blaster body, there is a shot illumination panel in the color of the team.

A capacitive hand sensor is installed in the body, which makes it impossible to play the game while holding the blaster with one hand. There is a vibration motor installed in the body to simulate recoil, as well as a gyroscope and and pedometer for counting steps in the game and signaling about blaster aggressive movements.
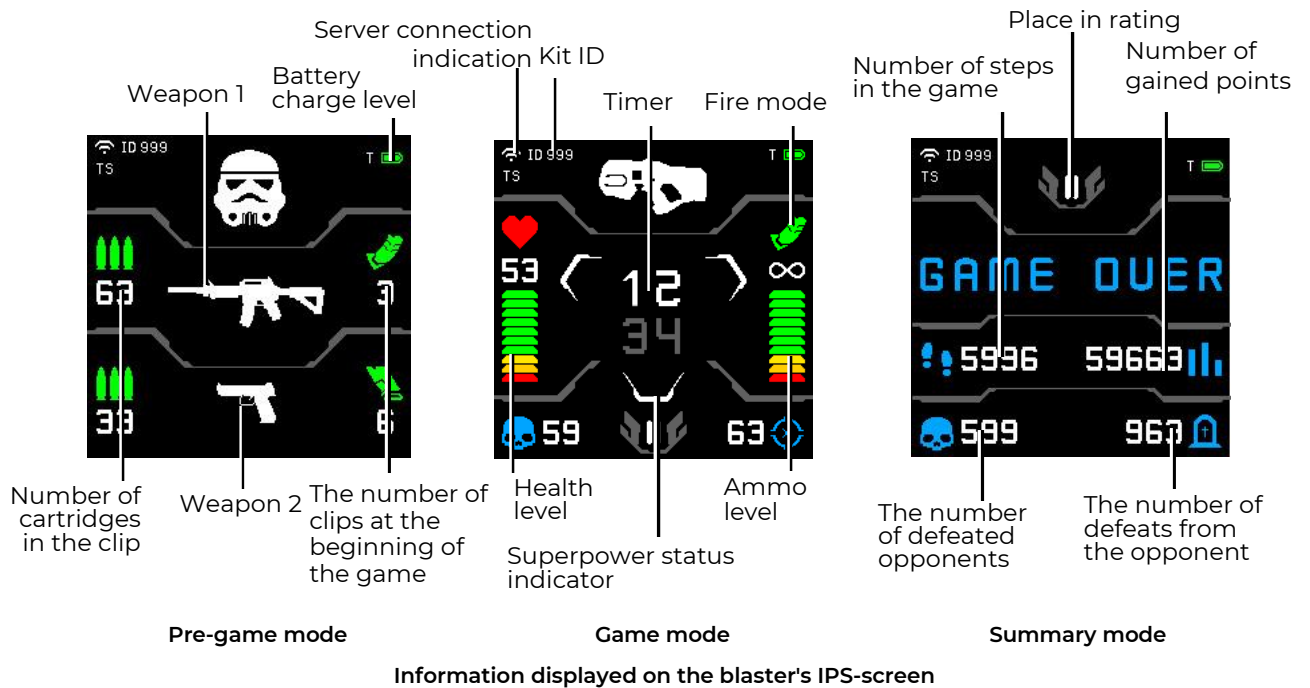
Blaster features a multicolored screen that operates in 3 modes:

Pre-game mode displays initial parameters of the kit;
Game mode displays actual player's info during the game round;
Summary mode displays game statistics after the game is over.

At the same time, the screen can display more than 10 indicators: dynamic scales of health and ammunition levels, the number of hits on the opponent, the type of weapon, the selected preset, rating, and much more.

Pre-game mode   Game mode   Summary mode

Information displayed on the blaster's IPS-screen

Default preset ("Special Forces")   Preset "Doctor"   Preset "Vampire"   Preset "Zombie"

Preset "Hostage"   Preset "Sniper"   Preset "Stormtrooper"

Displaying presets with weapon type before playing

When the Change weapon mode option is turned on in the scenario, it is possible to choose to fire single shots, a fixed burst and an endless burst until the magazine is empty. Mode switching - short double press on the recharge button.

Single shots

Remaining clips

Fixed round shots
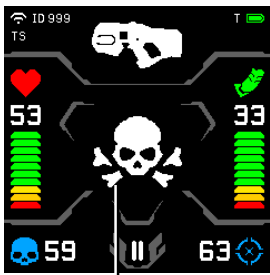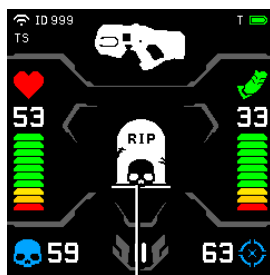(N is the number of shots)

Auto mode

Endless clips
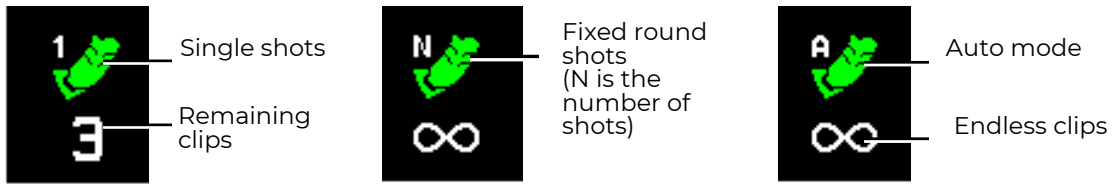
Pictograms keys of firing modes

The player defeated an opponent

The player was defeated
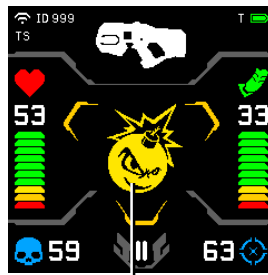
The player has activated the Bomberman supermode (explosion of others)
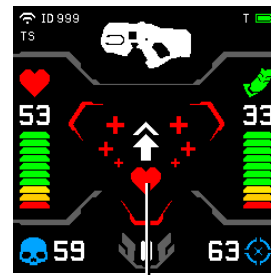
The kit was affected by the Medkit
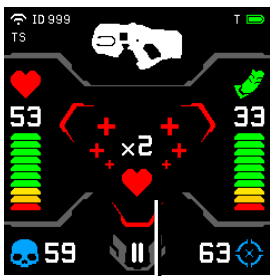
The player has doubled the number of health points
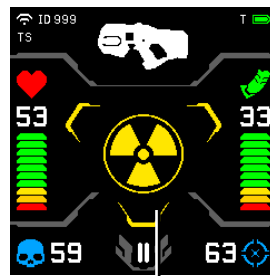
The player was affected by Radiation
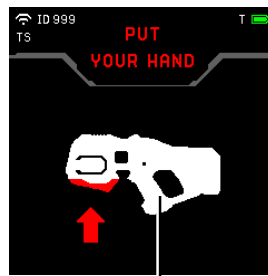
Two-hand absence sensor tripped
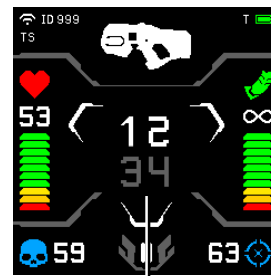
The player is playing with the default preset (game timer is in the center)

The player has replenished ammunition
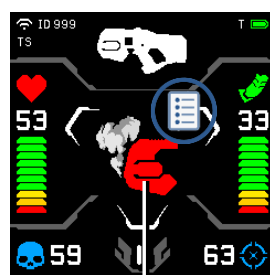
The weapon does not fire due to overheating of the barrel
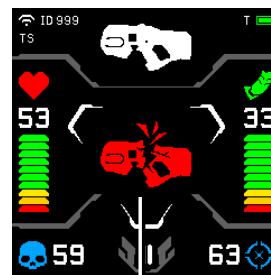
Breakage of weapons (with the type of defeat in the weapon - deactivation)

Game situations displaying on the screen of the blaster

| Falcon | Assault rifle | Grenade launcher | Sniper rifle |

| Pistol | Medkit | Vampire bite | Zombie claw |

| RPK | Radiation | Hostage recorder |
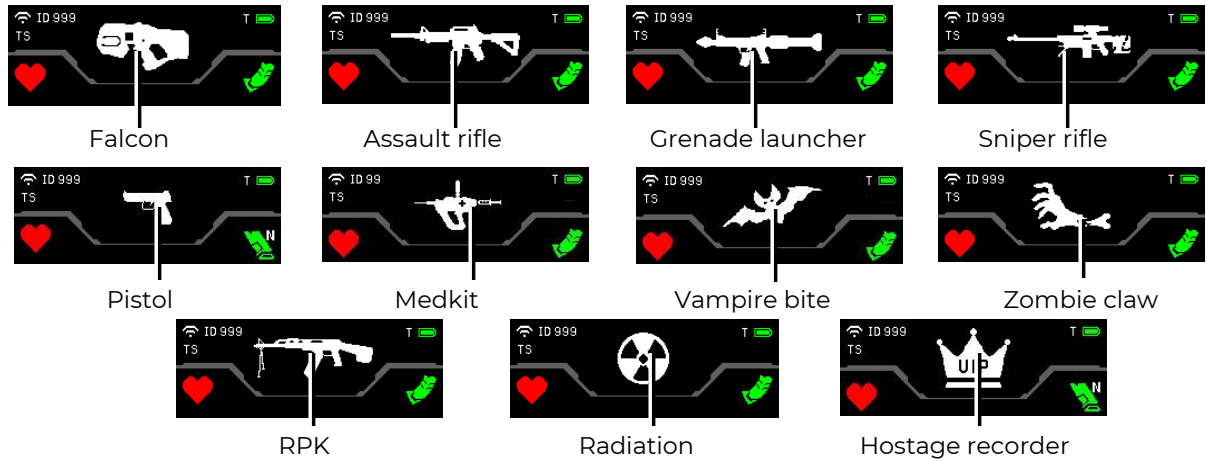
Displaying the weapon type of the kit

In the kit settings, the player can have <u>two virtual weapons</u>. To switch them, you must press the function button on the blaster.

When a player activates a new arena playset option - superpowers, corresponding colorful icons are displayed on the blaster screen. In addition, there is a light indication of each mode on the vest (see Ch. 2 of this manual) and setting the modes in the program (see Ch. 9.3.2 of this manual).

| Bomber man | Healer | Ninja | Max damage | Power shield |

Displaying superpowers upon activation

The blaster also contains two additional devices - a gyroscope and an accelerometer.

The gyroscope records the player's activity, i.e. the approximate number of steps taken during the game. The result is displayed on the blaster screen in the summary table.

The accelerometer detects sudden and dangerous movements with a blaster. Information about this appears on the instructor's monitor screen, and the player himself receives a warning about a safety violation in the form of a sound signal and a corresponding notification on the blaster screen.

The number of steps taken per game

Blaster aggressive movement warning
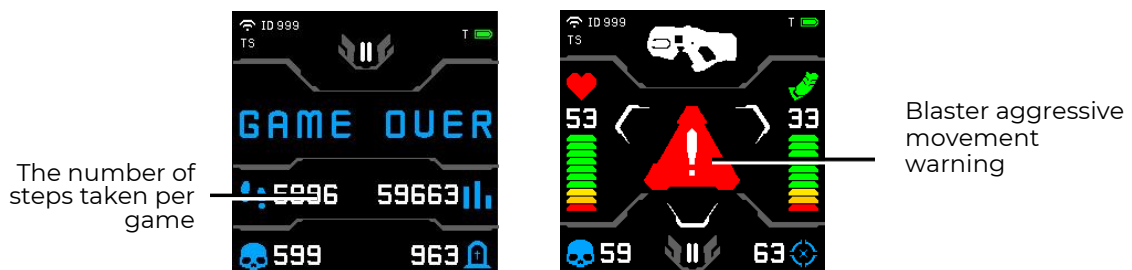
The results of the gyroscope and accelerometer on the blaster screen

2. Vest

The vest is an integral part of the indoor laser tag game kit and is connected to the blaster with a special cable.

There are 14 hit and indication sensors on the vest grouped in 4 sections - in front, back and on the shoulders. The hit sensors and the vest control unit are equipped with vibration and RGB light indication (52 independent LEDs), and are protected by shock-resistant polycarbonate bodies.The capacitive sensor allows the player to activate certain functions by touch. The supermodes in particular.

The outer layer of the vest textile base is made of eco-leather. The inner part of the vest is a PVC material with a density of 680g/m2, which has a water-repellent property. Two adjustable side straps allow the vest to be sized to fit most players.

The kit is powered by 2 Li-ion batteries located in the vest control unit (7.4 V, total capacity - 4800 mAh).

Basic elements of the vest

External elements of control unit

The kit provides an opportunity to give the player superpowers - with a certain frequency, the player can receive a significant improvement in functionality.

The program chooses which superpower can be granted to the player in the current kit setting. The following modes are available in the current firmware:

- Ninja
- Healer
- Max damage
- Power shield
- Bomber man

The Ninja mode presupposes a temporary shutdown of the light indication of the kit - the kit blinks at a large interval (every 10 seconds there is a short blinking of the team color). Accordingly, in the darkened room of the arena, the player is practically invisible - only the illumination of the shot and the indication of hitting a specific sensor are visible.

Such a superpower can be useful for a player hiding in an ambush or, if necessary, quietly approach the opponent's base.

The Healer mode allows the player to "heal" himself and those around his team with the protocol command "Medkit", distributed over the infrared channel by the vest emitters with a frequency of ¼ sec. Wherein, the radius of impact on the kits is up to 0,5 meters. For each impulse, 25 health points are restored. During activity, the vest flashes quickly in the team color.

The mode can be used, for example, when several players attack together, one of which activates the "Healer" super ability. For the period of activity, his kit quickly restores the "health" of the group's vanguard.

The Max Damage mode increases the damage of the current weapon to 100 units per shot. The vest flashes every 0.5 seconds in the team color.

The increased damage, temporarily, can significantly change the balance of power of the playing teams.

The Power Shield mode sets the player's temporary invulnerability to an opponent's beam hitting his kit. The vest LEDs flash alternately white and team color.

This mode can be especially useful when capturing a Domination Box or team base of a different color.

In the Bomber Man mode, the emitters of the vest with a frequency of ¼ sec hit adjacent sets with 100 damage. Upon activation, a message sounds with a countdown to the explosion. Then the sound of explosions is played from the speakers, during which only the opposing teams are hitting nearby players, if "friendly fire" is disabled, or all players, if it is enabled. Wherein the explosion does not affect the player himself. The vest flashes in team color.

The peculiarity of this mode is in the preliminary sound notification about the upcoming "explosion". Therefore, despite his "destructive", the opponent has the opportunity to either retire to a safe distance, or in time to deactivate Bomber-Man.

You can also choose to grant different superpowers randomly throughout the round.

Before the opportunity to activate this function, a colorless image of the mode logo appears on the blaster screen and the color of the superpower status indicator changing as it is ready. When all three indicators and the logo become colorful, a special signal sounds, notifying the player about the opportunity to activate a new mode.

To activate it, you need to hold it with your hand for a few seconds (the time is set in the program, by default - 3 seconds) a capacitive sensor on the front vest hit sensor. The LEDs on the sensor light up in a circle, and when the circle is completed, the superpower is activated. In this case, a sound message about activation is played by the vest speakers. As the powers is

spent, the status indicators will lose their color. The player is also informed about the stop of the mode by a sound message.

Superpower logo

Superpower status indicator

Displays status indicators and superpower logo on the blaster screen

The duration of the superpower is configured in the program (see Ch. 9.3.2 of this manual).

Configuring, game kits controlling, as well as removing statistics, is carried out using the Lasertag Operator program, which is included in the package.

3. Battery Charger

To charge the batteries of the arena laser tag equipment, the delivery set includes a charger connected to a 220 V electrical network.

The output voltage is 8.4 V, the maximum charge current is 2 A.

Case with wall plug

Charging indicator

Connector
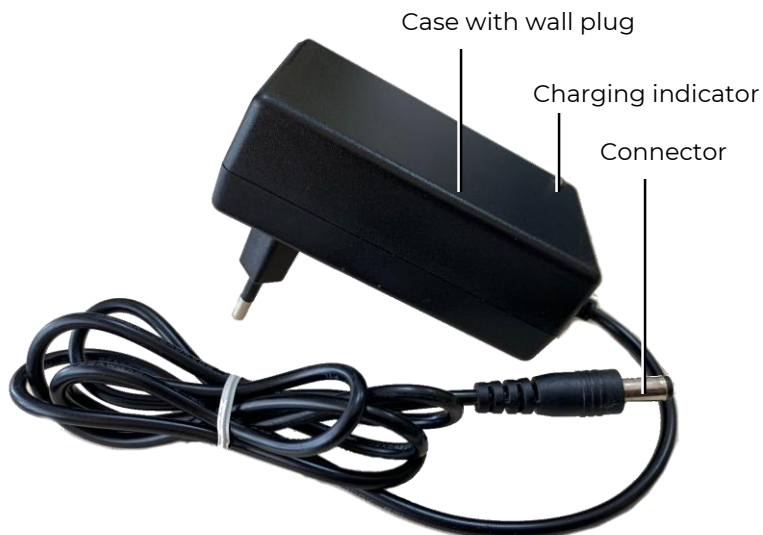
Charging device

Battery charging

Indoor laser tag equipment, produced by Lasertag.net uses lithium-ion batteries with an internal overcharge, deep discharge and shortcut protection circuit.

Nevertheless, serious attention shall be paid to safe handling with Li-ion batteries.

Use ventilated and fireproof room to charge the batteries. In case of possible inflammation of batteries, it shall not cause fire in the entire premise.

Temperature mode of Li-ion batteries charge affects their capacity being reduced during charging process in the cold or heat environment. The charge shall be done under environmental temperature in the range of +4 °C to + 40 °C, but optimum charging temperature is +24 °C.

Insert charger outlet cable into appropriate connector on the vest control unit. Insert battery charger plug into 220 V socket.

Average charging time of a kit is 3,5 hours.

Safety precautions for the process of batteries charging are presented in a special section of this manual (chapter 11).

4. Wi-Fi router

As a Wi-Fi router in the set of laser tag equipment, the company supplies the Tp-link Archer C80 AC1900 device.

The router is based on a 1.2 GHz MediaTek network processor, which has a single core capable of performing two threads.

In the 2.4 GHz range, there is a processor that provides 802.11n protocols, supports MU-MIMO 3×3 and has a maximum connection speed of 600 Mbps.

For 5 GHz and 802.11ac is the processor, also working with MU-MIMO 3×3, and the maximum connection speed it is 1300 Mbps.
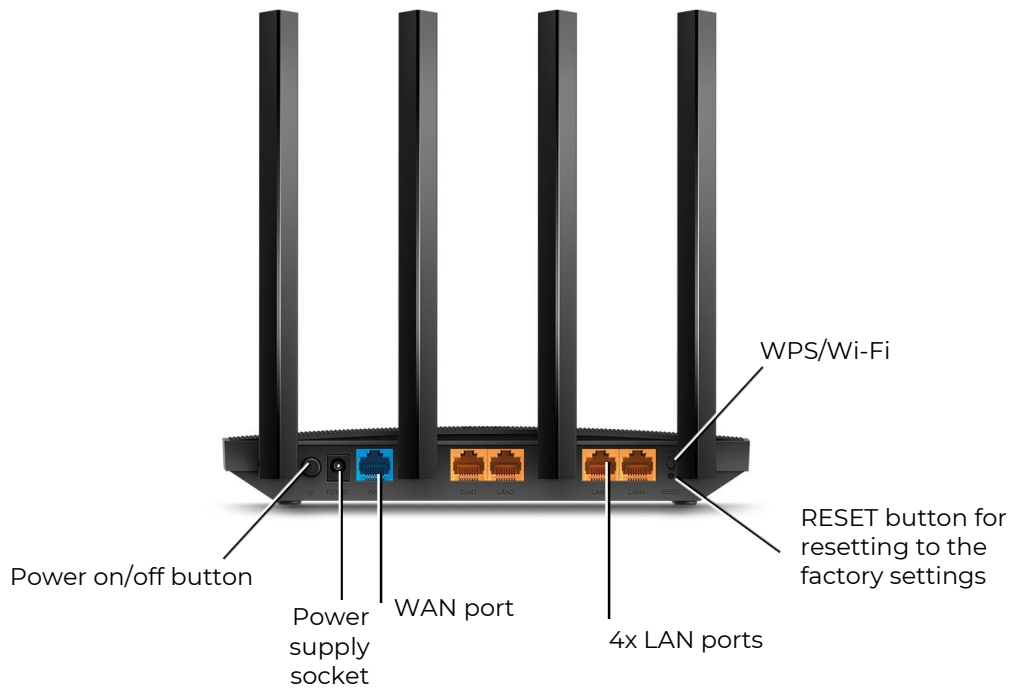

The appearance of the router

The router is equipped with an external power supply (12 V, 1 A (EU Version) or 12 V, 1.5 A (US Version)) and RJ45 Ethernet cable.

❗ **Caution! When using a portable power supply (Power Bank) for the operation of the router, it is necessary that the output voltage on it corresponds to the nominal supply voltage of the router – 12 V.**

❗ **Do not use the power supply of the router to charge the batteries of laser tag equipment!**

On the mounting side of the router, the following objects are located:

- power on/off button;
- power connector;
- WAN – port for connecting the provider's cable;
- LAN1...LAN4 – four ports for connecting to the router of other devices, without indicators;
- WPS/Wi-Fi button – for simplified connection/disconnection of devices to the Wi-Fi network of the router;
- RESET button – reset the router settings to the factory settings.

WPS/Wi-Fi

Power on/off button

Power
supply
socket

WAN port

4x LAN ports

RESET button for
resetting to the
factory settings

The appearance of the router from the mounting side

❗ The device is delivered fully configured for use with software and laser tag equipment produced by the company and does not require any additional changes.

Wi-Fi network setup is described in the chapter 9 of this manual.

5. Domination Box Smart

The Smart Domination Box (DBs) – an additional device that allows you to implement one of the most interesting scenarios in the indoor laser tag - "Capture a domination box". The main difference is the presence of 3 indicator scale, that shows the capture degree of each command, as well as 5 modes, which allow to record the capture for both - time and shots.

Capture is made by an infrared ray pulse directed from the blaster into the sensor. The sensor is placed in the lower inner part of the device, so the emitter must be placed vertically downward relative to the base plane of the Domination box.

The device is powered by Li-ion batteries (7.4 V, total capacity 5200 mAh) located in the case. The batteries are charged from the mains with a standard charger with an output voltage of 8.4 V and a maximum charge current of 2 A

Smart Domination Box general view

The device consists of a stand and a case, on the outside of which there are three racks with 16 LEDs in each. On the case itself, there is a connector for the charger, a service button and a power button. Three IR-emitters are mounted on the top cover, another 3 are mounted in the upper part of the case on three sides, providing a circular effect on the kits of players. There is an electronic board with an infrared receiver, a speaker and batteries inside the case.

The goal of the Domination Box is to record its "capture" by players of different teams, summarize the total capture time or the number of hits in the DB infrared receiver and determine the winner.

The device parameters are configured and controlled in the Lasertag Operator program via Wi-Fi (chapter 9.3.3 of this manual).

The Smart Domination box has three operating modes: standby, game and service.

Standby Mode

Upon power-up, the Domination Box switches to the standby mode. Two central LEDs are lit with the color of the current DB mode. To find out the battery's charge level in this mode

you should press and release the service button. The number of glowing purple LEDs will indicate the battery charge: 16 LEDs – 100 %, 8 – 50 %, etc.

Game Mode

The domination box can work in 5 display modes (Capture for time; Capture with shots; Tug of war; Triple capture and Raise the flag), each of which is configured either by the number of shots or by time DB holding required to determine the winner of the round. Indication of the settings is carried out by the glow of 10 central LEDs. The color of their glow corresponds to a certain mode, which is displayed in a sticker placed on the device case.

In the capture modes for time, you can set the timer for 1, 2, 4, 5, 7, 10, 15, 20, and 30 minutes.

In the modes of capture by shots, the number of hits in the device receiver is set from 50 to 500 in increment of 50.

Time Capture Mode.

2 to 4 teams are participating.

This is a classic mode. At the first shot at the DB sensor, the lower LEDs of all indicator posts are lit by the color of the team of the hit player and the timer of the captured team starts. If at the same time there is no interception by another team, the LEDs will be lit sequentially from the bottom upwards and will show the capture level. The glow of each LED corresponds to 1/16 of the set hold time.

When the box is captured by another team, the timer of the new team starts. The LED strip begins to show the capture level in the relevant color. The timer of the previous team stops and does not reset, but resumes its work after the first team again captures the Domination Box.

After the timer of one of the teams participating in the round reaches the set time (all 16 LEDs light up), the victory is assigned to this team. The Domination Box plays an audible signal and flashes the color of the winning team.

Shot Capture Mode.

2 to 4 teams are participating.

It differs from the previous mode in that the capture does not take place in terms of retention time, but in the number of shots fired by players at the DB receiver. Also, so that players do not linger near the Domination Box, the device by default is constantly in the "Radiation" mode during the game in this scenario. At the same time, after the time set in the program, players in the zone of influence of the IR-emitters of the device will be taken away health units. If necessary, this function can be disabled.

At the first hit, the lower LEDs of all racks are lit with the color of the player's team. On next hits, the LEDs will sequentially fill the racks from the bottom up to a multiple of the set capture value. For example, if the setting value is set to 100 hits, then the ignition of each LED will correspond to 100/16 = 6 hits.

When players of other teams enter the DB receiver, the LEDs will show the degree of capture by these teams in the appropriate color. At the same time, the achieved level of the remaining teams is not reset.

When a team reaches the set value of hits, the Domination Box plays a audible signal and starts blinking in the color of the winning team.

Tug of War Mode.

2 teams are participating. Time capture.

It differs in that the indication of the degree of capture is made for two teams in real time on all three indicator rack, as shifting each other vertically.

When a point is captured by the first team, its timer is activated and the lower 8 LEDs immediately are lit with the color of this team. At the same time, they pulsate and until the point is captured by another team, the glow gradually rises from the middle up. The second team ignites the upper part of the rack with its hit, and now the indicators of its color will shift down the LEDs of the second team. The glow of each LED corresponds to 1/16 of the set hold time.

When all the LEDs are lit in the same color, the Domination Box plays an audible signal and starts blinking in the color of the winning team.

Triple capture Mode.

2 to 3 teams are participating. Time capture.

It differs in that the indication of the degree of capture of the Domination Box is made in real time for each of the teams in different indicator stands. It allows you to constantly monitor the degree of capture of the point by opponents.

After the first hit, the timer of the capturing team is turned on, and the lower LED of one of the indicator racks starts to flash smoothly with the color of this team. As the timer works, the LEDs will light up from bottom up, each of which will correspond to 1/16 of the set hold time. After a player hits another team, they start to light up and flash the LEDs of the second indicator rack from bottom to top. The timer of the previous team stops and does not reset, but resumes its work after this team again captures the Domination Box. The LEDs of this rack stop flashing and remain lit at the achieved level. It similarly occurs after hitting the third team. The DB does not respond to the fourth team.

After all the LEDs of one of the indicator racks light up, the Domination Box plays an audio signal and starts flashing with the color of the winning team.

You can use this mode for two teams as well, but you need to set the Domination Box so that the racks of both participating teams are visible, for example, near a wall.

Flag Raising Mode

Two teams are participating. Capture by shots.

It differs in that the capture is carried out by shots, and the indication of the degree of capture is carried out simultaneously on all indicator racks on the basis of the flag raising principle.

After the first shot, the lower LEDs of all three racks are lit with the color of the player's team. When the number of shots is equal to 1/16 of the set capture parameter, the LEDs light up sequentially. If the second team makes a "re-capture", then first the LEDs of the color of the previous team will go out sequentially (the flag of the first team "drops"), and then they will light up with the color of the newly captured team (the flag of the second team is "raised").

Also, as in the Capture by shots mode, during the game the IR-emitters of the device by default issue the Radiation command, and players who are in the zone of influence of the emitters will be taken health units.

The winner is the team that first "raises" the flag / LED strip of its color. The Domination Box plays an audible signal and flashes the color of the winning team.

Service Mode

The Domination Box control board is equipped with a Wi-Fi module. Thanks to this, it is possible to flash the microcontroller of the device "by air". The need for it arises when updating the firmware (it is planned to increase the number of Box modes to at least 10), as well as to restore the current one.

The transition to the service mode is carried out by turning on the device with the service button held down.

The transition to this mode will be indicated by a blinking power indicator above the power button.

Due to the transition to a new data transfer protocol at the Domination Box, flashing is possible only remotely. To implement it, you need to contact the technical support of the company https://lasertag.net/support/.

6. SIRIUS station

The SIRIUS station is an additional device that, thanks to its capabilities, allows you to create a huge number of interesting laser tag scenarios. Distinctive features of the station are 8 game modes, a display panel, a touch sensor and a futuristic case with side backlight.

Battery charger port

Power button

IR emitters

LED panel

SIRIUS station
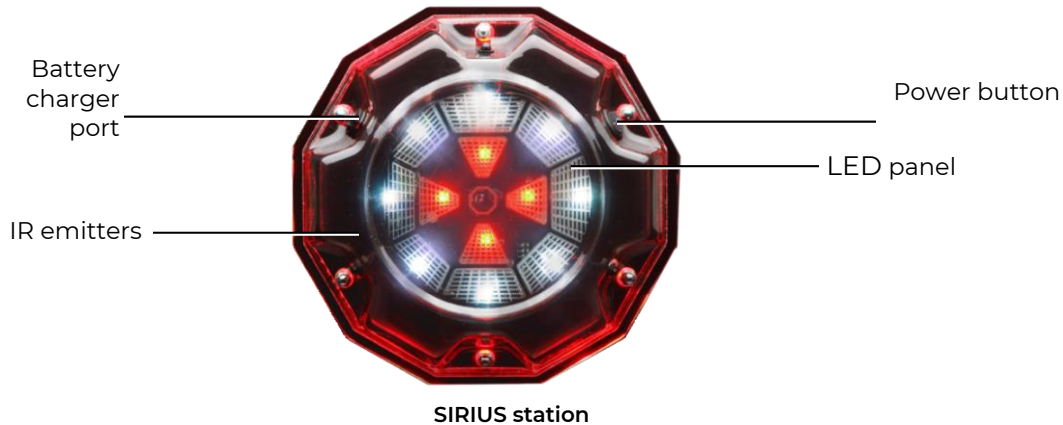
Power supply: 220 V network via a power supply unit (8.4 V 1 A) or a built-in 7.4 V 2600 mAh battery. Sound: buzzer.

The activation of the device (impact on the kits of players) occurs, depending on the mode, in three ways: by firing a shot at the device (modes Bonus and Flag), automatically by timer (other modes) and forced - when the body is briefly covered with the palm, the touch sensor is triggered (modes Medkit, Respawn and Arsenal).

Range with direct visibility: 5-7 meters.

Standby Mode

In sleep mode (before the start of the game and at the end), when the connection with the server is established, the station LEDs light up smoothly and fade alternately in different colors.

Game Mode

When the game starts, the device starts working in the selected mode with the settings specified in the program (the frequency of issued commands, the impact on players of certain teams, the number of shots for deactivation, etc.). Indication will correspond to the mode.

In the current release, the SIRIUS station can operate in eight game modes: Respawn, Radiation, Medkit, Arsenal, Random, Bonus, Base and Flag.

In the Respawn mode, the central four LEDs constantly flash in the color of the team that the device is acting on (if the LEDs are lit in four colors, it respawns everyone). The outer circle of LEDs in this mode performs the function of a timer - the LEDs that are set multiple times in the time program turn on the LEDs in white counterclockwise. After the 8th LED lights up, the device is triggered and respawns the players (restores the starting value of health units and ammunition). Activity is indicated by the frequent flashing of all LEDs in purple. Then the timer starts again and the cycle repeats.

The device can be deactivated by firing at it the number of times that can be configured in the program. Team players, who the device in this scenario is not affected on, can do it. If it is set to "Affect all", then players of all teams can deactivate. The station responds to a hit in the IR-receiver by the frequent

flashing of all LEDs in blue. During the self-healing period, the central indicators flash periodically, while the external ones display a countdown timer.

Due to the built-in touch sensor, you can forcibly activate the Respawn command without waiting for the timer to work - by briefly touching the device with your palm.

The mode is used in scenarios with a limited number of health units and disabled auto-respawn. One of the options is to install one SIRIUS each on the team bases, having previously configured them to act on a specific team. You should note that the device respawns only those players whose kits have 0 health units, i.e. only the "dead". The rest when the station is active, it refills the last magazine.

Radiation - the internal and external LEDs blink yellow, rotating counterclockwise. Activation (the player takes out the number of health units set in the program) is accompanied by the frequent blinking of all the LEDs in purple.

SIRIUS station in the Radiation mode can also be deactivated similarly to the Respawn mode. The difference is that to put the device on pause, it is possible for the team that the team acts on or all, if it is set to affect all.

The device in this mode can be used as an anomaly that will protect, for example, an artifact or approaches to the base, if you choose a selective effect on a specific team.

Medkit Mode - the central and closest 4 LEDs of the outer circle form an image of the cross of the color of the team that the device is acting on. The cross cyclically lights up and fades out. The outer circle of LEDs also serves as a timer - the LEDs that are set multiple in the time program turn on the LEDs in turn counterclockwise. After the eighth one is lit up, the device is triggered and replenishes the number of lives set in the program for players. In this case, all LEDs flash violet frequently. Then the timer starts again and the cycle repeats.

You can activate the Medkit command forcibly, while waiting for the timer to work - by briefly touching the device case with your palm.

As in previous modes, in the Medkit it is possible to temporarily stop the distribution - after getting into it a certain number of times in the scenario by players who are not affected by the device (with the parameter "Affect all" - all players).

The mode can be used to replenish the lives of "wounded" players (but no more than the value at the start of the game), and you can configure it to "heal" only one team or all teams.
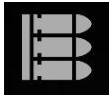
Arsenal - a row of three LEDs of the outer circle and one adjacent LED from the central circle form a blue sector that rotates counterclockwise. At the time of activation, the device adds to the player the number of cartridges or magazines set in the program (but no more than the starting value), which is accompanied by the frequent flashing of all the LEDs in purple.

As well as in the Medkit mode, in the Arsenal mode, the possibility of forced activation is available by touching the device case with your palm.

In this mode, it is not possible to configure the selectivity of the distribution of ammunition by commands, but you can configure the distribution of either cartridges or magazines and their quantity. As in the previous modes, the station can be deactivated.

Using the Arsenal mode is convenient in scenarios with limited ammunition - the device can be installed on bases (for example, by setting the maximum number of "lives" for kits, but only one magazine) or in separate zones for replenishing ammunition.

In the "Random" mode - the central 4 LEDs perform the timer function - they turn on counterclockwise in turn when the time set in the program is multiple. LEDs in the outer circle flash in different colors. When exposed to players, all LEDs often blink purple.

In this mode, the impact also occurs on players of all teams.

Since during activation one of the commands is distributed in random order: Double lives, Arsenal (the magazine is completely filled) or Radiation (health points are taken away), the SIRIUS station in the "Random" mode can be used in scenarios with anomalous zones - an element of unpredictability adds interest to the game.

Base mode - the indication is similar to the Respawn mode, i.e. if the base is red, then the central LEDs glow red. The difference is that they do not blink like in Respawn, but glow constantly. The outer circle in white also displays a timer. When commands are issued, all LEDs often flash purple.

When activated, the device gives out two commands at once - Respawn and Radiation. Moreover, the impact on teams is made in different ways - if the team of the Reds is selected in the program as the "mistress" of the base, then only this team will be respawned, and the rest will be affected by "Radiation". As in the Respawn mode, SIRIUS in the Base mode respawns only "killed" players. If the player has health units, the station refills only the last magazine.

To deactivate a foreign base, it is necessary to shoot a certain number of times in the scenario settings. Hits are indicated by the frequent flashing of all LEDs in blue. After deactivation, the central LEDs often flash, and the external LEDs display a countdown timer until self-healing.

The <u>Base</u> mode is one of the most popular in scenario laser tag games. Based upon the name, the device in this mode is installed on the team bases in scenarios with a limited number of health units and ammunition. Moreover, it protects itself from deactivation by players-opponents.
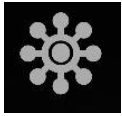
 Indication in the <u>Bonus</u> mode is as follows: the outer circle of LEDs shimmers in a rainbow clockwise, the center ones do not glow. The mode differs from others in that there is no automatic distribution. The impact on the player (double health units) occurs only after a shot at the device. Distribution is accompanied by frequent flashing of all LEDs with the color of the team of the player who fired.

Bonuses are distributed to all players, regardless of the team color.

In the program, you can set a limited number of distributions of bonuses, after which the device pauses and resumes its work after the time set in the program. During inactivity, only the central LEDs shimmer with a rainbow.

 <u>Flag</u> mode: the sense of this mode is as follows. The player's kit has a new status - <u>Flag bearer</u>. It arises after the player from close range falls into the SIRIUS of the opposing team during the game according to the scenario of this series. In this case, the device sends a coded infrared signal to the kit of the firing player, which must be received by the vest or blaster hit sensors (the "flag is captured" sound signal). After the player becomes a flag carrier, now his task is to deliver the virtual flag to his base unharmed. The procedure for surrendering the flag is the same - shoot at your team's SIRIUS until you receive the "Flag accepted" confirmation.

Each of the SIRIUS generates a virtual flag for their team. In this case, the central LEDs of the devices glow with the team color, and the white LED "rotates" clockwise along the outer circle. In parallel, the devices every 60 seconds distribute the protocol command <u>Respawn</u> via the IR-channel and restore the initial settings of the kit to the deactivated players whose station is.

After passing the flag, the player's role settings return to the start preset. The game ends when one of the teams fulfills the game end condition.

The device is configured and controlled from the Lasertag.Net Operator program via Wi-Fi channel: Menu Scenarios/Settings/Additional devices tab/Add SIRIUS/Settings (see Ch. 9.3.3 of this manual).

Due to the transition to a new data transfer protocol at the SIRIUS, flashing is possible only remotely. To implement it, you need to contact the technical support of the company https://lasertag.net/support/

7. Multistation

The Multistation (MS) is a multifunctional additional device for playing laser tag which significantly increase the list of possible scenarios.

The main advantage of this device is the availability of the LED screen (panel 192x192 mm, 1024 pixels), which clearly shows the mode the station is being used in. Also, thanks to a futuristic design, interactive animation and side lighting, Multistation makes the games more colourful and spectacular and becomes an adornment of any platform.
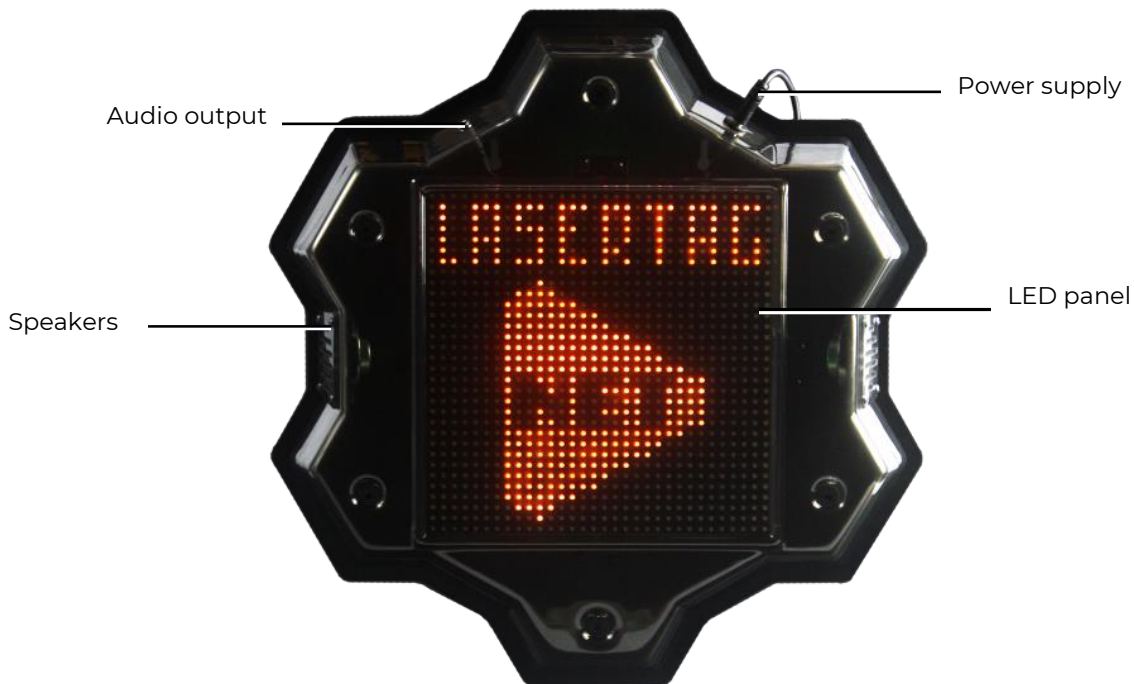
External Elements of the Multistation

Power supply: 220 V network via 8.4 V 2 A.

Sound: built-in speakers + audio output.

The Multistation is inherently the development of a standard laser tag device - the Utility Box. But besides this, it acquired the functions of a Domination Box, an Electronic bomb and a Base.

In the current release, the Multistation can work in seven modes: Medical Kit, Arsenal, Respawn, Bomb, Check Point, Radiation and Base.

When the game round starts, on the LED screen of the Multi-station, instead of the company logo, a picture appears showing in which mode the device is operating. Moreover, the screen, like the device itself, is interactive and can respond to the actions of players.

In the Medkit mode, health units are distributed over the IR-channel with the interval set in the settings. Moreover, at the time of activation, the image of the red cross changes on the screen.

In the program, you can set a parameter when the effect is made on one or all teams. The mode is used in "survival" scenarios with a limited number of health units.
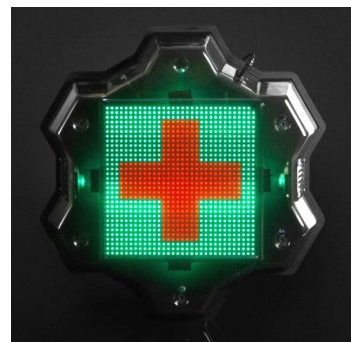
In the _Radiation_ mode, at given intervals, health units are taken away. In this case, the standard radiation sign makes a turn on the screen.

Also in this mode, you can set which team the device affects – for one or for all.

In this mode, the Multistation is best used in scenarios with artifacts.
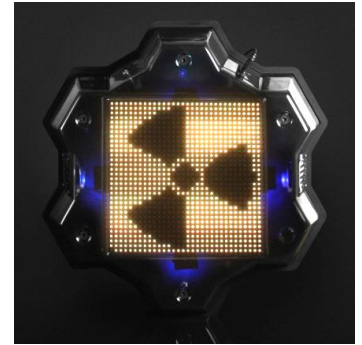
In the _Respawn_ mode, the Multistation restores the number of health units and the ammunition of the kit to the starting state.


It is valid only if the player at this moment has no health units left. To the "Alive" it replenishes the last magazine. At the moment of activation, a silhouette of a person flashes on the screen. Just as in previous modes, you can choose which team players will respawn the device.

The mode is used in many scenarios with a limited supply of health units and ammunition.

In the _Arsenal_ mode, cartridges or magazines can be replenished in one of the ways - by waiting for the automatic distribution or by firing from the blaster into the device (can be configured). At the same time, in the clips shown on the screen, the upper cartridge is sent to the chamber, and two lower ones rise in its place. After using the third cartridge, the "conveyor" loads the next package of ammunition. In the program, you can choose to add either cartridges or magazines and their quantity.

The mode is used in survival scenarios with limited ammunition.
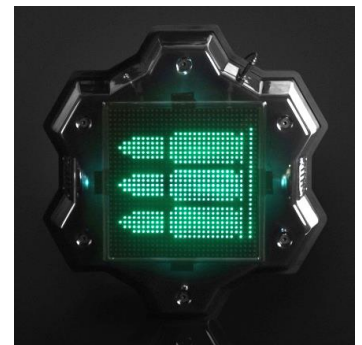
The _Bomb_ mode allows you to conduct scenarios that resemble one of the episodes of the computer game "Counter-Strike". Namely, "Bomb Defusal". Starting with the multistation firmware version MS_v2.1.14, the mode functions in a new format.

Initially, players are divided into two teams - _miners_, who set the bomb and _sappers_, who must disarm it.

Simplified scenario of a game using Multistation in the "Bomb" mode is as follows:

- A team of miners sets a bomb with shots the number of which is set in the program. The team of sappers at this time is trying to prevent this, hitting the players of the miners team. The dynamics of the installation can be observed on a progressive scale at the bottom of the screen of the Multistation. Moreover, the device does not respond to sapper shots.
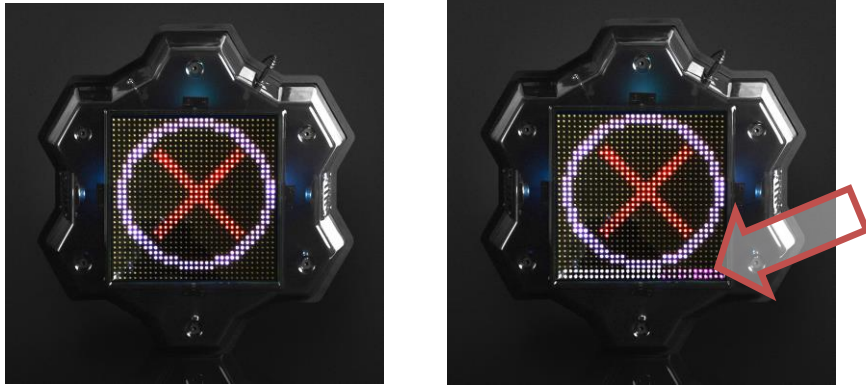
- If during the game round the installation did not complete, or the bomb did not explode, the victory is awarded to the team of sappers.
- If a bomb was installed, the speaker of the Multistation reports: "Bomb has been planted" and the timer starts, which is graphically displayed on the screen as a burning wick of an old grenade. The "wick" is lit in proportion to the time set in the "Clock work" field. Now tasks of the teams become diametrically opposed - the team of sappers needs to disarm the bomb during the timer work, hitting the device (shots are also controlled by the lower two rows of screen LEDs), and the miners must counteract this by hitting the opponent. Accordingly, the station now does not respond to shots from miners.
- The following are two options. The sappers manage to disarm the bomb, and it returns to its original state - the message "Bomb has been defused" sounds and the ring with a crosshair appears on the screen again. Or the bomb explodes.
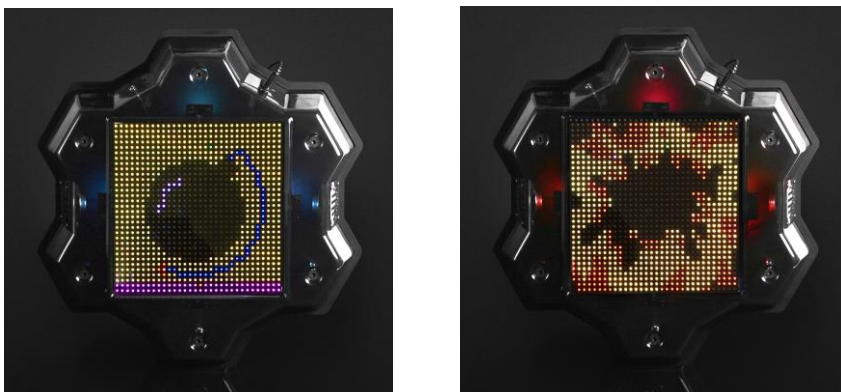
One of the most popular additional laser tag devices is the Domination Box. The Multistation can work in this mode. But the device's functionality as such takes into account the specifics of the indoor laser tag.
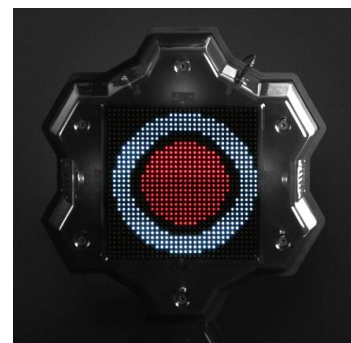
When the round starts, a white target-ring appears on the screen. When a blaster beam hits the device, a color circle of the player's team appears in the center of the screen. On subsequent hits by players of the same team, the circle will increase. The circle growth dynamics corresponds to the value "Number of shots for activation/deactivation" set in the program, i.e. if 5 units are set, the circle will fill after 5 shots, if 20 - after 20.

If a player of another team hits the device, a circle of color of the second team appears in the center (the circle of the first team does not reset) and with subsequent shots the circle of the new team begins to increase in size.

The task of the players is to fill the entire circle with the color of their team first, after which the point is considered captured and only after that points will be awarded to the capturing team (1 point in 1 second of retention).

After the capture, the task of the players of other teams is to intercept the point. By firing shots at the device, they fill the circle with their color, and players of the captured team reduce it with shots. If the other team nevertheless intercepts the point, then points accrue to it already.

In order to prevent players from accumulating near the Multistation operating in the "Domination Box" mode, you can set the "Radiation" parameter in the program (the distribution period and the damage done are also set in the program).

This mode can be used in scenarios with the completion condition of the Team points limit (Menu Scenarios/Scenarios tab/Game end conditions/Team points limit). Meanwhile, the game ends ahead of schedule with the victory of the team that scored the set number of points, and the image of the cup of the winning team color is displayed on the screen.

If the parameter of early termination is not turned on and the game ends in time, the team that scored the most points by this time wins. If two or more teams have equal number of points, the victory is awarded to the team that owns the point by the time the game timer stops.

The mode Base has been added in the list of modes for additional devices comparatively recently. Its main difference is the respawn and radiation lesion of selectively players of teams of different colors. It is also possible to destroy (deactivate) the opponent's base.

After the scenario starts, an image of a waving flag of the team color appears on the screen of the Multistation. The LEDs of the side illumination also glow in the same color. At the time intervals set in the program, the device distributes the Respawn command via the IR channel, which restores the initial values of the health units and ammunition of the players of its team (does not work on "alive" ones - only the last magazine is replenished). With the same frequency, the Base distributes the Radiation command, which acts on players-opponents. With these activities, a corresponding picture appears briefly.

To destroy the opponents' base, you need to shoot at the device set in the scenario settings the number of times. In this case, the white bar at the bottom of the screen will graphically display the degree of destruction. After the strip reaches the right edge, an explosion animation is displayed on the screen and the crossed-out flag appears. From this moment, the Base is inactive.
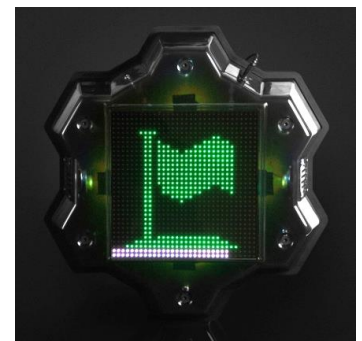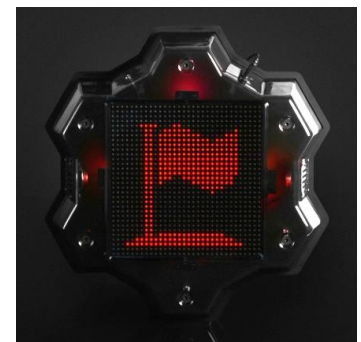
If the "Base captured (times)" parameter is enabled in the scenario (Menu Scenarios/Scenarios tab/End game conditions/Base captured (times), the game ends ahead of schedule with the victory of the team that captured the opponent's base the number of times set in the program.

If this parameter is disabled, then after the time set in the "Inactivity time" setting (Menu Scenarios/Additional devices tab/MS Settings/Base/Inactivity time) the base will self-recover.

The Base mode can be used in any scenario with a limited number of health units and ammunition.

The device is controlled from the Lasertag Operator computer program via a Wi-Fi channel. Setting up the Multistation is described in chapter 9.3.3 of this manual.

Due to the transition to a new data transfer protocol at the SIRIUS, flashing is possible only remotely. To implement it, you need to contact the technical support of the company https://lasertag.net/support/.

8. Supernova laser tag bomb

The SUPERNOVA laser tag bomb is an additional device that makes it possible to implement in laser tag scenarios with the installation and clearance of "time bomb", including the scenario "Bomb planting" from the computer game Counter Strike.

The device consists of two parts:
- portable bomb;
- stationary NFC platform (at least 2 pcs).

The bomb is activated/deactivated only when it is on the platform. The number of platforms can be more than the number of bombs, and they can be placed in different places on the site.

Components of the Laser Tag Bomb

A portable bomb is a device with a plastic body framed by expanded thermoplastic elastomer. The bomb has an autonomous power supply from built-in batteries, a speaker, a charger connector, an action button, an electronic timer and a carrying handle. The electronic circuit board is equipped with a Wi-Fi module for communication with the server and NFC-module to contact with the platform.
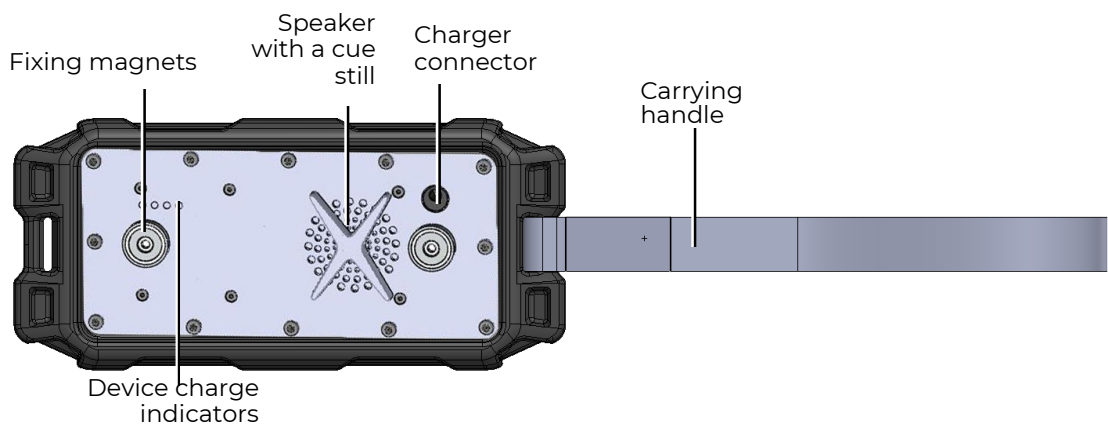
Portable bomb. Back view

The stationary platform is equipped with special mounting holes for installation on vertical or horizontal surfaces of the site. A recess in the body of the platform and built-in

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magnets allow the bomb to be securely fixed in case of installation. An NFC card (mark) is also embedded in the platform, which identifies the place where the bomb was planted.

The bomb is turned on by pressing the action button for 3 seconds. After turning on, the device goes into the "Out of game" mode and the digital display shows a smoothly blinking indication in the form of horizontal segments with a colon in the middle: «--:--».

In out-of-game modes, it is possible to see the charge of the built-in batteries - pressing the action button for 1 second activates four white LEDs located on the back part of the device body. The glow of 4 diodes corresponds to a charge of more than 75%. When the charge is 50 to 74%, three LEDs light up. 25 to 49% - two LEDs. Blinking of one indicator means a critical value - less than 24%.

Turning off in the "Out of game", "Bomb deactivated", "Bomb detonated", "Service" modes is performed by pressing the action button for 2-3 seconds until the "OFF" message appears on the screen.

In game mode, to turn off the power, press and hold the button for 90 seconds. In this case, if you release the button during this time, the progress is reset, and to turn off you need to press the button again for 90 seconds.

Before the game stationary NFC platforms are installed in different places of the playground, and the players are divided into two teams:

- miners (or terrorists like in the game Counter Strike), by default, it is the team of red;
- sappers (special forces), by default, it is blue team.

After adding a device to the Lasertag Operator program (it should be displayed in the "Additional devices" tab of the main program menu) The bomb turns on the "In game" mode, which is indicated on the bomb timer dial by clockwise stripes moving in a clockwise direction.

The bomb is handed to one of the players on miners team and the round starts.

The task of miners is to plant a bomb on one of the platforms.

The task of sappers is to prevent the planting, and to deactivate the bomb before the explosion if it is planted.

The bomb is planted as follows:

1. After the player with the bomb and who still has health units, manages to approach the planting point - one of the stationary platforms (to the plant - as it is called in CS), the player must insert a portable bomb into its socket (the button should be on the right).
2. The device switches to the "Bomb installed" mode - the numbers on the display start blinking, showing the time at which the timer is set.

The clockwork is configured in the appropriate section of the Lasertag Operator program (Scenario Settings/Additional Devices/Bomb Settings). By default, it is 1 minute.

In this case, the bomb reader receives data from the NFC card embedded in the platform, and information about its number is transmitted to the server.

If in this mode the bomb is removed from the platform, it switches to the previous mode "In the game" and the corresponding indication turns on.
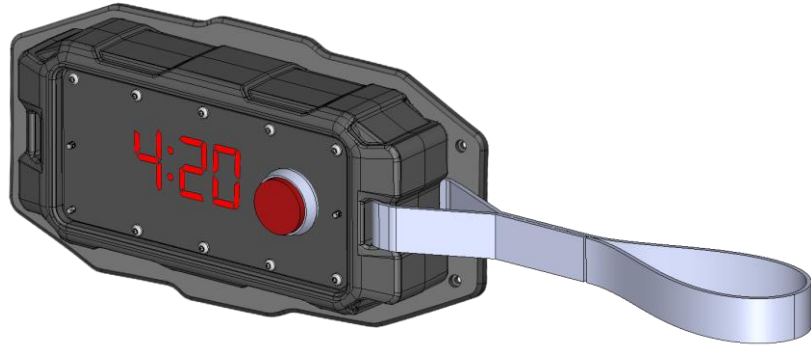
3. After a few seconds, which are accompanied by a sound signal, a hint will appear on the bomb screen - the inscription "Shot". It says that the player from the miners team must confirm that his individual kit is active - it is necessary to shoot from his blaster at the bomb receiver located behind the front panel of the body

4. The successful confirmation is indicated with a green LED in the upper right corner of the screen and then the next hint appears on the screen - the inscription "Hold". If a player of the sapper team shoots at the device, the LED turns red, and the device doesn't switch to the next mode.

5. Next, you need to press and hold the action button for 3 seconds. The bomb activation process is indicated by the absence of flashing of the timer display and the sound from the device speaker. If a player of miners team did not hold the button for 3 seconds, or at that moment a player of sappers team fired at the bomb, the activation process will be canceled. The miner should shoot the bomb again and repeat the pressing of the action button.

6. As soon as the bomb switches to the "Bomb is activated" mode, the countdown timer starts - the display shows the time decreasing every second until the explosion. At the same time, a short beep will be played by the bomb speaker every second. During the last 10 seconds before the explosion, the frequency of signal playback increases up to several times per second.

7. If during the operation of the clockwork the bomb is not deactivated, an "explosion" occurs - the inscription "Booo" blinks on the display, LED flashes with overflow of colors, a corresponding sound is played and all kits within a radius of about 10 m are hit via the Wi-Fi channel. The amount of damage is selected in the Lasertag Operator program (Scenario Settings/Additional Devices/Bomb Settings). The default is 100 health points.

If sappers team failed to prevent the installation and activation of the bomb, it must be deactivated. Such procedure can be done while the timer is running, but not later than the time set in the "Clearance time" parameter of the bomb settings in the program.

<u>To deactivate the bomb</u> you need to:

1. The player of the sapper team, who approached the planted bomb, also needs to confirm the activity of his kit - shoot from their blaster into the front panel of the device. The device displays the "Hold" hint, but the device timer continues to count down.
2. The player is given 3 seconds to press and hold the action button for a set clearance time (10 sec by default). If the sapper does not have time to hold down the button in 3 seconds, the screen displays the inscription "Shot" again and for the next attempt it is necessary to repeat the shot from the blaster. The device reacts to the shots of miners with a red LED glow and does not switch to the next mode.
3. If the clearance process is started when the timer has less time than is necessary for clearance, the explosion still occurs, i.e. it is impossible to deactivate the device during this time.
4. In the operating mode of the clockwork, there is a "protection against violations of the game rules": if at this time the bomb is removed from the platform, the sound "Alarm" is played and the device switches to the "Out of game" mode. The inscription "Eror" (error) is displayed and the instructor must restart it to continue the game.

5. Successful deactivation of the bomb is accompanied by a timer stop and a special sound signal, the screen displays the inscription "SAFE", the LED glows blue.

6. To reuse the bomb, it must be removed from the platform and handed to the instructor.

You can choose various scenarios playing with the Bomb device. For example, it can be configured so that each team has its own portable bomb in a round. In this case, a team of miners and sappers is selected for each device, and then the color of the bomb tile decoration in the program will correspond to the color of miners team.

You can create such a scenario when not two, but three or four teams participate in the game. Each team has its own bomb color coded (for example, using colored tape). In the settings of each mine, a different color for the miners team is selected, and in the settings for the color of sappers team, "All" is selected. Then a player of any team can execute bomb clearance, and so that he does not accidentally begin to deactivate the bomb of his team, the player must pay attention to the marking color.

In long-lasting laser tag games, more explosions and clearances than there are bombs can be set to fulfill the game finishing condition. In this case, after the explosion or clearance by the instructor, the bomb is removed from the platform, transferred to the starting position of the miners team, and re-launched into the game (it is removed from the game in the program and added again). Each successful action of teams is reflected in the final statistics.

Alternatively, you can further bring the scenario closer to the computer game Counter Strike if exclude from the settings any "respawn" of players and add one more condition for the end of the game: "One team left". In this case, the game ends either with a bomb explosion, or mine deactivating, or when all the players of one team are deactivated.

9. Setting up a router (Wi-Fi network)

9.1. Self-configuration of the router in case of accidental resetting

If the settings of the router for any reason were violated (for example, you accidentally pressed the RESET button or made changes to the settings that led to incorrect operation of the router), you should configure the router yourself using a personal computer. To do this, you should:

1. Position the antennas vertically;
2. Connect the computer directly to the router via any of the 4 LAN connectors using an Ethernet cable (included in the delivery set);
3. Turn on the power of the router and wait for it to load;
4. In any browser installed on the computer (Opera, Google Chrome, Internet Explorer), enter the address https://192.168.0.1 in the URL input line;

If the router settings page does not open, you should reset the router to the factory settings – on the mounting side of the router, hold down the RESET button and wait for the indicators to turn off for a moment, then release the button.

Reopen the router settings page.

5. On the back panel of the router, read the login and password from the sticker tapped by the company's QCD and enter the settings menu.

To do this, in the window that opens, enter the username and password in the appropriate fields;

6. In the window that appears, click on the name of the Archer C80 router:
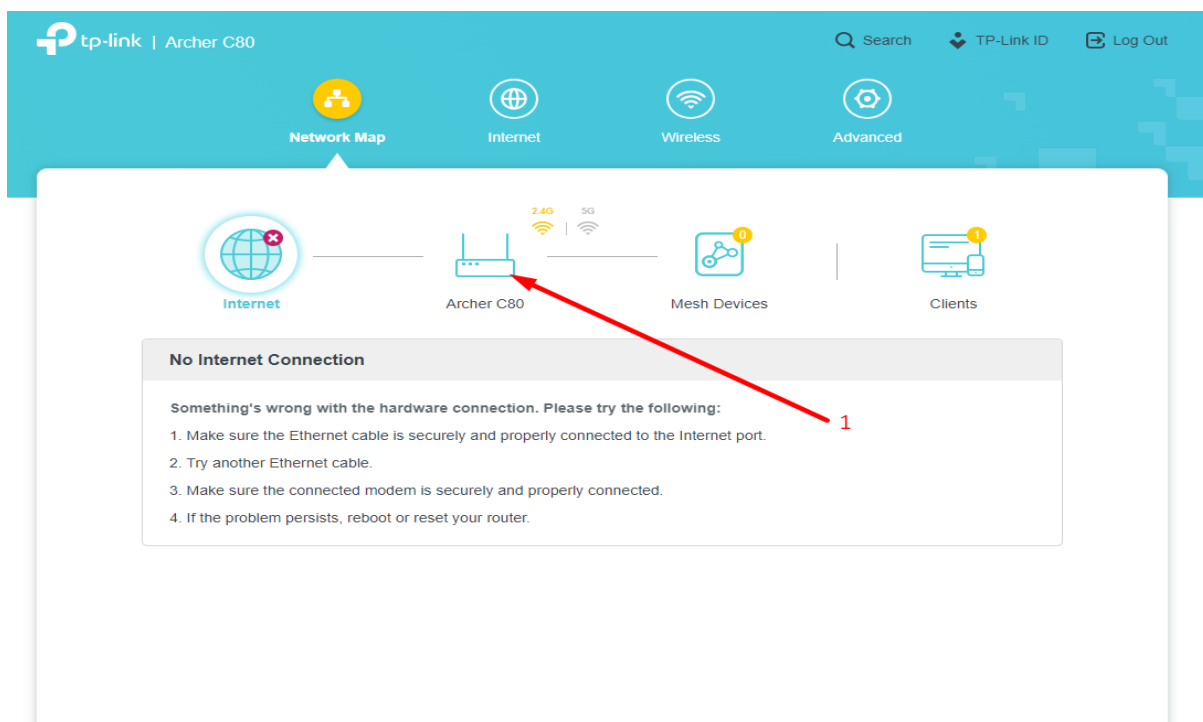
7. Next, in the Wireless menu, click Edit.
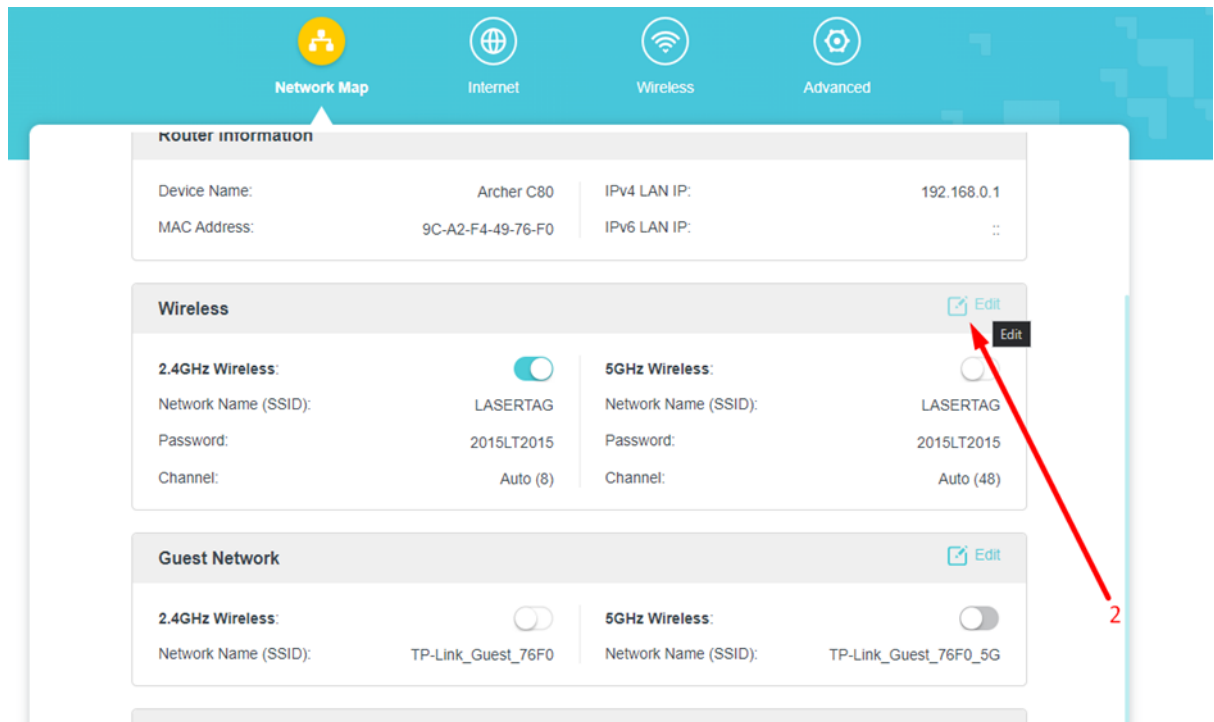
8.	In the window that appears, enter the LASERTAG network name in the Network Name (SSID) field, and enter the 2015LT2015 password in the Password field.
	Check that the remaining fields are filled in according to the picture.
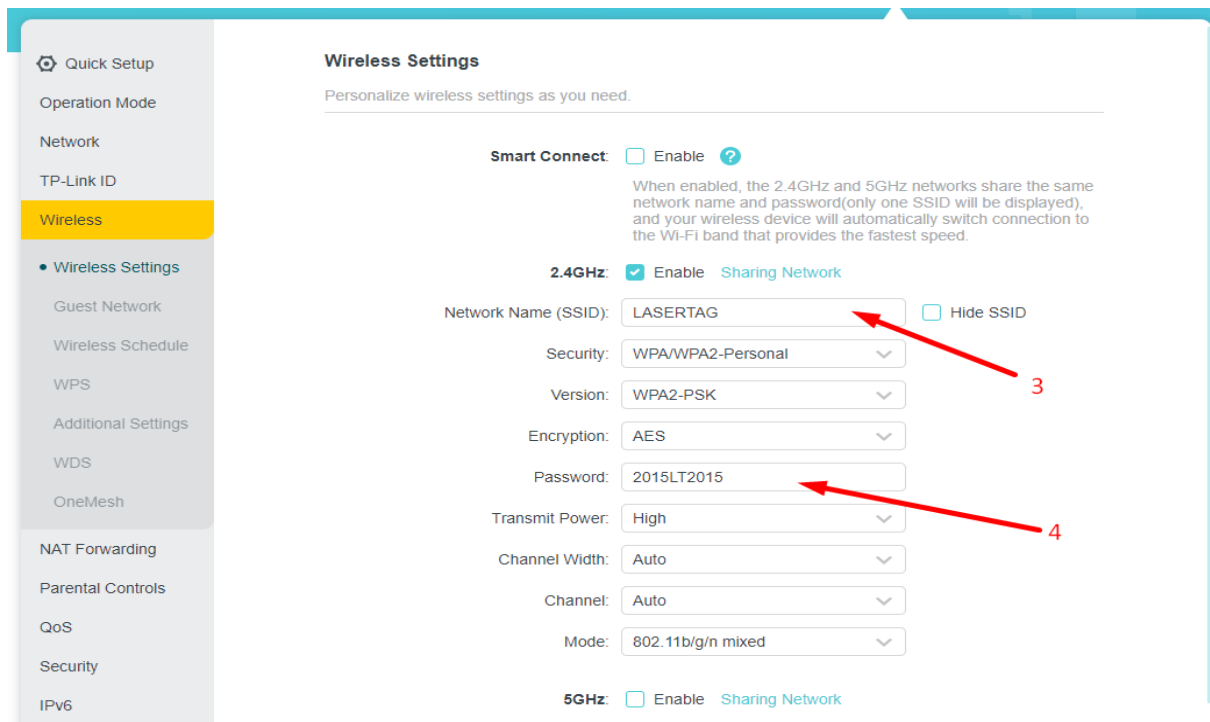
The router is ready to operate.

10. Setting up and controlling equipment using the Lasertag Operator program

The program Lasertag Operator is designed to set up the equipment, control the game and record statistics using devices supporting the Android operating system (smartphones, tablets). The program interface language is automatically selected depending on the device settings.

Minimum hardware requirements:
Snapdragon 450 chipset
RAM 4 GB
ROM 16 GB
Android operating system version 7.0

The connection of the Android device with the laser tag equipment is carried out via a router.

10.1. Connecting Android device

1.   Download and install the Lasertag.NET Operator program on the device - available at:
   https://play.google.com/store/apps/details?id=net.lasertag.operator
                    or https://lasertag.net/support/
2.   Install the program.
3.   Turn on a router configured for a specific hotspot. At factory settings, the hotspot name is LASERTAG, the password is 2015LT2015.
        Note: the system supports 5 more names:
           LASERTAG-NET, password - 2018LTN2018
           MGO, password - 2018MGO2018
           Test mode, password 2018TM2018
           OTK, password - 2018OTK2018
           TechSupport, password - 2018TS2018
   In these cases, the hotspot, as well as all the laser tag equipment used at one site, should be configured in accordance with the selected name and password.

To prevent interference between routers it is recommended to locate routers at a minimum distance of 10 meters.

4.   On your Android-device, turn on the Wi-Fi network connection mode (Settings/ Connections/ Wi-Fi) and search for the Hotspot. (The setup procedure may differ depending on the version of the operating system and device model).
5.   After finding the LASERTAG Hotspot, select it and enter the password 2015LT2015 in the window that appears.
6.   Touch the Connect button. A connection entry should appear under the LASERTAG inscription, marked "no Internet access".
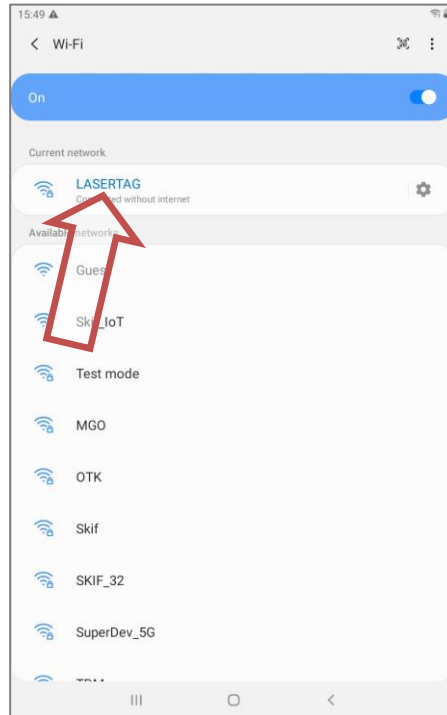
7. Launch Lasertag Operator program. The first time you open the app, the quick user start guide is shown.
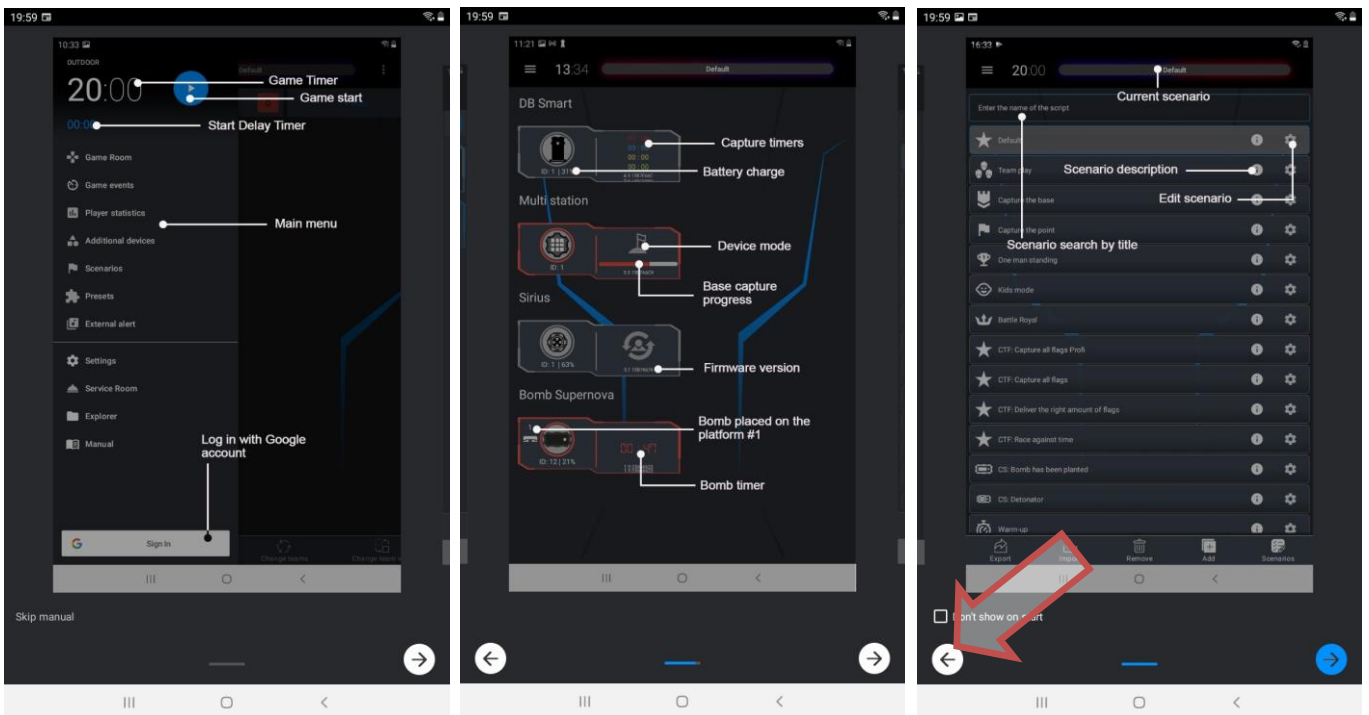
It is recommended to start mastering the program with this manual. If desired, you can select the Skip training item. On the last slide of the displayed instruction, you can check the Do not show at start option. If you want it to be shown again, in the settings click "Allow training".

First of all, the application will request access to the device's location, files, and so on. It should be noted that access to location data is needed to control Wi-Fi network data and

correctly display the game network, which will be indicated in the corresponding pop-up notification
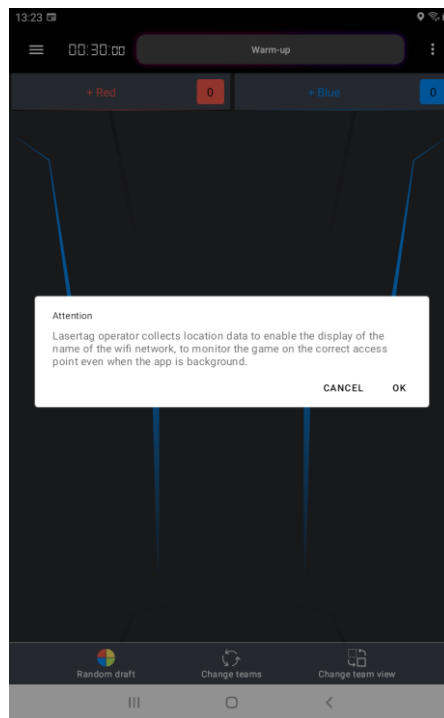
After that you need to make sure that the device is connected to the desired network. At the top of the main menu screen, two stylized green Wi-Fi icons, the name of the network, and a message that the network is correct will be displayed. If one of the icons is red, the device is connected to the Wi-Fi Internet network, not to one of the local networks intended for laser tag games. In this case, you need to reconnect to one of these networks – Lasertag, Lasertag.net, etc.
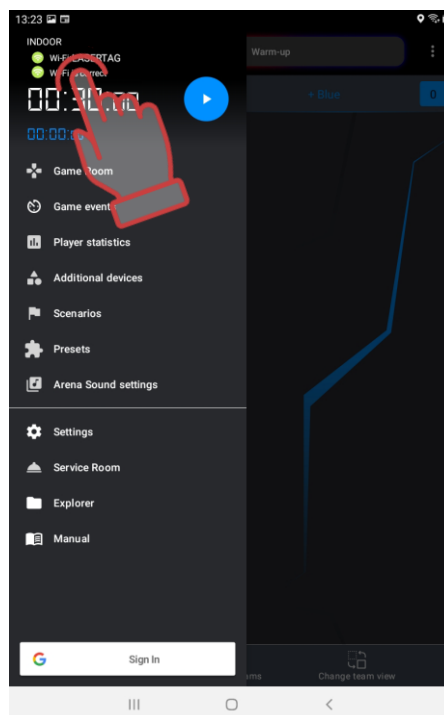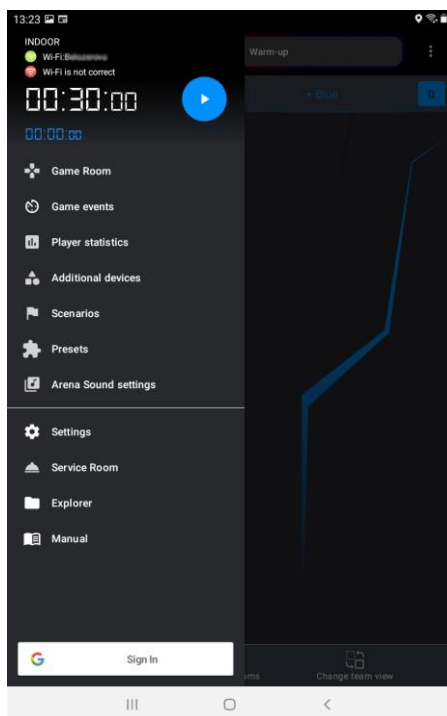
8. In the start window click on the <u>Main Menu</u> button ☰ , or swipe to the right (slide your finger horizontally from the left edge to the center of the screen) and go to the main menu screen.
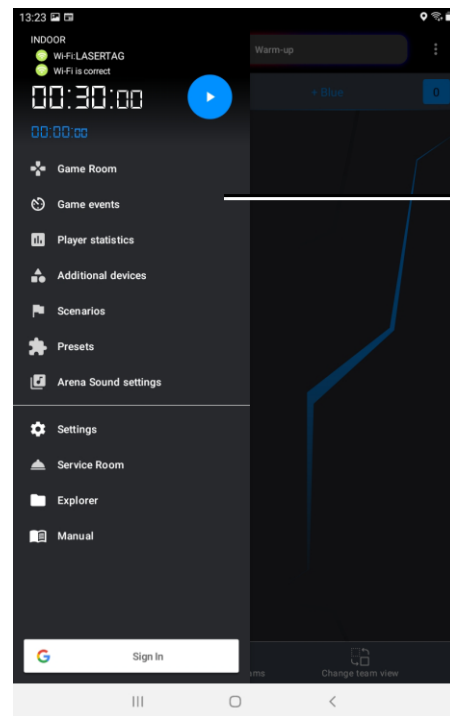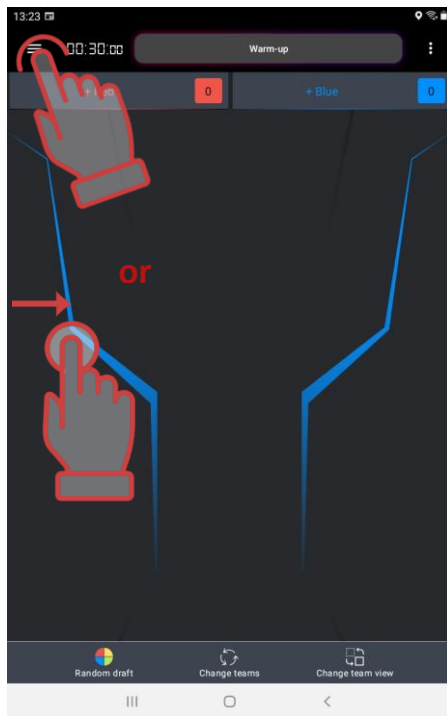
Main menu

10.2.　　Settings

Before starting the gameplay, you need to go to the <u>Settings</u> menu.

The window is divided into six sections.

The top section contains the language selection of the application. When you click on the checkbox, a list of available languages is displayed. By default, the application opens in the same language in which the operating system is currently running. When the language is changed, the application restarts.
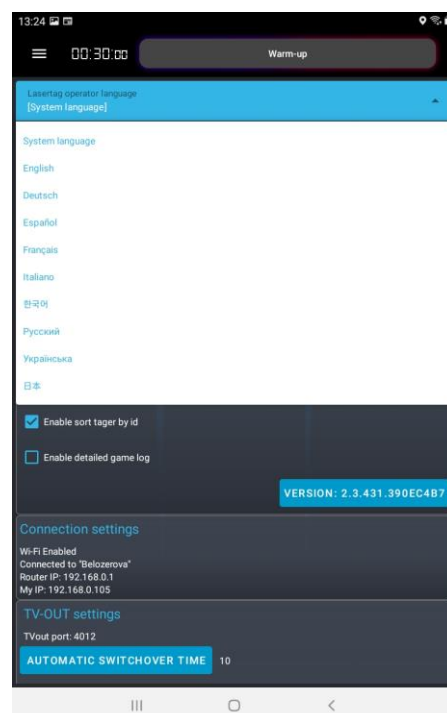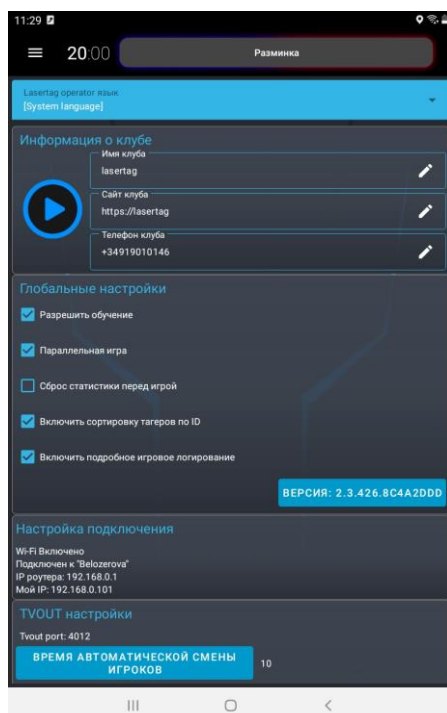
Below is <u>information about the club</u>. These data will be shown on the forms for printing statistics.

To enter up-to-date information on the club, you must touch the corresponding line and, using the keyboard that appears, enter the name, website address and phone number of the club. To hide the keyboard after editing - click on the checkmark button at the bottom of the screen.

In the same way, you can change the image of the club logo - click on the current logo and select the desired image in the opened window of the file system of the tablet or phone. The recommended logo size is 200x200 pixels. When uploading a larger image, the image will be automatically adjusted to the specified size. It is not recommended to load a smaller logo, because the picture is stretched and the image will be of poor quality.

The <u>GLOBAL SETTINGS</u> section has five items: ALLOW TRAINING, PARALLEL GAME, RESET STATISTICS BEFORE THE GAME and TURN ON SORTING OF BLASTERS BY ID, TURN ON DETAILED GAME LOGGING.

If the <u>Allow training</u> point is checked, training slides are shown when the application starts. If the item is not checked, the tutorial is not shown.

The <u>Parallel game</u> point is necessary when games are played simultaneously on several open areas, bounded by each other, for example, only by nets. In this case, it is possible to hit the player from a blaster participating in the game on another playground.
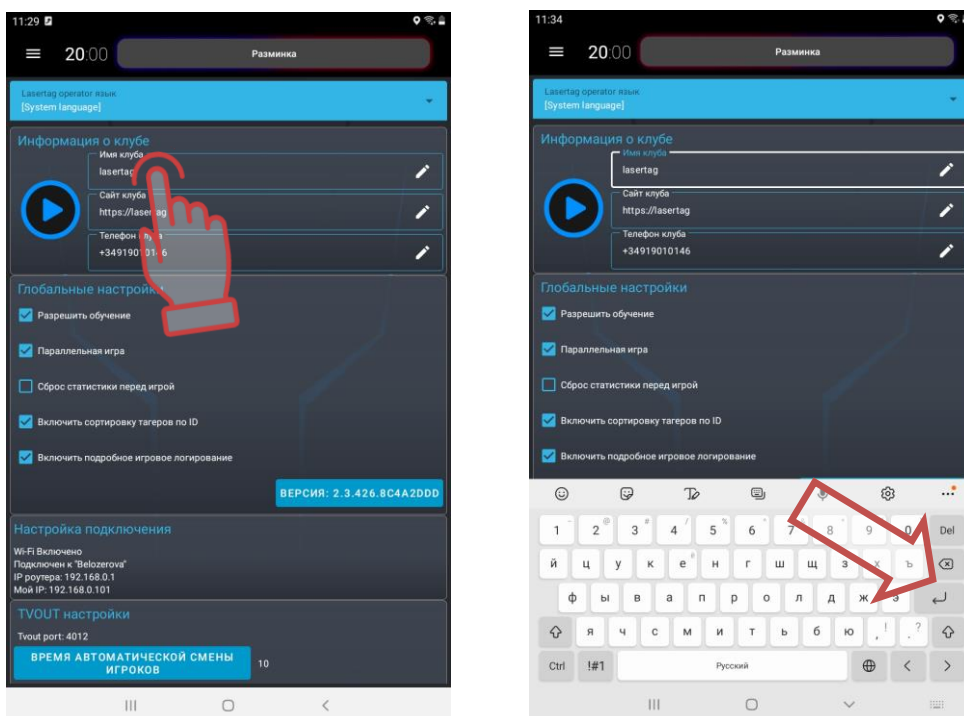
Control over the observance of the parallelism of games is possible only when the settings and management of games are performed from different servers. In this case, the PARALLEL GAME item (Main menu/Settings) must be checked on the control tablets. The algorithm for conducting parallel games is as follows:

1. When the game starts, the server throws off the identified numbers of the playerss participating in the round to the kits.
2. After the IR-signal of the opponent's blaster hits the player's kit sensor, the ID number is compared with the list of numbers participating in the game on this site.
3. If the number is on the list, the hit counts. If not, it is ignored.

The marked item <u>RESET STATISTICS BEFORE THE GAME</u> allows you to automatically reset game statistics before each round.

If you check the box ENABLE SORTING OF BLASTERS BY ID, then in the Game room window the tiles of the players will be arranged in order - numbers in ascending order from top to bottom. Otherwise, the tiles will be arranged in random order.

The marked menu item TURN ON DETAILED GAME LOGGING allows user to display the maximum number of game events. If the item is not checked, in the sub-item of the main menu "Game events" during the game, only the main events in the game are displayed - the start and end of the game, the base capture, the capture of the Domination Box, etc. If the item is checked, this submenu displays all game events, including all hits and defeats of players against each other.

The next section is CONNECTIONS SETTINGS. Here you should check the availability of a Wi-Fi connection, the correctness of the selected network name (LASERTAG), the IP of the router (192.168.0.1) and the device (My IP).

Next is the TV OUT SETTINGS section. The parameter of the TV OUT port is indicated here - this number, like IP devices, is required to configure the display of statistics on an external screen (the LaserTagStatistic program is used - see Ch. 2).

During a game round, statistics can be displayed both in the form of player tiles and in the form of a table. In this section, you can select DISPLAY TYPE. In a tiled view, it may turn out that all of the players' tiles cannot fit on the screen. In this case, the program splits the display into pages and the frequency of page turning in seconds is set by the TIME OF AUTOMATIC PLAYER CHANGE parameter.

User can select the display language as one more item - the language in which the information is displayed on the external screen. Currently there are 5 languages available - Russian, English, Spanish, French and German. To select a language, shortly click on the selected current language and, if necessary, select another one from the drop-down list.

Also in this section you can select the interface language of the statistics display program and show/hide the game timer on the screen.

The last section of the Settings menu is FISCAL STATISTICS. It has two fields for entering a username and a secret key. If the data is entered correctly and the LOGIN button is pressed, the club administrator gets access to the statistics of the games played to the server. Detailed – see ch. 10.9.
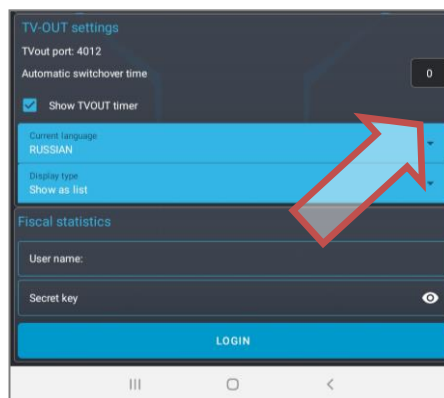
10.3. Scenarios

A number of ready-made scenarios are built into the Lasertag Operator program (see chapter 10.3.1.) All of them have been tested in real conditions, but, as a rule, the scenarios must be adjusted depending on the size of the ground, the number and composition of players. The program has such an opportunity, as well as the ability to create your own original scenarios.

Clicking in the main menu on the inscription SCENARIOS opens the list of scenarios in the form of tiles.

Clicking on the icon on the scenario tile opens information with data on the difficulty level of the scenario and its brief description.

To speed up the search for the desired scenario, you can click on the line ENTER THE NAME OF THE SCENARIO and type the first letters of the name on the keyboard that appears. Scenarios starting with these letters will appear. Now you need to click on the required tile - it will take the top position in the list.

In order for the game to use the selected scenario, you need to press on the tile.
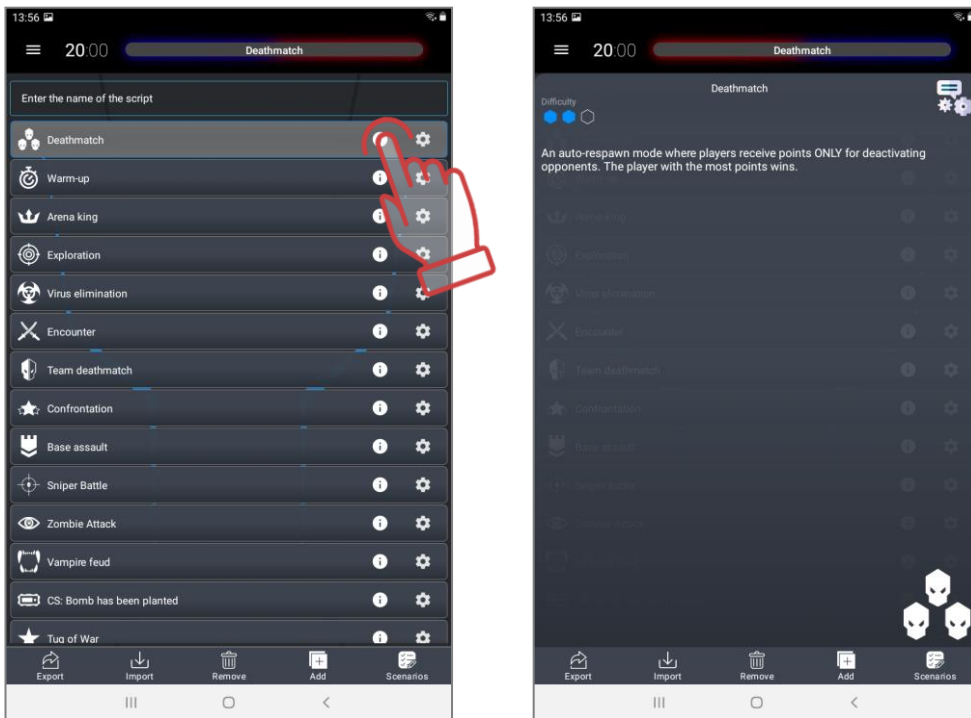
The scenarios tab can also be called directly from the Game Room tab - when you click on the display of the name of the current scenario, a window with scenario tiles will open.

10.3.1. Description of built-in scenarios

The scenarios built into the Lasertag Operator program are focused on a typical indoor laser tag playground with numerous shelters and an area of 200 m2 or more. In the arsenal of additional equipment, it is recommended to have at least 1 Multistation (optimally 3), 5 SIRIUS stations and one SMART Domination Box.

Below is a table of standard game kits settings that are used in default scenarios. If any table parameter is changed, this is indicated in the description of the specific scenario.

Specification	Units of measurement	Quantity/ Indication
Health units	Health units	100
Time of invulnerability	Sec	1
Shock duration	Sec	1
Respawn invulnerability	Sec	2
Regeneration	Sec	1
Points for steps		0
Recoil		Yes
Side lighting		Yes
Vest vibration		Yes
Defeat in weapon		Damage
Additional weapon		No
Weapon damage	Health units	25
Weapon type		Falcon
Recharging time	Sec	2
Autoreload		No
Friendly fire		No
Endless magazines		Yes
Number of magazines	v	30
Amount of cartridges in a clip	pcs	100
Shots in a burst	pcs	3
Rate of fire	shots/min.	565
IR-beam power	%	70
Second hand sensor		Yes
Stop aggression		Yes
Aggression sensor sensitivity	%	20
Differential damage: Chest	%	100
Back	%	100
Shoulders	%	100
Weapon	%	100
Superpowers activation time	Sec	3
Superpowers duration	Sec	30
Recovery time	Sec	60
Points for hitting into: Chest	pcs	1
Back	pcs	1
Shoulders	pcs	1
Weapon	pcs	1

- <u>Warm up</u>. One of the simplest scenarios, which does not require special instructions and allows you to get comfortable on the playground and get acquainted with the features of laser tag weapons. The scenario works well as a starting round for both beginners and children.

The players have the same settings and they each play for themselves in one color - red.

Each player has 100 health points at the start. Weapon - Falcon with 25 damage, i.e. for each hit in the opponent's sensors, 25 points are deducted from the latter.

After the 4th hit, the player's kit is considered deactivated, the weapon stops firing, but in this scenario, after 5 seconds, the player automatically "respawns".

Auto-reloading is turned on (no need to press the reload button when emptying the magazine) and an endless number of magazines is turned on. The second hand sensor is switched on.

To prevent injury to players by the body of the weapon, the <u>Stop aggression</u> parameter is enabled - when the blaster moves sharply, a warning signal sounds and a corresponding notification appears on the screen.

Additional devices are not used.

For hitting an opponent's kit, 1 point is awarded.

The round starts from random place.
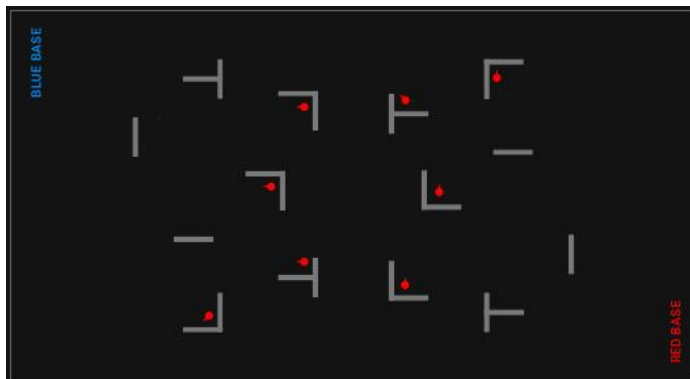
Timed end of the game. The player with the higher score wins.

• Deathmatch. The peculiarity of this scenario, where the players play each for themselves, is that points are awarded only for the deactivation of an opponent, i.e. the first three hits to the player are not counted (at the start, the player has 100 health points, weapon damage - 25 points).

Since the players have limited ammunition (7 magazines with 30 cartridges each, auto-recharge is enabled), the scenario provides for the use of additional devices - two Multistations and two SIRIUS stations operating in the Arsenal mode. They can add 1 magazine to the player every 5 seconds (but less than the starting value). The player can deprive opponents of the opportunity to replenish ammunition - 4 hits in the body of the device deactivate it for 30 seconds.

At the start, the players take random places on the playground.
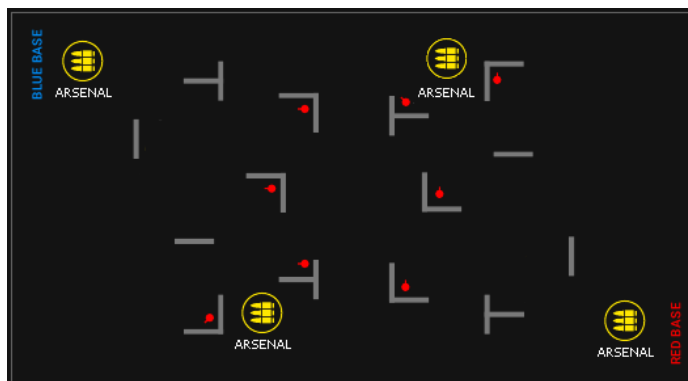
Timed end of the game. The player with the higher score wins.

• In the Arena King scenario, the game goes to elimination - deactivated players do not have the opportunity to respawn and leave the playground. Accordingly, the winner is the last remaining "alive" player - "King of the Arena".

Points are not awarded for any player's actions in this scenario. To automatically stop the game, the condition for automatic ending the game - "One man standing" is turned on.

All kits glow in one (blue) color. Players play every man for himself (friendly fire is on) - sensors record hits from any blaster.

Weapon damage is reduced to 15 points. Accordingly, the player leaves the playground after the 7th hit in his kit.

In order not to turn the game into a pointless firefight, the player's ammunition is limited to 20 magazines of 20 cartridges each. In addition, the Barrel overheating mode is enabled - if

you fire more than 10 shots, the weapon turns off for 3 seconds with a corresponding indication on the blaster screen.

Although there is no way to respawn, the player can still "heal" during the game - the HP per step parameter is enabled. For each step fixed by the blaster gyroscope, the player is added 1 point of health. This will stimulate the player not to sit in ambush, but to take active actions in the arena.

The scenario uses 4 SIRIUS devices, which in the Random mode every 5 seconds affect the players who are in the zone accessible to the device's IR-emitters with one of the protocol commands: Double lives, Arsenal (the magazine is full) or Radiation (25 points of health are taken away).

Before the start of the round, players are placed on the playground in random order, preferably behind shelter.
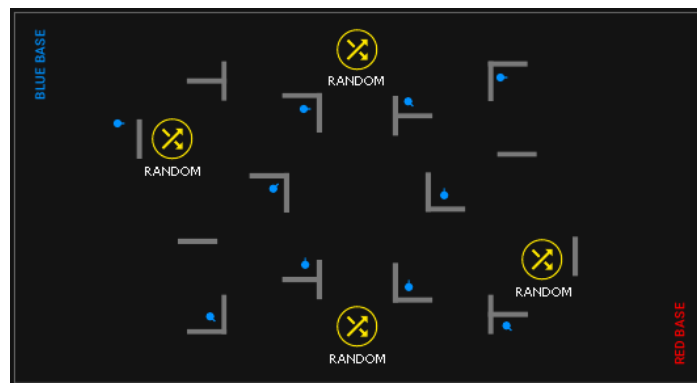
End - upon reaching the end of the game, i.e. when there is only one player left on the playground.

It is recommended to use the scenario as the final round, therefore the timer should be set to the maximum value (99 minutes) so that the game does not stop prematurely. In case of a long-lasting round, the game should be forcibly stopped with the announcement of the result Draw.

- Exploration. A simple scenario in which players need to deactivate targets with blaster shots. The targets are SIRIUS stations (up to 8 points) and Multistations (2 points), located evenly throughout the playground.

The players have the same settings, the color of the kit LEDs is green. The blaster has unlimited magazines and auto-reload.

For each hit on the target, the player gets 1 point. Points are not awarded for hitting the opponent.

SIRIUS stations are set to Bonus mode in such a way that these targets are hit on the first shot. In operation, the LEDs on the outer ring of the panel are iridescent. When the player's blaster beam hits them, only the central 4 LEDs glow brightly and the device pauses for 30 seconds. After the end of the period of inactivity, SIRIUS is again set to arm.

The Multistation is used in the scenario in the Base mode (no radiation is distributed) - a yellow flag flutters on the screen. You can earn 3 points on it, i.e. to deactivate it, you need to hit it 3 times. The degree of destruction is graphically indicated by the lower bar on the screen. The restore time is 60 seconds.

Since the defeat of targets does not occur simultaneously, and wait for the next recovery for a long time, players are forced to look for devices that are currently active.

It is preferable to start the round from one point of the playground, as far as possible from the targets.
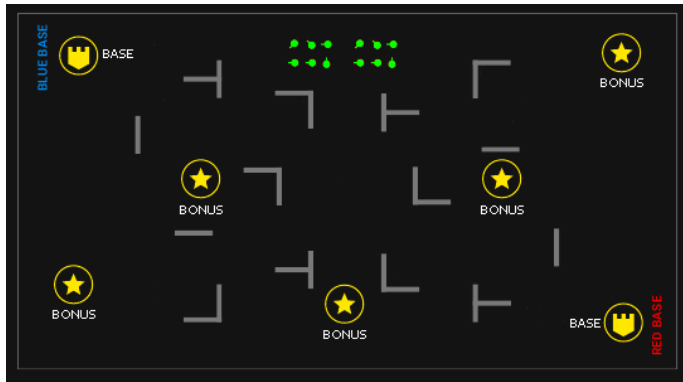
Timed end of the game. The player with the higher score wins.

If the club has a smaller number of additional devices, it is recommended to reduce the time of their inactivity after being hit. This will give players more opportunities to score points.

The scenario is suitable for children whose parents do not want them to shoot at each other. In this case, the opponent is the Arena itself.

- Virus elimination. A more complex version of the previous scenario. You also need to hit target viruses. As in the scenario Exploration, points for hitting an opponent are not awarded, but there is an opportunity to "freeze" him. Players are given a virtual weapon - a machine gun with the ability to switch the firing mode (single shots, a fixed burst of 3 cartridges or an endless burst). The blaster beam, hitting the sensors of the opponent's kit, disables his weapon for 5 seconds. It allows you to easily get points on the defeat of additional devices, among which SIRIUS stations in the Bonus mode and Multistations in the Yellows' base mode are also used.

During the "freeze" the player cannot be hit.

For deactivating SIRIUS, the player gets 1 point, for the Multistation – 1 point (in accordance with the number of hits in the device). Unlike the Exploration scenario, the Radiation protocol command is turned on the Multistation - a player can lose 25 health points every 5 seconds.

Recovery time for SIRIUS station - 30 seconds, Multistation - 60 seconds.

Players have an unlimited number of magazines, but when the magazine is empty, the weapon must be reloaded with the corresponding button on the blaster.

It is recommended to start the round from one point of the playground, as far as possible from the targets.
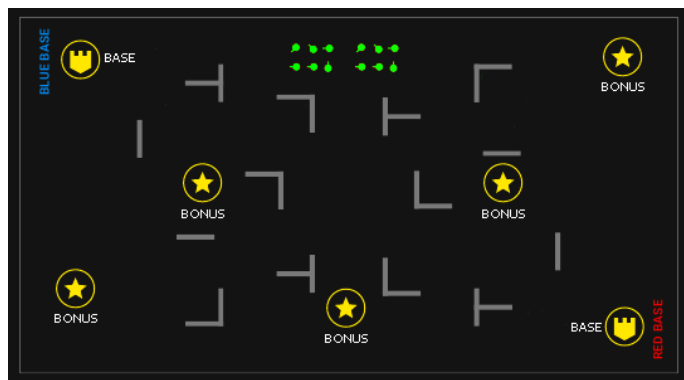
Timed end of the game. The player with the higher score wins.

The scenario is best to use for players who are sufficiently prepared, who have already mastered the equipment and the playground.

- Encounter. Simple team game for younger children and beginners.

Players are divided into two teams - red and blue. For hitting an opponent - 1 point, for deactivating him (after 4 hits) - 2 points.

The weapon has endless magazines and automatic reloading.

After deactivation, the player returns to the game after 5 seconds.

Before the start of the round, the teams are deployed to their bases.
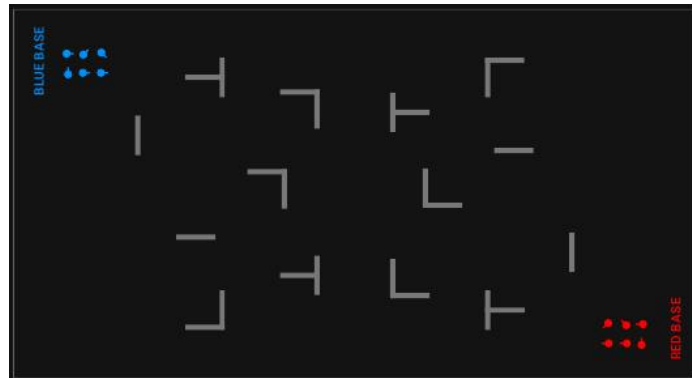
Timed end of the game. The winner is the team with the highest score.

- Team deathmatch. A team game with limited ammunition for experienced players.

The players are divided into two teams with the same settings - red and blue. Points can only be earned by deactivating a player after 4 hits.

The main feature of this scenario is the limited ammunition: 3 magazines with 30 cartridges each. To replenish it, SIRIUS and Multistations are randomly placed throughout the arena, which in the Arsenal mode every 10 seconds distribute 1 magazine with cartridges (but the player can only replenish up to 3).

The scenario also uses a superpower - Max Damage mode. Every 90 seconds, the player is given the opportunity to turn it on and thereby increase the damage of his weapon to 100 points for 10 seconds, i.e. the opponent's kit will be deactivated with one hit.

After deactivation, the player is automatically returned to the game after 5 seconds.

Before the start of the round, the teams are deployed to their bases.
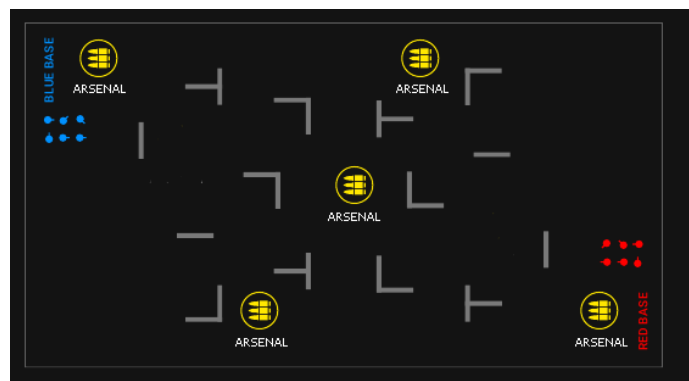
Timed end of the game. The team with the highest score wins.

For more variety, some of the additional devices can be used in other modes, such as Medkit or Radiation.

- Confrontation. Team game for experienced players with base respawn.

There are two teams opposing each other - blue and red.

For hitting an opponent, a player gets 1 point, for deactivating him (after 4 hits) – 2 points.

At the start, players have 100 health points, weapon damage 25. There is no auto-respawn - the deactivated player must return to his base, where Multistations or SIRIUS stations in <u>Respawn</u> mode are installed. In this mode, the devices return the starting number of health and ammunition points to the kits only of their own color every 5 seconds (7 magazines with 30 cartridges each). Please note that devices respawn only deactivated players. The only thing that players who still have health points, but only a few cartridges can get from the device, is to fill the last magazine to the end.

After emptying the magazine, you need to press the blaster reload button.

The scenario requires sufficient endurance of the players - one has to return to base quite often, and the team's fighting efficiency depends on the speed of recovery.

The round starts on the bases.

Timed end of the game. The team with the highest score wins.

- <u>Base assault</u>. Team game with the capture of someone else's base and with the respawn on the home base.

The peculiarity of this scenario is the increased number of points received for getting into the opponent's base (10). In addition, you can earn points by hitting a player (1) or deactivating him (2).

SIRIUS or Multistations are used as a base, set to the <u>Base</u> mode and located on opposite sides of the playground. In this mode, the devices not only respawn the players of their team every 5 seconds, but in addition, with the same frequency, they inflict 30 points of damage with the <u>Radiation</u> protocol command to the players of opposite team. After 4 hits to the device by the opposing player, they pause for 20 seconds (neither respawn nor distribute radiation), and then resume their work.

To facilitate infiltration into a foreign base, the player can turn on the <u>Ninja</u> superpower once every 1 minute - the sensor LEDs go out for 30 seconds.

Ammunition - 7 magazines of 30 cartridges.

The round starts on the bases.
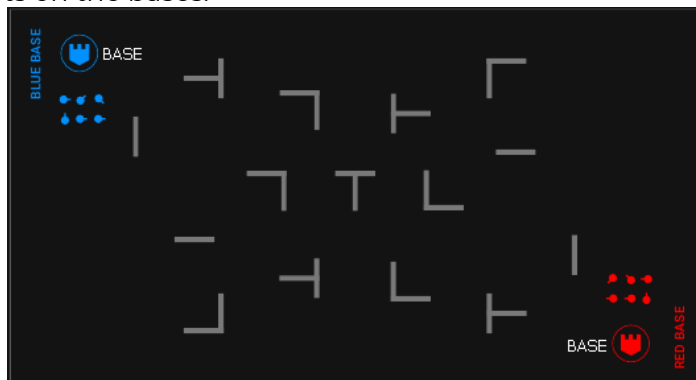
Timed end of the game. The team with the highest score wins.

- Sniper battle. A team game with limited ammunition, increased damage, low rate of fire, and respawn on the base.

In this scenario, players can deactivate each other with one shot from a sniper rifle (weapon damage is equal to the starting number of health points). At the beginning of the round, the player has 10 magazines, but each has only one cartridge. One point is awarded for hitting an opponent, a point is deducted for hitting an ally.

It is recommended to play the round without musical accompaniment in order to emphasize the specifics of the game and the absence of the margin for error.

SIRIUS or Multistations are installed at a team base, during the game they work in the Respawn mode (the frequency of activity is 5 seconds).

At least two more SIRIUS stations are located in arbitrary places on the playground. They are tuned to the Arsenal mode and can add one magazine with one cartridge to the player every 5 seconds. The maximum number of magazines is 10, but there is a high risk of being detected by the players of the opposing team, because with each increase in ammunition, the blaster speaker reproduces the message Ammunition replenished, which in silence unmasks the player.

Another feature of the scenario - when hitting a weapon, the damage is not scored up, but the blaster is inactive for 10 seconds.

Since there is only one cartridge in the magazine, it is recommended for players to keep their finger on the blaster reload button and press it immediately after firing.

The round starts on the bases.
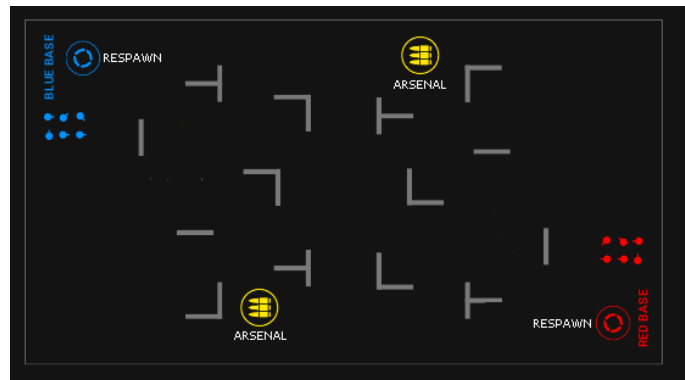
Timed end of the game. The team with the highest score wins.

- Zombie Attack. Scenario with "dragging" opponents to your team. The two teams have the same settings, the only difference is in the color of the vest LEDs glow and the blaster shot illumination. All players have a weapon - a Zombie Claw, which has the property, to turn an opponent into an ally after the second impact (weapon damage 50 points with a starting value of health points of 100).

For hitting into the kit of a player from another team, 1 point is awarded for deactivation and, accordingly, 2 points are awarded for capture of a player.

At the start, the player's kit has 10 magazines of 10 cartridges. Auto-recharge is on, but the IR power is lowered - only 40 %.

In order for the player to have a chance to stay in his team, the ability to receive 5 health points for each step on the playground is enabled. Therefore, after being "wounded" the player can hide from the one who attacks (the invulnerability time is increased to 5 seconds) and by moving around the arena to restore the stock of health points. Players also need to economically spend ammunition - there is no way to replenish it.

The round starts on the bases.

The condition for completing the game "One team remains" is enabled - the team that repainted all players in its color wins. At the end of the timer game, the winner is determined by points.

If the scenario ends quickly, player can reduce the damage of the weapon to 25 points - then, in order to capture the player, player needs to hit it 4 times.

- <u>Vampire Feud.</u> A team game, which has a distinctive feature: when hitting an opponent, a player both take away points of health from his opponent and add them to himself. The teams have the same settings, except for the color. Weapon - Vampire Bite. Respawn at the bases.

At the start, players have 200 health points. Weapon damage 25. When the opponent hits the kit, the player receives "bonus" health points. Their number is equal to the damage of their own weapons, but the total number cannot exceed the starting number. I.e. if the current number health points of a player equals to 190, then after hitting the opponent, not 25 points are added to the player, but only 10.

Player should also remember about the specifics of the Vampire role - every 5 seconds Vampire automatically loses 2 points of health - it is so-called "thirst for blood".

To add some entourage to the game, every 60 seconds a player has the opportunity to turn on the superpower <u>Ninja</u> for 10 seconds - like a vampire, he turns into fog and becomes invisible for this time.

Ammunition - 30 magazines with 10 cartridges each.

The round starts on the bases.
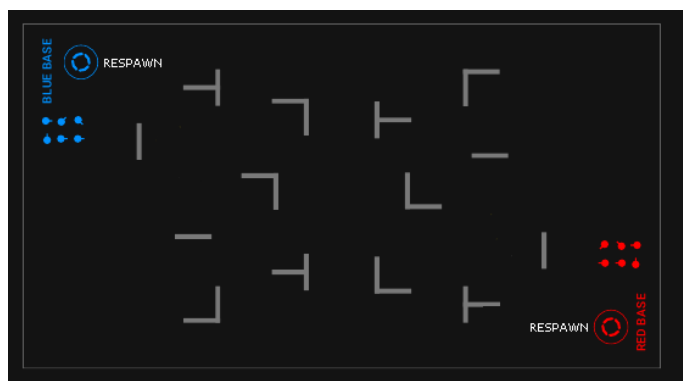
Timed end of the game. The team with the highest score wins.

- CS: Bomb has been planted. This scenario is primarily intended for use in the SUPERNOVA laser tag bomb game. There are two teams: red - miners and blue - sappers. The task of miners is to plant the bomb and prevent sappers from defusing it. The task of sappers

is to prevent a bomb from being planted, and if it happens, they need to defuse the bomb before it detonates.

The algorithm for setting and defusing the bomb is described in Chapter 7 of this manual.

The SUPERNOVA bomb is used as an additional device. It has a clock mechanism installed (time to explosion) - 60 seconds, demining time - 10 seconds.

The round starts at a team's bases.

Points are awarded for hitting a player (1 point), as well as for an explosion and for defusing a bomb (100 points each). The kit settings are standard, they are the same for both teams.

The recovery of health points is not provided - the defeated players leave the arena.

Explosion damage (100 health points) is performed on all players via WI-Fi, so this function is supported only by kits with firmware higher than 3.1.
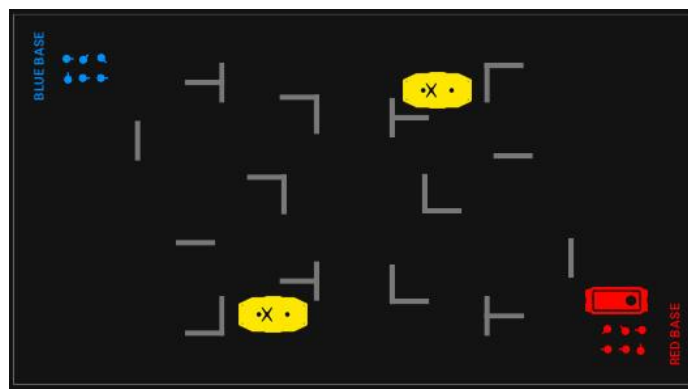
The game includes three conditions for completing the scenario "Detonate bombs" (1 time), "Defuse bombs" (1 time) and "One team left". The game ends when any of these conditions are met.

- The "Big Boss" scenario has its own specifics, which makes its use relevant for birthdays or games with elements of quest. There are two teams in the game, but there is only one player in the green team – the Boss, who has an increased maximum number of health points and has the opportunity to respawn. The task of the red team, which includes all the other players, is to "defeat the Boss".

For completing the mission in the game, the winning team receives 100 points, for deactivating the opponent – 1 point, but for hitting an ally the team loses 1 penalty point. The game includes the condition for ending the game "One team left".

For the Red team, which contains most of the players, the settings are more standard: 100 health points, invulnerability time and shock time – 1 second each. Health is replenished through regeneration (1) and points for steps (5), that is, in order not to be disabled, players must constantly move. At least two players on the red team are recommended to be assigned the Medic preset. Weapon damage is reduced to 10 and reload time is increased to 2 seconds. But at the same time, auto-reload and endless magazines are included. The weapon in Falcon mode shoots in burst of 3 cartridges, friendly fire is on.

The "Boss" of the green team, which can be a birthday person, an animator, etc. – has 999 health points and 3 seconds of invulnerability after respawn. Regeneration and scores for steps are the same as for the red team, but SIRIUS of the green team working in the appropriate mode can respawn the Boss within an interval of 5 seconds. The weapon of the green team player – RPK, deals damage of 25 points, reloading time – 5 seconds. Auto-reload, friendly fire, and endless magazines are turned off. Only 10 magazines with 250 cartridges and the rate of fire, compared to the standard, is increased to 600.

If necessary, depending on the playground configuration and the total number of players, the number of players of the green team can be increased – 2, 3 and so on.

The start of the round of the green team player – from their base, SIRIUS, the start of the players of the red team – from any place on the platform.

- The <u>Tug of war</u> scenario is a classic scenario with a capture of the Domination Box, but in the indoor laser tag entourage.

Points in the game are awarded for completing the mission – 100 points and for deactivating the opponent – 1 point. The condition for completing the "Capture of the Domination Box limit (1)" is enabled, that is, at the first capture of Domination Box of one of the teams, the round ends.

There are two teams in the game – red and blue. The settings are team-based, but they are the same for both teams. Players have 100 health points, invulnerability time and shock time – 1 second, the main weapon – Falcon, with damage 25, reloading time – 2 seconds, 100 magazines with 30 cartridges. Auto-reload, friendly fire and endless magazines off, sensor of the second had is on.

Players start from their bases. Approximately in the center of the playground there is a Domination Box operating in the "Tug of war" mode. DB damages 10 points of radiation every 5 seconds.

The team that will be the first to make the final capture of the Domination Box wins.

If necessary, you can add other additional devices to the scenario – SIRIUS or Multistation in the First Aid Kit, Respawn or Base modes located on bases of the teams.
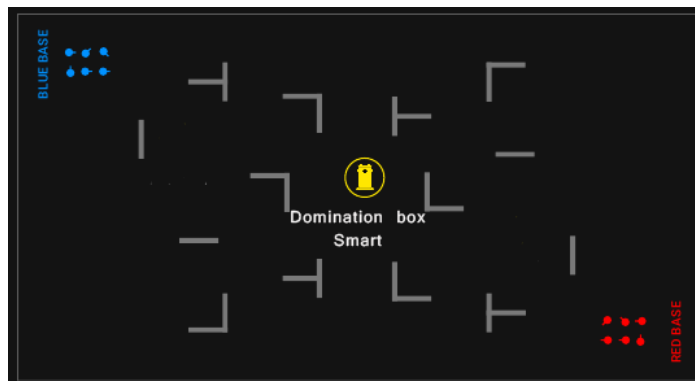
10.3.2. Scenario editor

Built-in scenarios can be edited but cannot be deleted.

The scenario editor is called by clicking on the button with a gear ⚙ .

The scenario editor window that appears has 3 tabs: <u>Scenarios</u>, <u>Teams</u> and <u>Additional Devices</u>.

First of all, the editor window allows you to change the name of the scenario - for this you need to click on the pencil-shaped button to the right of the name.

50
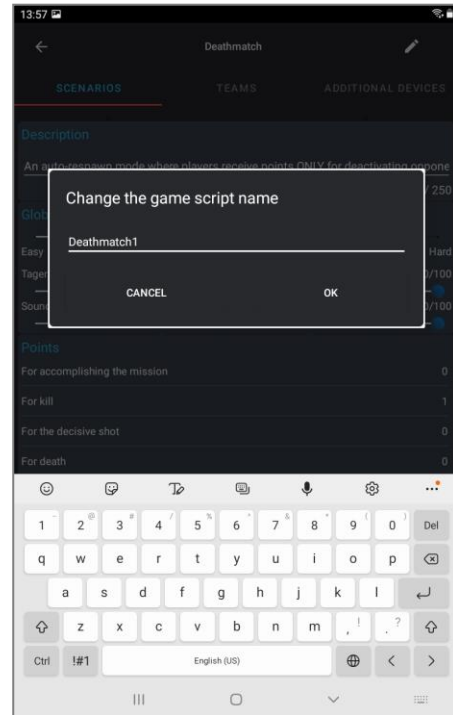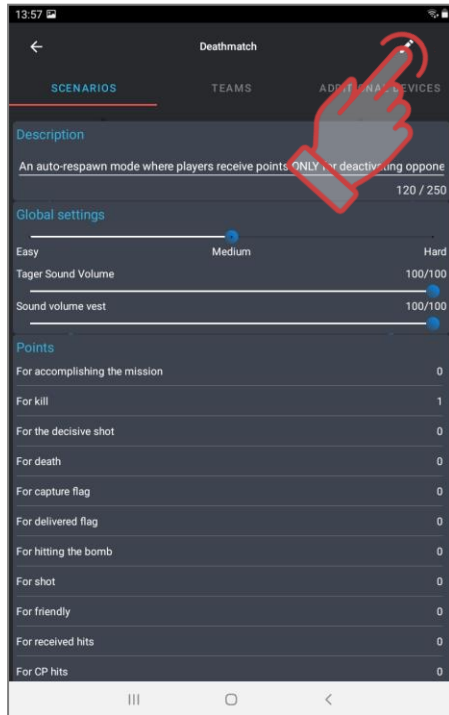
10.3.2.1.   Scenarios tab

The tab is divided into 5 sections.

The DESCRIPTION section contains textual information that helps to identify the scenario by specific features. The length of the text is up to 250 characters.

In the GLOBAL SETTINGS section, the level of complexity of the scenario and the volume of the sound reproduced by the blaster and vest speakers are set.

Next comes the POINTS section. It displays the number of points awarded or deducted for various events in the game - for a victory, deactivation of an opponent, a flag delivered, capture of a Domination Box, etc.

To change the numerical value, you must click on the parameter line and in the window that appears, scrolling vertically or using the numeric keyboard (appears if you tap on a number) set the desired value. Some parameters, for example, For hitting a team-mate or For a shot, can have negative values - that is, points for these actions are deducted, not added.
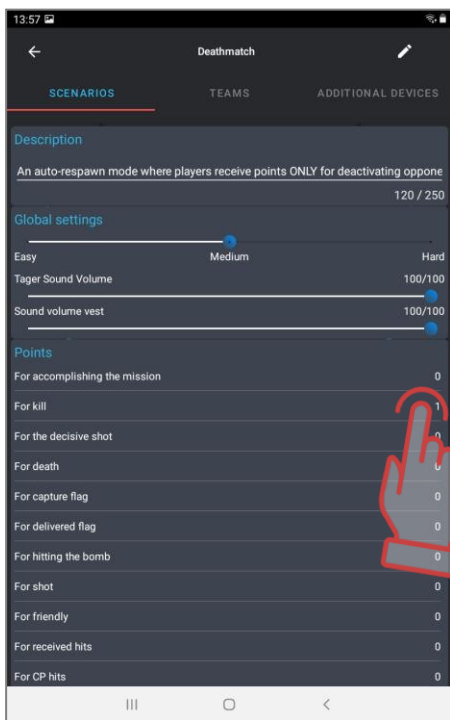
If the design and equipment of the kit allows it, you can set differential damage, i.e. the number of points for hitting different zones of the kit - in the back, in the arm, head or chest. The setting is made in the section <u>Points for the defeat of the zone</u>.

The last section is <u>GAME END CONDITIONS</u>. When you click on the + ADD button, a window appears in which you can select the condition for early (not by timer) completion of the game round.
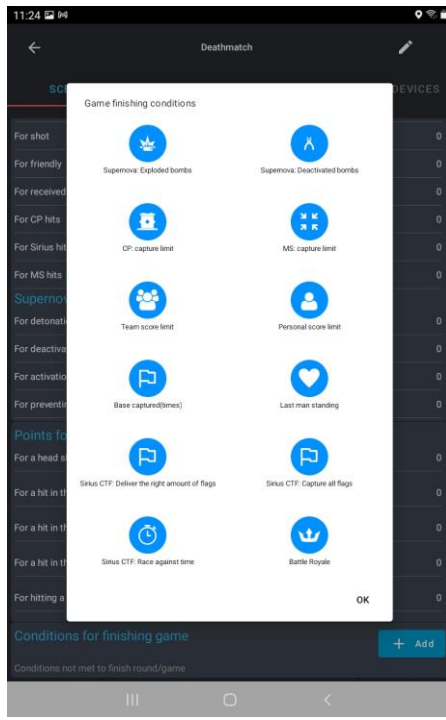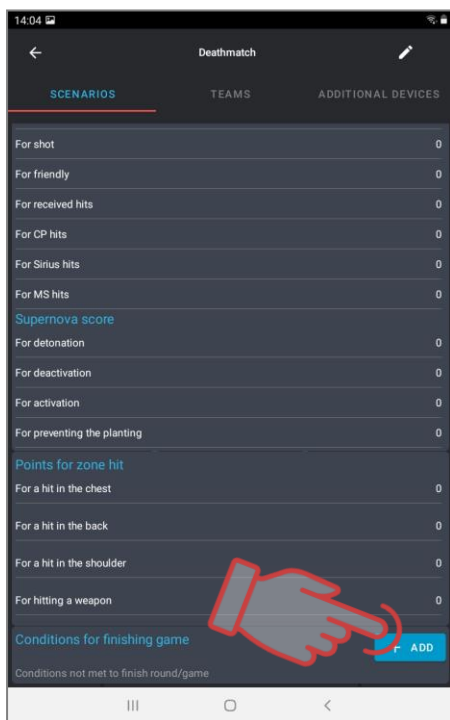
To add a condition, you need to click on the icon above the name. You can select several conditions at once - then the game will end if any of the given ones are fulfilled. To confirm, click on the inscription OK.

The selected conditions will be displayed at the bottom line of the section.

Some of the conditions have their own parameters, the numerical values of which are displayed on the right side of the condition line. To edit a number, click on it and change the value in the window that appears.

The Royale Battle condition has an advanced setting. This is due to the principles of the game, borrowed from the genre of the same name of computer games: the players are minimally armed and the safe zone in which the players can be is constantly decreasing during the round. The last survivor wins.

The principle of zone narrowing is implemented using RSSI control (the level of the received Wi-Fi signal from the router). At determined intervals, a player, whose game kit has RSSI less than the value defined in the scenario, starts with "bleeding" - a constant decrease in health units. To stop the bleeding, the player needs to approach the router.

Entering the setting mode for this round completion condition is the button ⚙ on the right side of the line. A window opens in which you can add the desired number of zones - click on the blue plus button in the lower right corner of the screen.

If it is necessary to delete a zone, its line must be shifted from the screen to the left.

The button ⚙ in the zone parameters field opens a window in which you can set the RSSI level, the time of a safe stay within the zone and the time of delay in bleeding after a message about the need to move to the next zone.

🛈 The specificity of this condition determines its use in scenarios on large playgrounds with shelters as transparent as possible for the wi-fi signal.
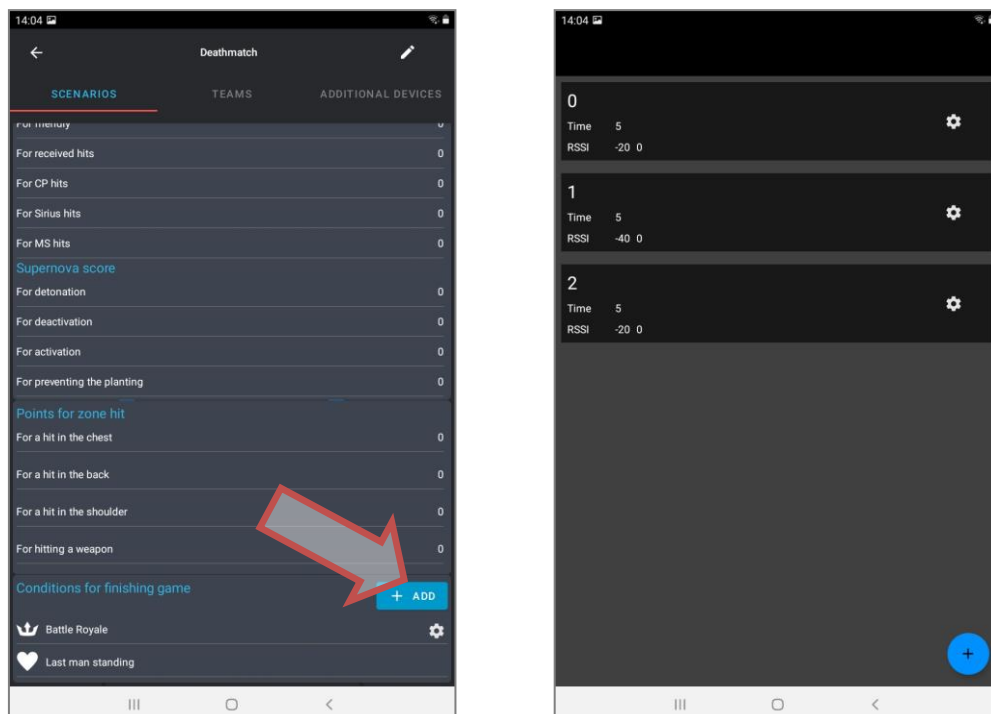
Three conditions for ending the game relate to a series of "Capture the Flag" (CTF) scenarios: CTF: DELEIVER THE RIGHR AMOUNT OF FLAGS, CTF: CAPTURE ALL FLAGS, and CTF: RACE AGAINST THE CLOCK.
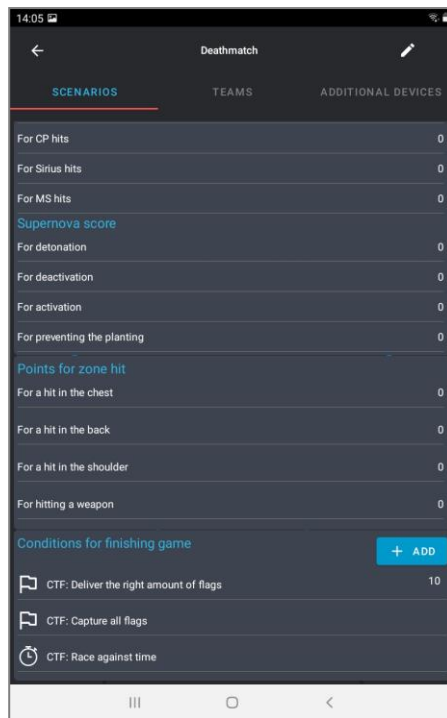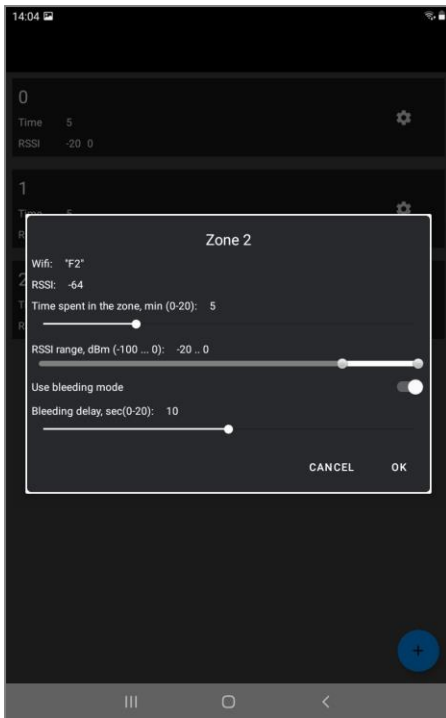
The program has three conditions for the completion of the scenario associated with the use of the bomb, each of which has its own setting. The first of them - "Bomb" is intended for playing games using the Multistation in the appropriate mode. You can set how many times you need to detonate a bomb and/or how many times to defuse it to win a round.

There are two more conditions for completing the scenario: "Detonate the bombs" and "Defuse the bombs" are intended for games using a new device - the SUPERNOVA laser tag bomb. When you click on the number opposite one of these conditions, a window opens. In this window, either by scrolling or tapping on the number and typing on the keyboard, select the required number of explosions or mine detonations (from 0 to 400, by default 1).

To remove the termination condition from the scenario, the line with the name must be moved to the left to the end of the screen.
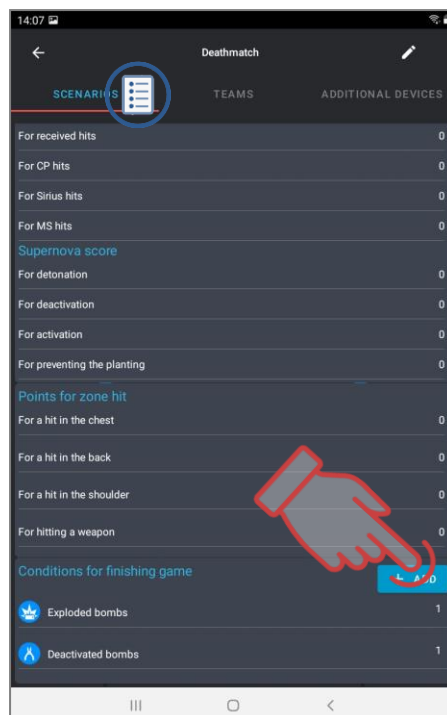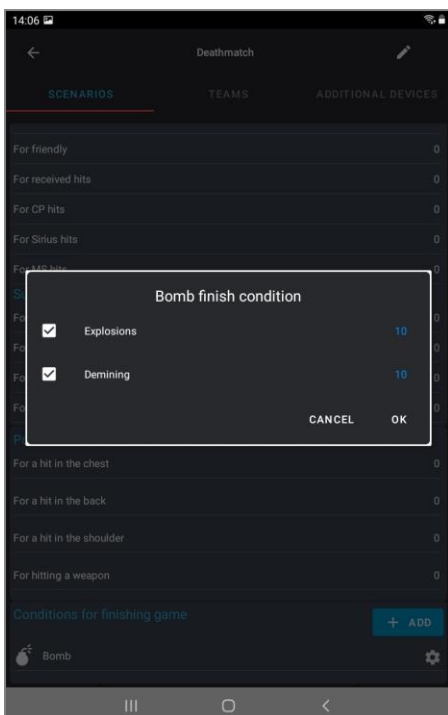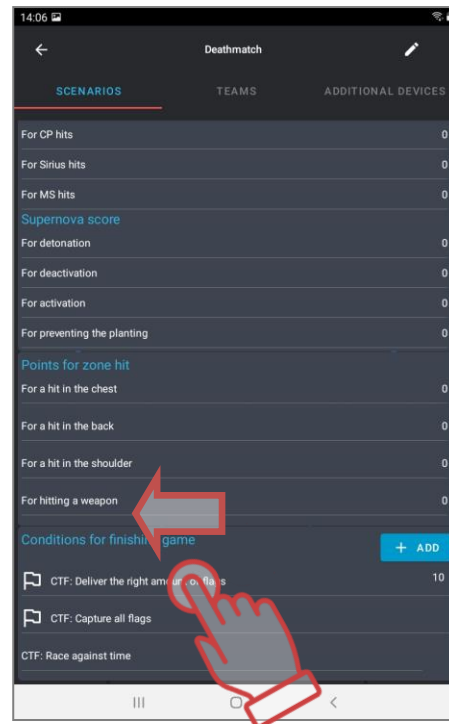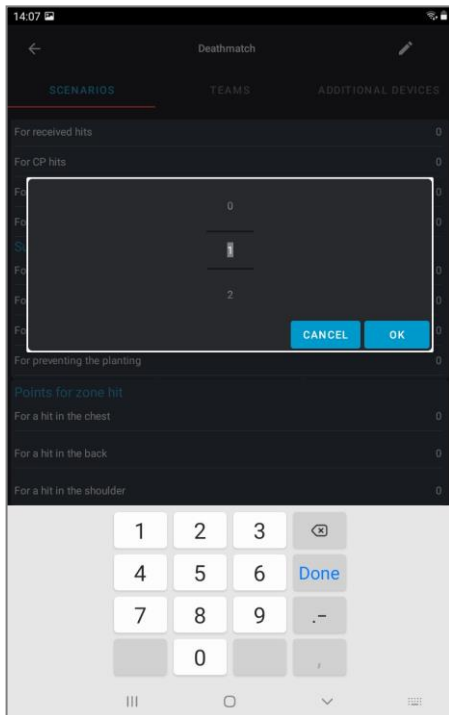
10.3.2.2. Teams tab

In a scenario, kit of players from different teams can have either the same settings or different ones. Common settings for all teams are called by touching the line General settings.

On the tab, by moving the slider to the right or simply tapping on it, you can select the number and colors of the teams involved in the scenario.

By scrolling down the window, you can configure more than 30 kit parameters. All of them are divided into groups: Health, Common weapon, Main weapon, Additional weapon, Security, Differential damage, Superpower. Each tab expands into sub-items when you click on the white checkmark opposite its title. To change each specific parameter inside the tabs, you must click on its title - a corresponding window will appear, with the help of which either the change is made, or the switch changes its state. Confirmation of changes - clicking on the "Apply" inscription at the bottom of the screen. Return to factory settings - click on the "Reset settings" inscription in the same place.
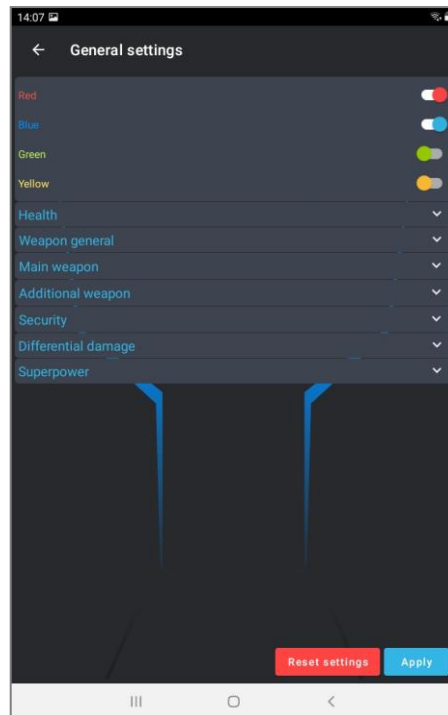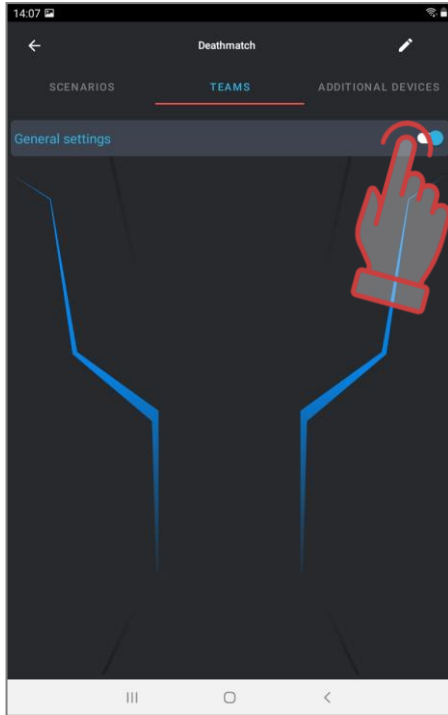
Below is a description of the parameters.

Section <u>Health</u>:

- <u>Health units</u> - the starting amount of health units (0-999 units).

- <u>Invulnerability time</u> - the period during which the player cannot be damaged after being hit (0-25.4 sec, in increments of 0.1). In this case, the player is prevented from being deactivated by one burst of shots.

- <u>Shock time</u> - the period of inactivity of the weapon after the opponent's beam hits the kit (0-25.4 sec, in increments of 0.1).

- <u>Auto-respawn</u> - the time after which the deactivated player automatically re-enters the game (0-254 sec, 0 - off).

- <u>Respawn invulnerability</u> - the time during which the kit cannot be hit after the respawn (0-100 sec). The parameter was introduced to prevent players from being "pinched" on their bases.

- <u>HP per step</u> - the number of points of health restored to the kit for each step of the player. This parameter allows you to stimulate players to take action.

Section <u>General weapon</u>:

- <u>Recoil</u> - permission to use impulse recoil on the blaster (yes/no).

- <u>Side light</u> - turn on/off the side light on the blaster, if provided by the design (yes/no).

- <u>Auto turn off</u> - the period after which the kit will automatically shut down in the absence of any game actions (0-720 min).

- <u>Shots before overheating</u> - the number of shots in a continuous burst, after which the Barrel overheating mode is activated for the blaster and it stops shooting (0-255, 0 - off)

- <u>Weapon cooling time</u> - the time after which the blaster resumes firing after the barrel overheats (0-255 sec)

- Vest vibration - permission to turn on the function of vibration of the headband or vest sensors when the opponent's blaster beam hits them or after receiving the Radiation command from additional devices (yes/no). The function is turned off, as a rule, for young children.

- Change weapon mode - permission to change the firing mode of a weapon from a single shot to a fixed or endless burst and back (yes/no). The mode change is carried out by double pressing the blaster recharge button with an interval of less than 1 second.

- Defeat in weapon - selection of the kit's reaction to the hit of the opponent's beam on the sensors of the player's blaster hit (Damage/Ignore/Deactivate). When you select the Damage parameter, the damage is counted in the same way as hitting the sensors of a headband or vest. If you select Ignore, then hitting the blaster is not counted. The selected parameter Deactivate disables the weapon for the time set in the next parameter - Deactivate weapon.

- Weapon deactivation - the time of inactivity of the weapon after the opponent's beam hits it with the selected parameter Defeat weapon - deactivate (0-100 sec).

Section Main weapon:

- Turned on - permission to use the main weapon in the kit (yes/no).

- Damage type - the type of virtual weapon that is selected when configuring the player's kit presets. (Falcon/ Assault rifle/ Grenade/ Sniper/ Gun/ Heal/ Vampire/ Zombie/ RPK/ Radiation/ Hostage). When choosing a type of damage, the following parameters are automatically set by default for this particular type of weapon. But each of them can be changed later. Only the icon on the blaster screen and the sound reproduced by the blaster speaker when fired remain unchanged.

  Falcon, Assault rifle, Sniper, Gun and RPK actually differ only in the amount of damage, rate of fire, power of the IR-beam and ammunition.

  The Grenade type (underbarrel grenade launcher) allows you to explode the player when, after hitting the player, the sensors of his kit, with their emitters, affect the nearby players of their team.

  The type Heal (Medkit) does not take away, but adds units of health when it hits the player. However, this does not apply to players with the Zombie and Vampire presets - the opposite effect is performed on them.

  Damage Vampire (Bite) not only takes away health units from the opposing player, but also adds them to itself.

  When a ray with damage Zombie (Claw) hits the player, the kit loses half of the health units available at that moment, besides, even if the player is defeated, the player also becomes a zombie.

  The specificity of the damage Radiation is that it takes away units of health from all players, and heals players in the roles of Zombies and Vampires.

  Hostage damage has not yet been implemented in current hardware firmware versions.

To change weapons during the game, you must briefly press the function button located on the blaster.

- Damage - the number of health units that are taken away from the opponent's kit when the player's blaster ray hits it (1-100 units).

- Reload time - a pause during which the weapon cannot fire after pressing the reload button on the blaster (0.1-25.4 sec, in 0.1 increments). As a rule, the value is set close to the reload time of real samples of small arms.

- Auto-reload - permission to automatically reload the weapon magazine without pressing the corresponding blaster button (yes/no). A useful feature for children's scenarios.

- Friendly fire - permission to turn on the mode when the kit can be hit by the players of their team (yes/no). The parameter is turned on in the games of the "Death match" series, as well as for adding spice to the gameplay of any scenario.

- Infinite magazines - a parameter that removes the limitation in the starting number of magazines with cartridges (yes/no). Most often used in games with young children who have difficulty using the Recharge button.

- Number of magazines - the numerical value of the number of magazines given to the player (1-254).

- The number of cartridges in the clip is the value of the magazine capacity at the start or after reloading (1-254). May correspond to the number of cartridges in the magazine of real weapon.

- Shots in a burst - the number of shots fired by the blaster after the trigger is pressed in the Fixed burst mode (1-254).

- Rate of fire - the frequency of rounds per minute, with which the blaster shoots when the trigger is pressed, if the weapon provides for an automatic firing is allowed (1-999). The optimal value for small arms is 565 rounds per minute.

- IR-beam power - the percentage of IR-radiation power when the blaster shots (1-100%). The range of the shot and the active spot depend on the power. It also affects the ricochet from walls and obstacles on the playground. In sunny weather, in an open area, it is recommended to set the power of the IR-beam to a high level, when using kits in arenas, 20-40% is enough.

Section Additional weapon:

The parameters are the same as in the Main weapon section. To activate it, you also need to allow it to be used in the Enabled parameter.

Security section

- Capacitive hand sensor - permission to use an induction sensor that reacts to the player's wrist grip on the blaster's forearm (yes/no). Enabling this parameter is necessary to prevent swinging weapons and shooting from behind cover.

- Stop aggression is a parameter that turns on the recording of sharp movements of the blaster made by the player (yes/no).

- Aggression sensor sensitivity - the degree of response to sudden movements of the blaster (0-100%).

Section Differentiated Damage

- Chest (0-300%, 0 – the parameter is disabled).
- Back (0-300%, 0 – the parameter is disabled).
- Shoulder (0-300%, 0 – the parameter is disabled).
- Weapon (0-300%, 0 - the parameter is disabled)
  - coefficients by which the received damage in a certain zone is multiplied. For example, if the selected value of differential damage is 50% in the back and the beam hits this zone with 90 units of damage, the actual damage will be 45. But at 300% the same hit will deal damage of 270 health units.
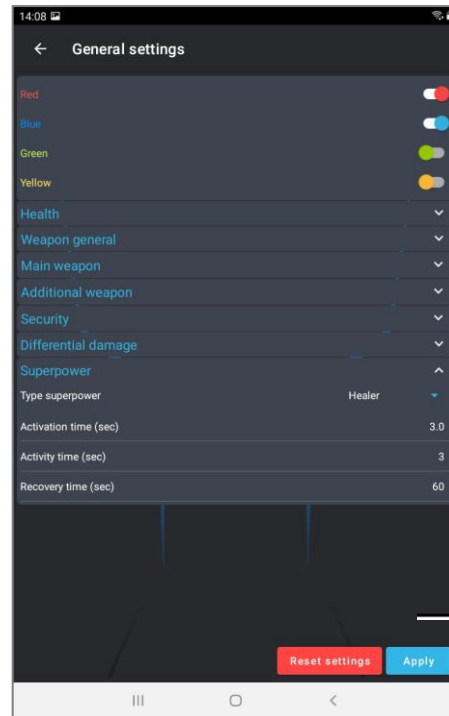
SAVE
CHANGES
button

Section <u>Superpower</u>:

- <u>Superpower type</u> - the choice of a temporary improvement in the functionality of the kit (Random/Ninja/Healer/Force shield/Bomber man/Super damage/Off). When choosing the type Random, the superpowers are given to the player randomly throughout the round. For more details see Ch. 2 of this manual.

- <u>Activation time</u> - the time of clamping the capacitive sensor on the frontal hit sensor of the vest to activate the superpower (1-10 sec).

- <u>Duration</u> - the period during which the kit uses the super ability after its activation (1-99 sec.).

- <u>Respawn time</u> is the pause between the last use of the superpower and the next opportunity to turn it on (1-999 sec.).

The last item in the table (Reset settings) allows you to return all the parameters of the kits to the factory settings.

If the game assumes different settings for teams (this may be due to different missions or compensation for a different number or composition of teams), in the Teams tab, move the switch to the left on the General settings line. After that, the team settings will become active.

By touching the switches, you can select which teams participate in the scenario. When you click on the line with the team name, a window for team settings of the kits opens, which is similar in content to the general ones.

Team selection
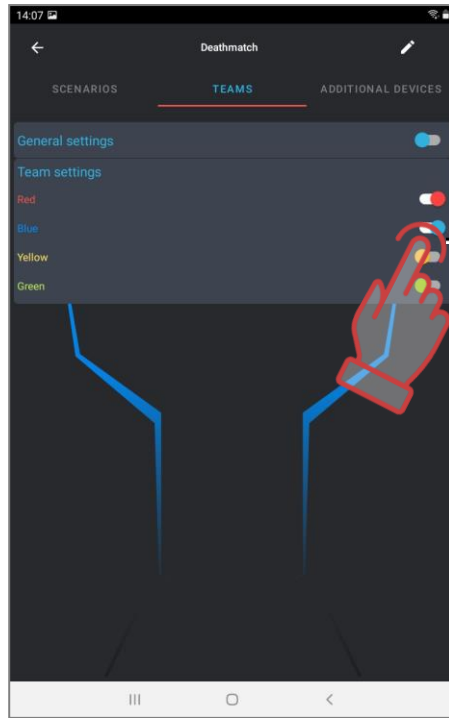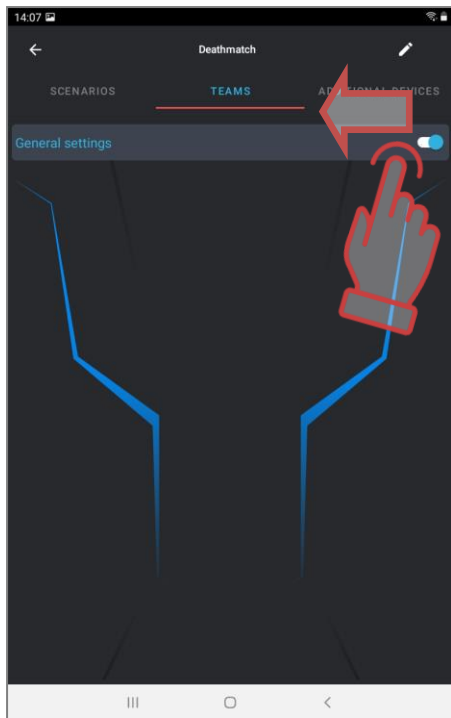
10.3.2.3. Additional devices Tab

To add a SMART Domination Box, SIRIUS, Multistation or lasertag bomb Supernova to a scenario, go to the Additional Devices tab and click on the corresponding button at the bottom of the window.

The number of each device is limited to 14 units, but this is quite enough to implement the most complex scenario.

The added devices will appear in the window. To configure them, you need to click on the tile.
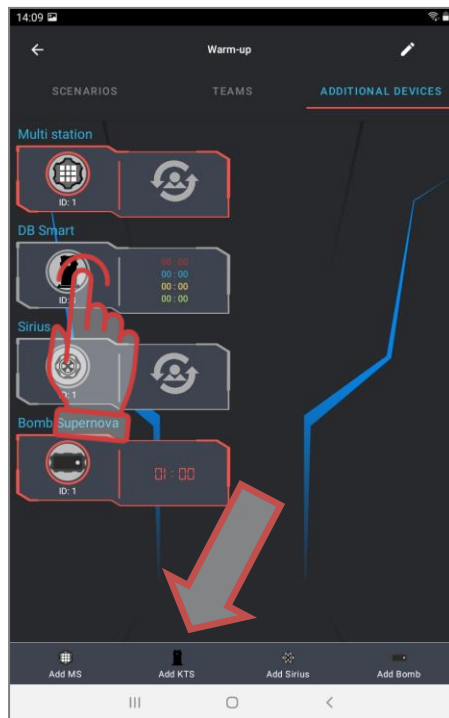
In the window that appears, it is proposed to exclude the device from the game, configure it and change the ID (from 1 to 20 for all devices). Exit the window - tap on an empty space on the screen. To change the parameters of devices, touch the Settings label.
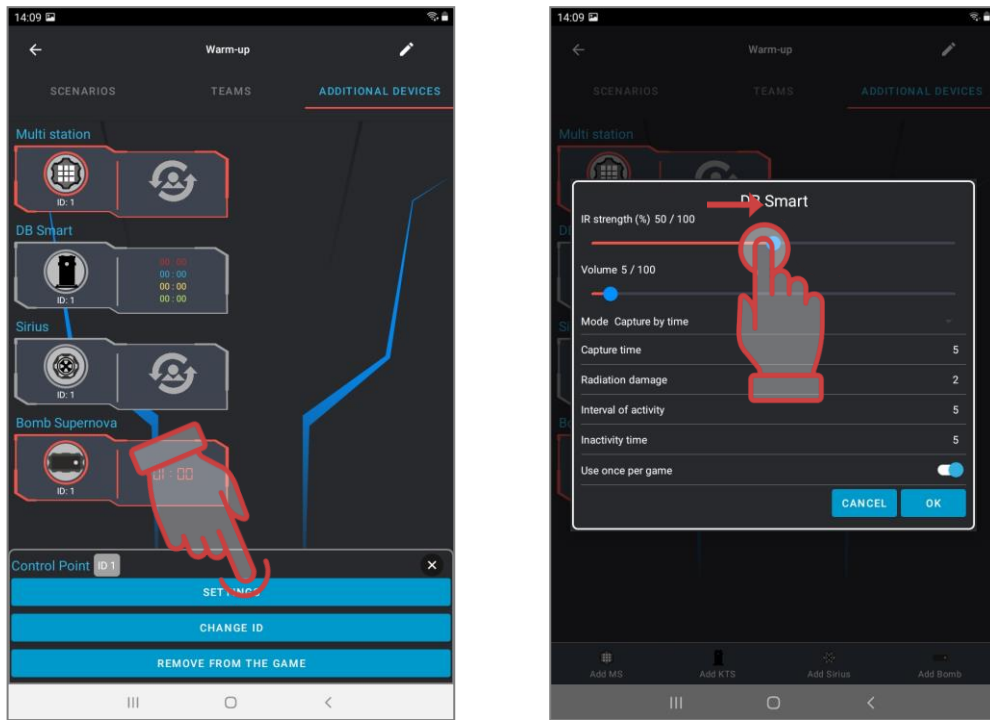
In the window that appears, depending on the device being configured, you can use the slider to change the power of the IR-beam of the emitters, the volume of the reproduced sounds (for DB SMART and Multistation), and also select the mode of operation of the device. To do this, click on the Line Labeled Mode.
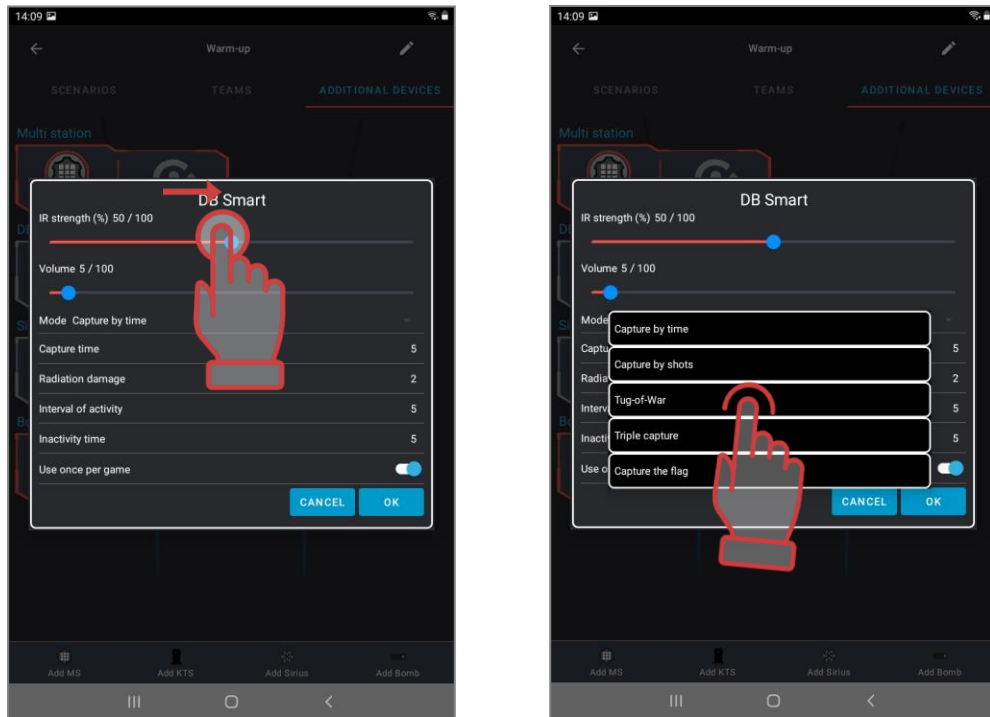
For each of the modes there is an individual setting for both numerical values (damage for deactivation, interval of activity, time of inactivity, etc.), and the ability to affect all or certain teams.
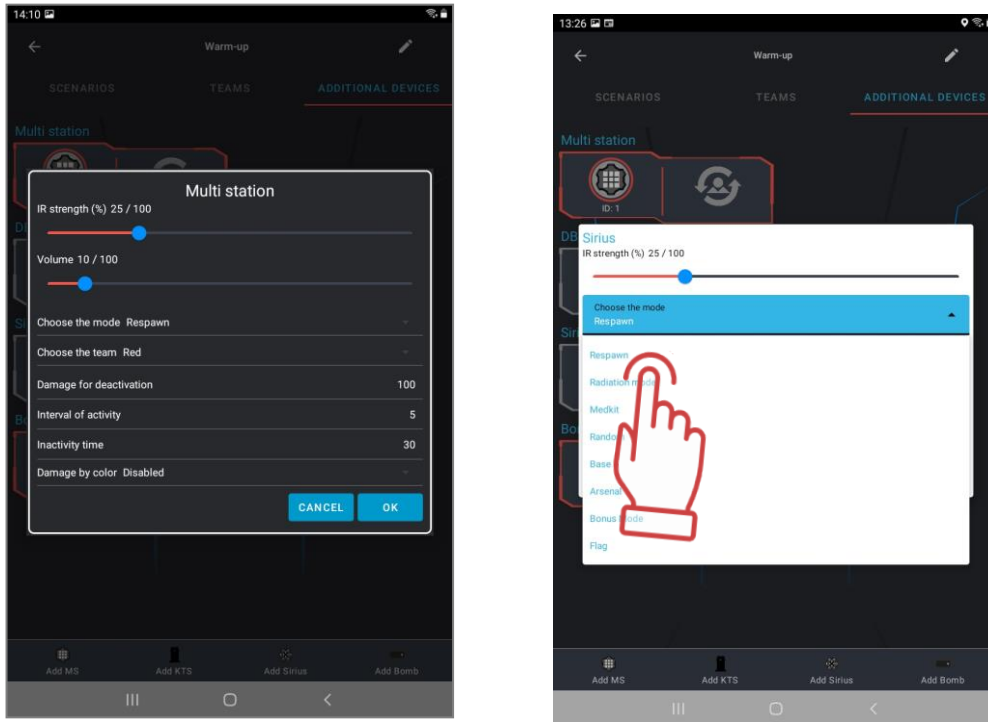
The SMART domination box is configurable to one of five available modes:

- CAPTURE BY TIME - the classic mode, in which the device controls the holding time of the point of each of the teams. The indication in all columns is the same. Up to 4 teams can participate.

- CAPTURE BY SHOTS - capture occurs by the number of shots fired by players into the DB receiver. In game, only from 2 to 4 teams are allowed to participate.

- TUG OF WAR is a capture by time, but the indication shows the percentage balance of the hold. 2 teams are participating.

- TRIPLE CAPTURE is also a capture by time, in which the degree of capture is displayed for each of the teams in different indicator columns. 2-3 teams can participate.

- RAISING THE FLAG - a mode for 2 teams, in which the capture occurs according to the number of hits in the receiver of the device. The indication is made according to the following principle - one team raises the LED column with shots, and the second tries to lower it.

After confirming the setting, the tiles of the Domination Boxes involved in the scenario will appear on the screen with counters of time, shots or percentages, depending on the selected capture and hold mode.

Capture by time

Tug of war

Raising the flag

Capture by shots

Triple capture
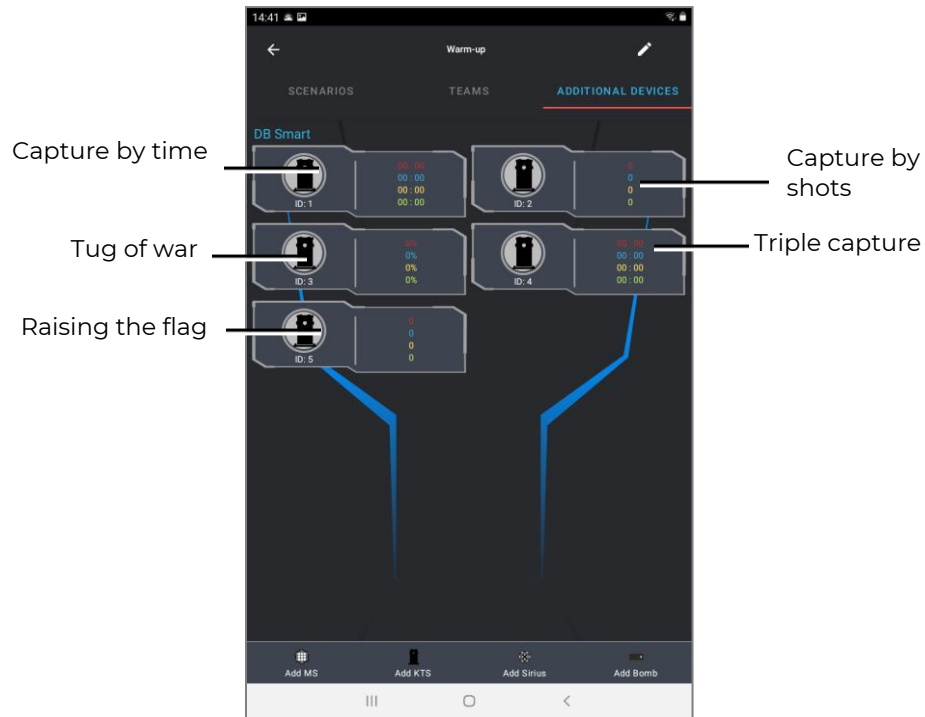
The SIRIUS station can be used in eight modes:

- RESPAWN - during its activity, the station restores the starting value of health and ammunition units of deactivated players, as well as the starting type and firing mode of the weapon. When impacting on a player who still has health units, only the last clip and only the main weapon are replenished.

- RADIATION - the station at regular intervals reduces the supply of units of health for ordinary players, and in the roles of Zombie and Vampire, it increases.

- MEDKIT - the device periodically replenishes the players' health units (but no more than the value at the start of the game). Another function is to stop "bleeding" in kits that have this parameter enabled by software. It worsens health for Zombie or Vampire.

- ARSENAL - the device adds to the player the number of cartridges or clips set in the program (but not more than the starting value).

- RANDOM - when activated, one of the three game commands is distributed in random order: Double lives, Arsenal or Radiation.

- BONUS - after firing a shot at the device, all kits within the range of influence of the SIRIUS IR-emitters double their health units (up to 999 units). There is no automatic distribution.

- BASE - when triggered, the device sends out two game commands at once - Respawn for its players and Radiation for opponents.

- FLAG is a new mode that allows you to play "Capture the Flag" (CTF) scenarios. During the game, SIRIUS generates virtual flags which players of the opposing team can capture by shooting several times at the device. After receiving confirmation of the capture, the player becomes a flag carrier, and then he must fetch the flag to his base. To surrender the flag, the flag carrier must also fire at his SIRIUS before receiving the FLAG ACCEPTED confirmation.

To confirm the settings, press the OK button, if you reject changes, press the Cancel button.

Tiles of the devices involved in the scenario with icons of the configured mode will appear on the screen.
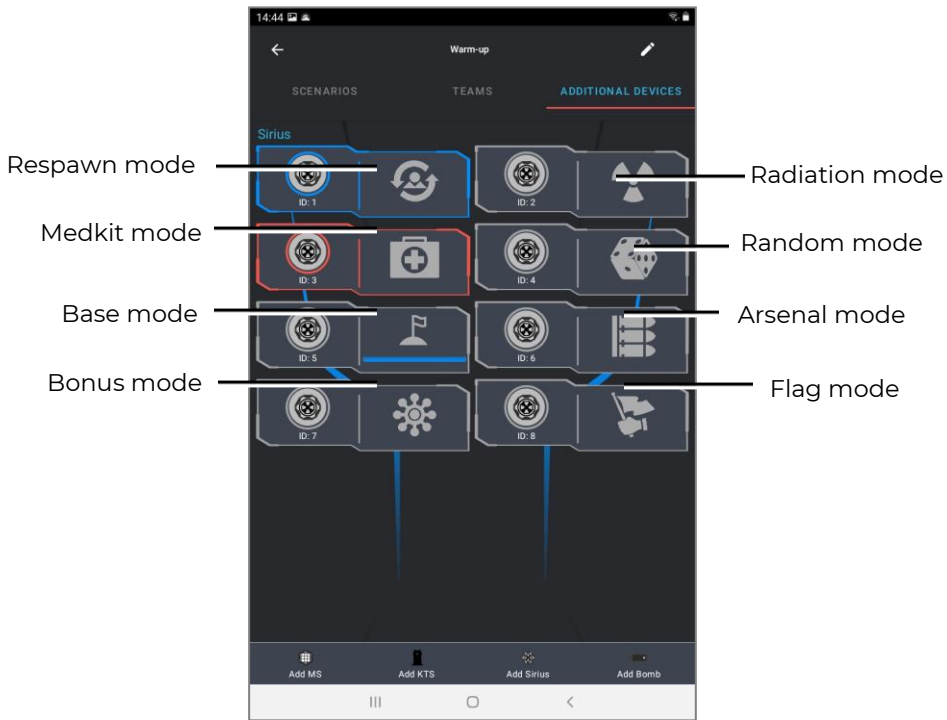
The Multistation in scenarios can operate in seven game modes. The functions of the device in the modes MEDKIT, ARSENAL, RADIATION, BASE and RESPAWN are similar to the functions of the same modes in the SIRIUS station.

Besides, Multistation has two more game modes:
- DOMINATION BOX is an analogue of the Domination box, but with its own specifics. The capture is made by shots, and points are awarded for holding the box.
- BOMB - the mode allows to conduct scenarios reminiscent of an episode of the PC game "Counter-Strike", namely, "Laying the bomb". Initially, the players are divided into two teams - miners, who plant a bomb with shots at the device and sappers who must defuse it.
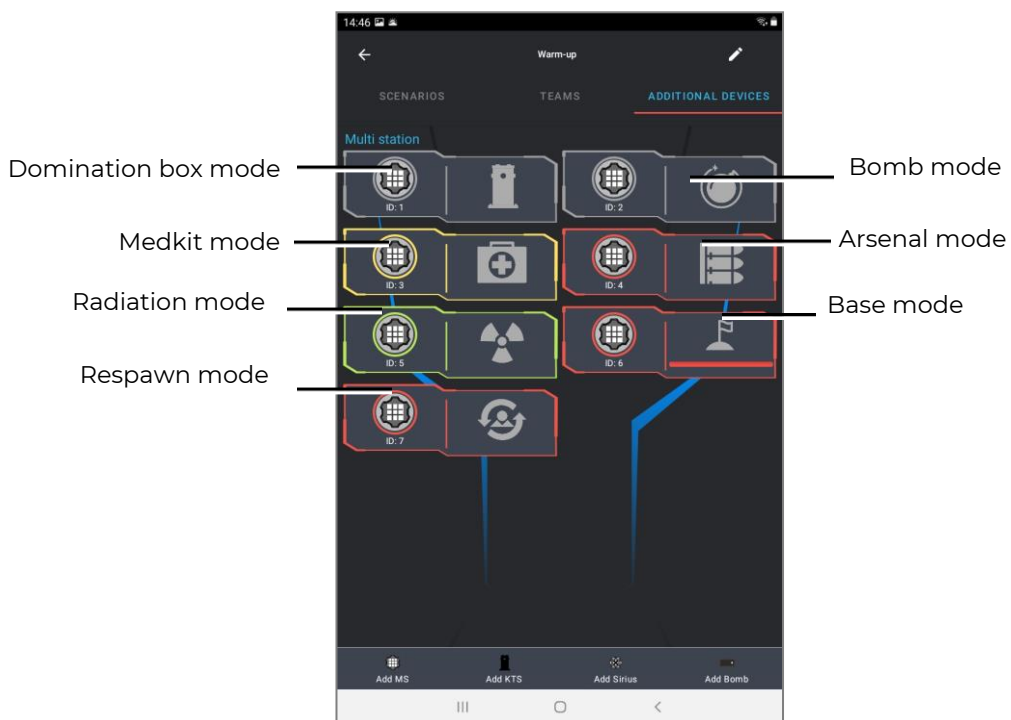
In the laser tag bomb settings window, you can select:

- game mode (laser tag or paintball);
- the time of the clock mechanism after the bomb was activated by miners (from 10 to 600 seconds);
- the time that is given to the sapper team to clear an already activated bomb (from 2 to 60 seconds);
- damage (from 0 to 999 health units);
- color of teams of miners and sappers (red, blue, yellow, green).

The "paintball" mode does not provide for confirming the activity of the player's kit with a shot from a tagger before planting and demining a bomb. The mode is saved even after the device is turned off and on again - until this parameter is changed in the program.

Damage caused by a bomb explosion is done over a Wi-Fi channel and affects the players of all teams that are within the signal range at the time of the explosion (about 10 m).
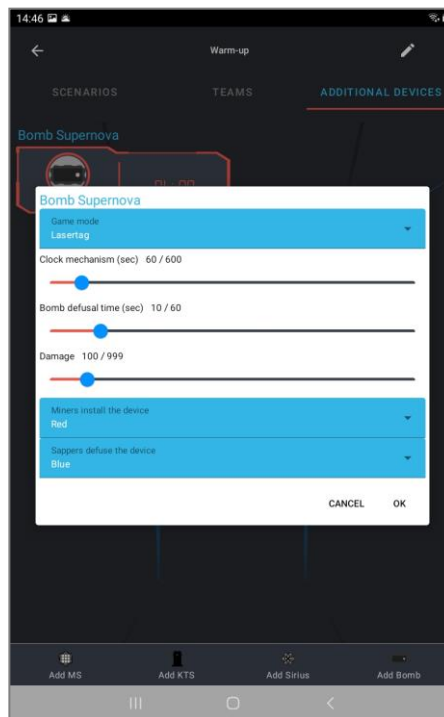
10.3.3. Creating custom scenario

To create your own scenario, you need to click on the ADD button in the bottom of the screen.

At the first step, the program offers to enter the name of the new scenario, at the second step it offers to select a template based on which a new scenario will be created, i.e. copy settings from existing scenarios in the program. After confirmation by clicking on the OK button, the scenario editor window opens. Here you can give a short description of the scenario and set the necessary parameters of the equipment and the scenario itself.
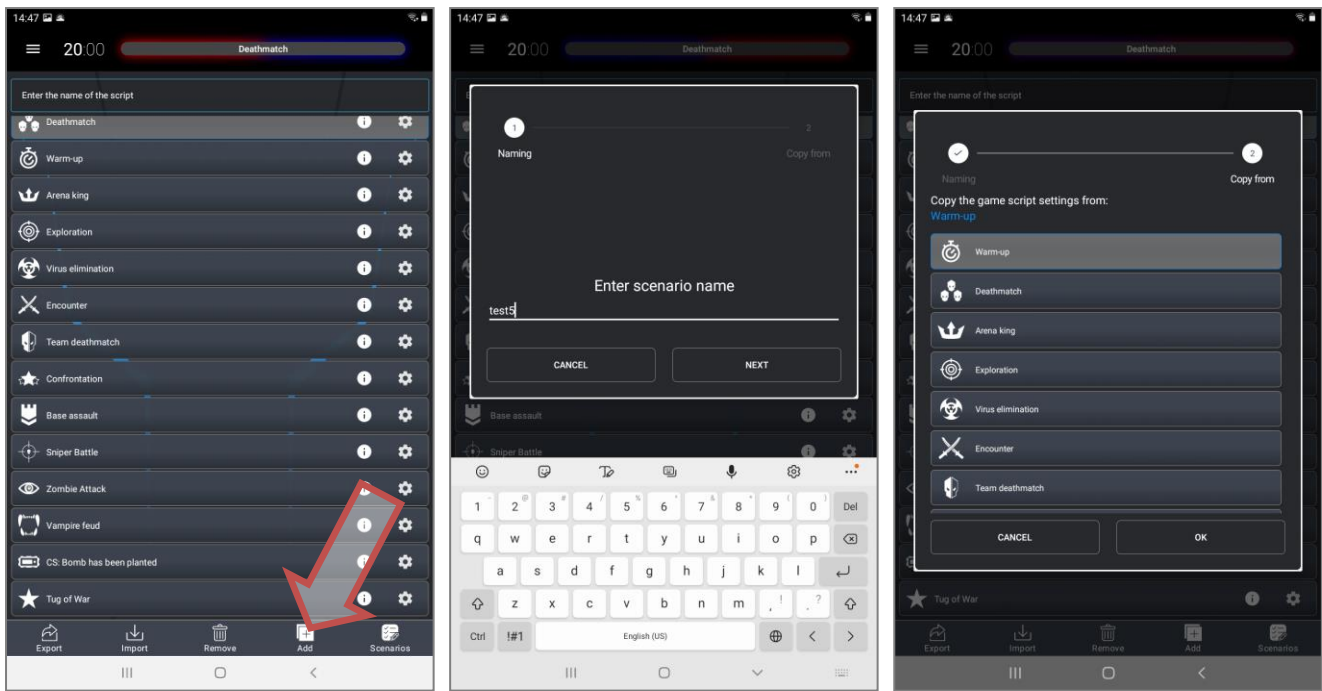
Unlike built-in scenarios, custom scenarios can be deleted - click on the menu item - delete (the delete icon will appear on all custom scenarios), then select the scenario that requires deletion, confirm the deletion.
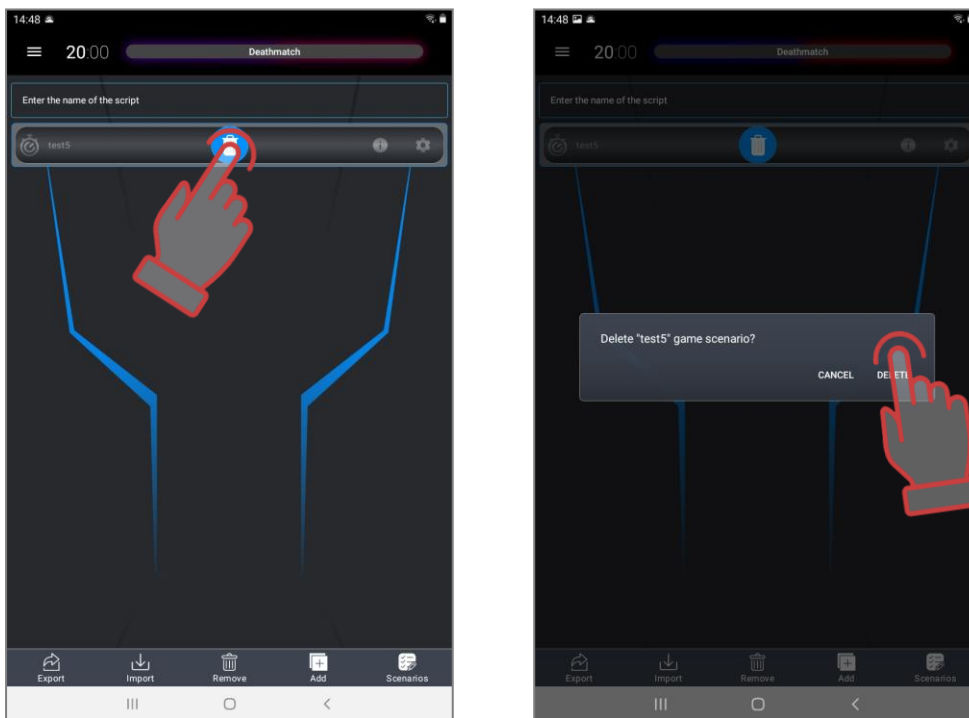
In order to immediately return to the scenarios window after deleting a scenario, you must click on the SCENARIOS button in the lower right corner of the screen.

The program has the ability to export and import scenarios. This only applies to user-generated scenarios. Export is needed to back up the scenarios, as well as to share an interesting scenario with colleagues in the laser tag business. To export in the scenario editor (Main menu/Scenario), press the Export button. The program will save the scenario to the device memory.
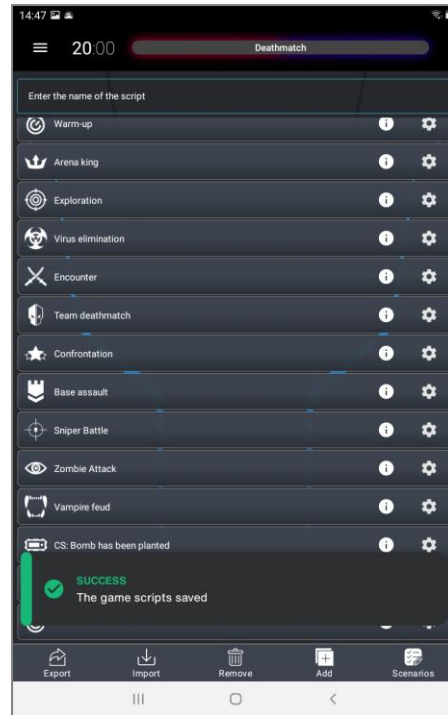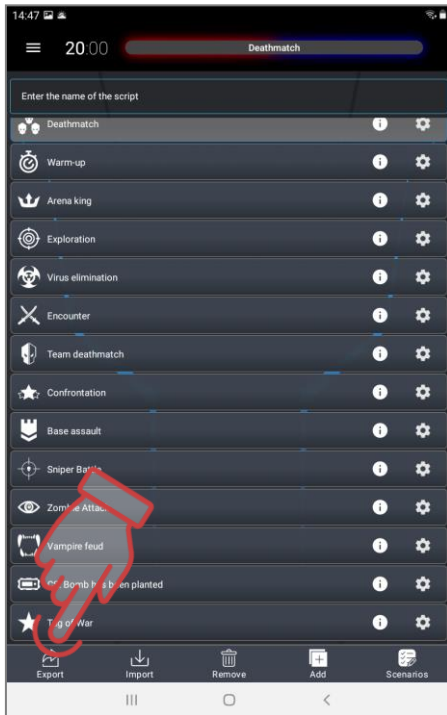
When you click on the Import button, a window with the names of the saved or imported scenarios opens. You should also click on the white circle to the left of the scenario name, which should turn into a checkmark. Press the OK button.

To find files of saved scenarios on the device, click on the "Explorer" main menu item, and then select the "Scenarios" tab. Scenarios files will have the .ScriptGson extension.
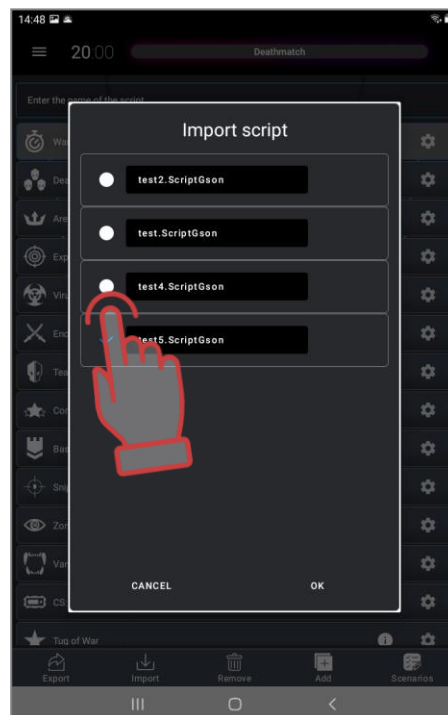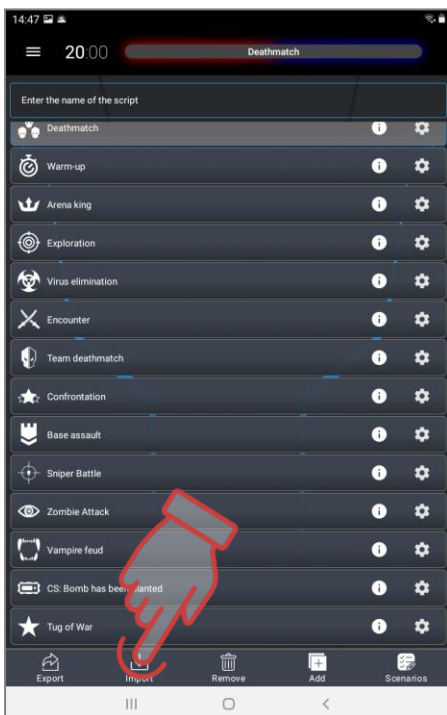
10.4.   Forming teams

After choosing and configuring the scenario, you need to divide the players into teams. Even if the scenario is carried out according to the principle "death match", it is recommended to assign different colors to the kits to improve the visibility of statistics and add color to the game. The sequence is as follows:

1. Turn on all the kits that will participate in the game.
2. In the main menu, click on "Game Room".
3. In the screen that appears, click on the button with the name of the team color.
4. If the device is connected to an incorrect Wi-Fi network, the application prompts you to check the hotspot or network connection and to change it if necessary. Only then it will be possible to enter the kits distribution menu.
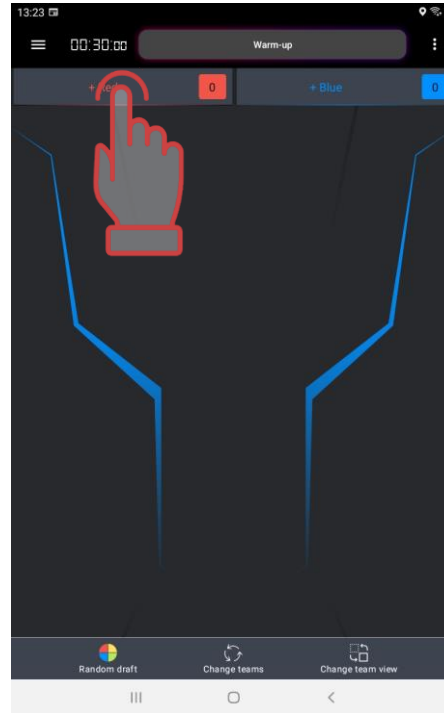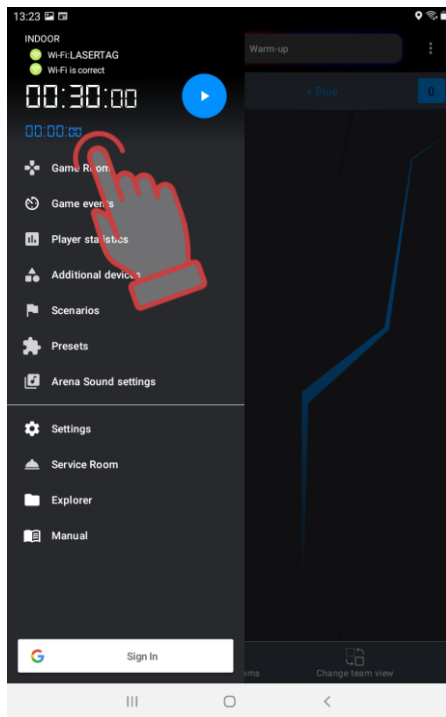
5. Mark the cards of the kits connected to the server for the selected team or tick the box in the upper right corner to select all. Confirm your selection by clicking on the OK button.
6. Click on the button with the name of the team of another color. Mark cards of the remaining players. Check the equipment for teams.

Select All Button
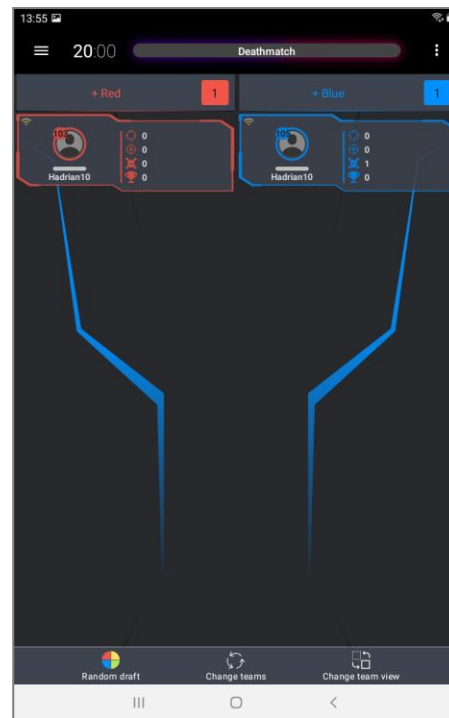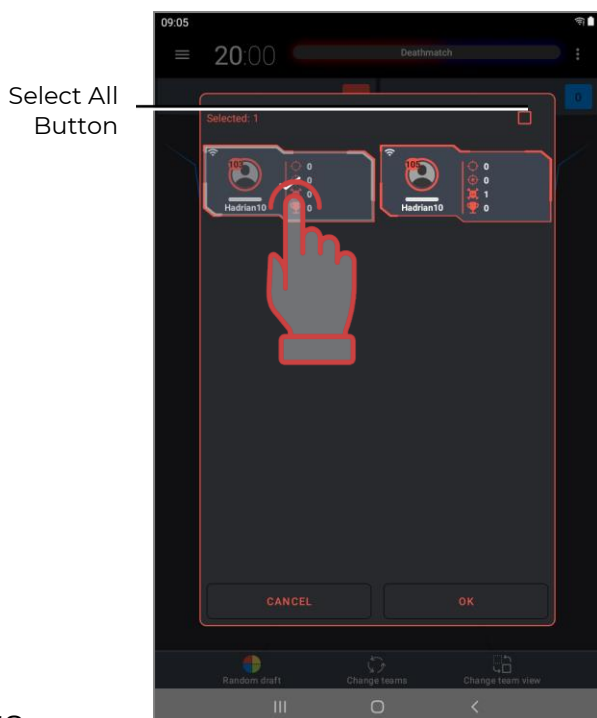
Players can be assigned to teams automatically. To do this, in an empty game room, click on the "Auto-distribution" item at the bottom of the screen - a window appears with all the kits connected to the server.
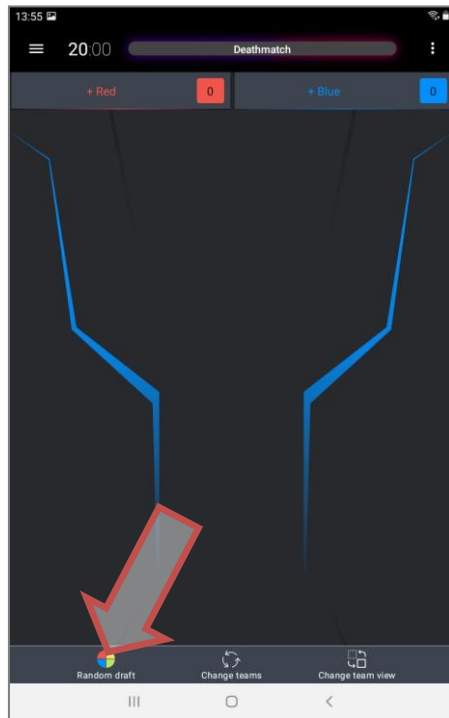
When you click on the Auto-distribution button in the menu, players are automatically assigned to teams within a few seconds. The process is graphically displayed by scrolling a multi-colored circle consisting of four segments in the center of the screen. To refuse auto-distribution, click on the Cancel button.

When you click on the inscription "Change team", the color of the teams automatically changes and, accordingly, the players start from another base. If there are more than two teams, the color change is performed "circle wise".
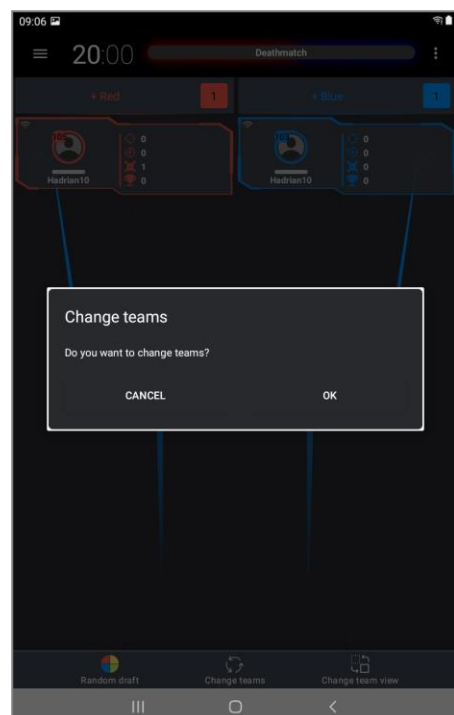
7. You can edit the distribution if necessary. To do this, select the card with a long press and, without releasing your finger, move it to the field of another team.
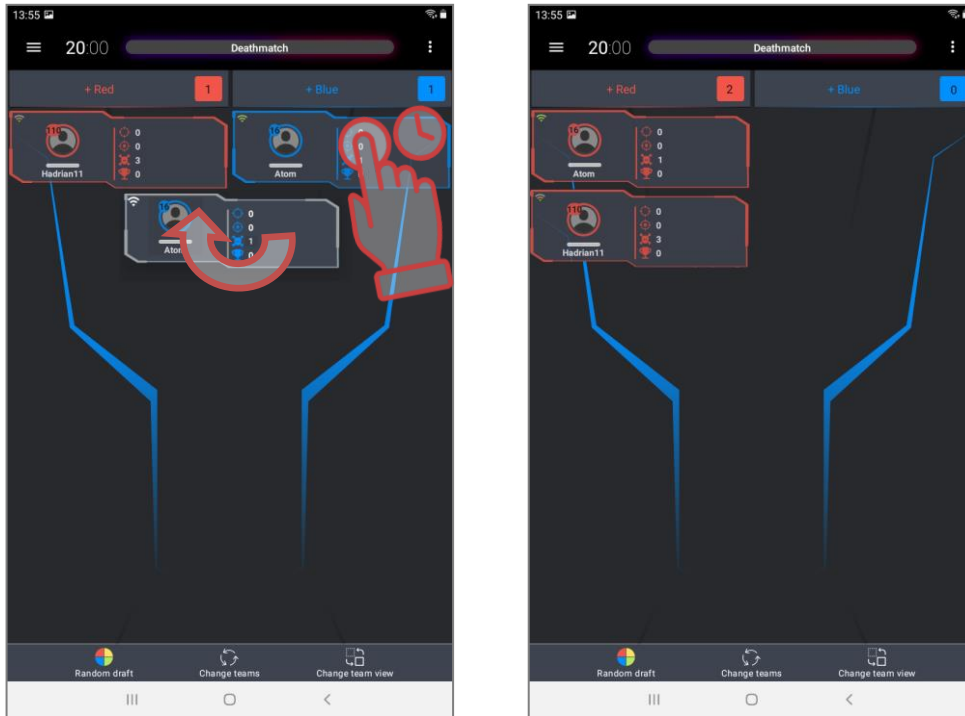
The program has two types of displaying the player card. In the main view (Statistics), the ID of the kit, the name of the player or the kit, the number of hits, kills and defeats, the number of points scored and a graphical display of the state of health points are displayed.

In an additional form (Service), in addition to the ID and the name of the kit, the screen displays the state of charge of the kit's batteries, the firmware version, the level of the Wi-Fi signal received from the router.

The color of the frame and icons in both views matches the color of the team.

Switching between modes is done by clicking on the CHANGE DISPLAY TYPE button at the bottom of the screen.

Switch to service mode
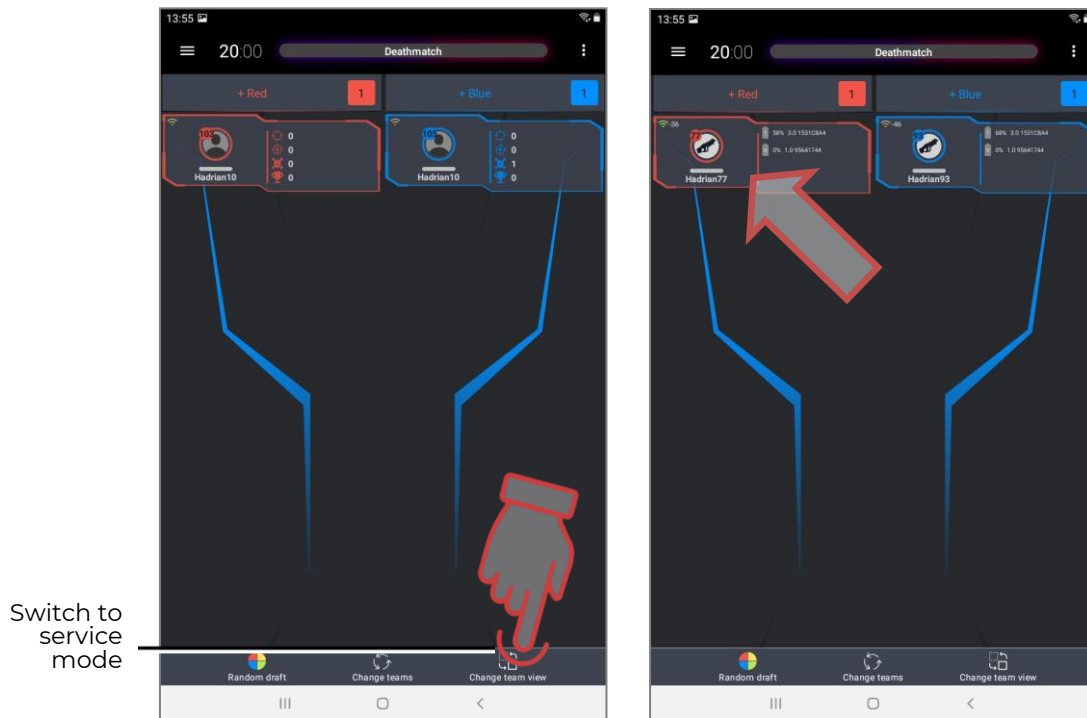
Pressing the button ⣿ in the upper right corner of the game window brings up a window with six items: <u>Sound volume</u>, <u>Remove all</u>, <u>Turn off all devices</u>, <u>Send logs</u>, <u>Reset player names</u>, <u>Change language</u>.

- By clicking on the item <u>Sound volume</u>, you can set the volume level of the speakers of all the kits participating in the game - separately for the blaster speaker and separately - for the vest speakers. In the window that appears, move the slider with your finger to increase the volume to the right, to decrease it to the left. Save changes - click the OK button.
- The item <u>Remove all</u> clears the team fields from all cards.
- The <u>Turn off all devices</u> item allows you to remotely turn off the kits.
- The <u>Send Logs</u> item sends all existing program error messages to the company's technical support address (after connecting the device to the Internet).
- The item <u>Reset player names</u> allows you to reset the player names to standard ones.
- The item <u>Change language</u> allows you to change the language of the voice messages reproduced by the speakers of all kits during the game. This release provides support for two languages - Russian and English. To select a language, click on its name - the corresponding window will pop up at the bottom of the screen. To confirm, click on the OK button.

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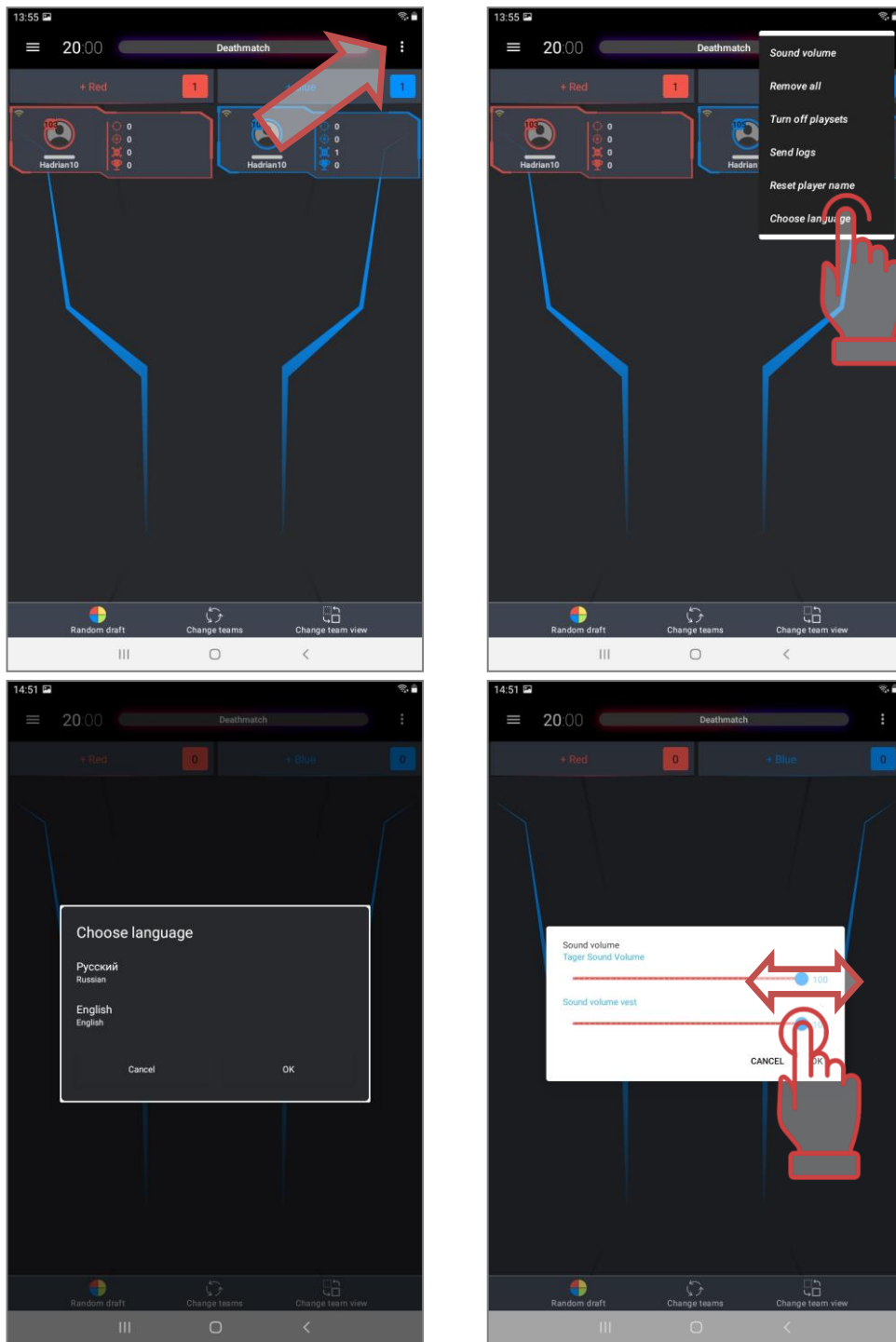
10.5. Individual kits settings

Individual kit settings are called only after the kits are connected to the server, and they will be selected in one of the teams:

By default, scenario settings (general or team) are assigned to all kits connected and used in the game. But the program allows kits of individual players to assign specific capabilities that differ in other virtual weapons, their characteristics, the number of health points, different reactions to protocol commands, etc. Such players can be, for example, birthday people, medics, snipers, supermen or animators taking part in the game. After the start of the game, individual settings will take priority and will be assigned to the selected players.

There are two setting options:

- Custom (quick change of parameters, which are saved only until the change of the scenario)
- With the help of presets (previously prepared and stored parameter sets).

🛈 **Individual settings are only saved for consecutive rounds of the same scenario.**
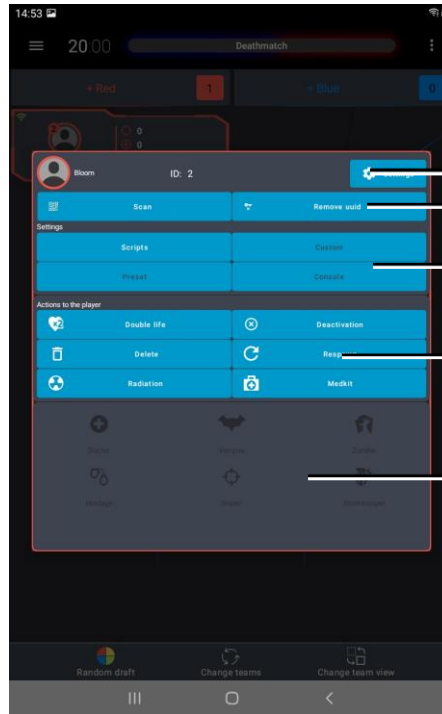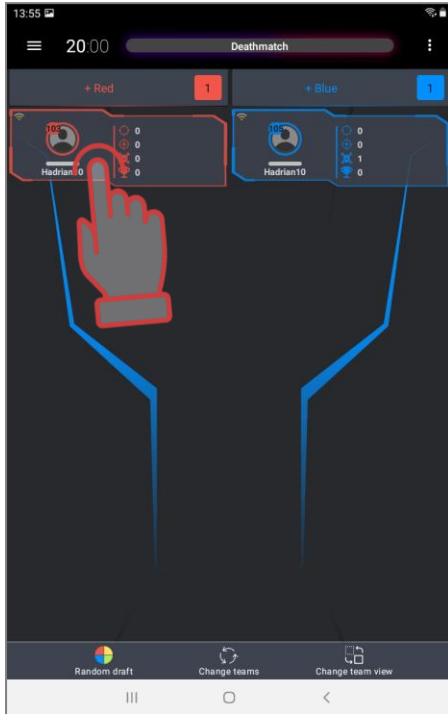
Custom kit settings

Personal statistics access setting field

Display and switch settings field

Quick command field

Preset field

10.5.1. Custom settings for kit

You can customize the kits using the <u>Settings</u> button in the quick commands and kit settings window:

1. In the <u>Game room</u>, when you click on a player's card, a window for quick teams and kit settings opens.
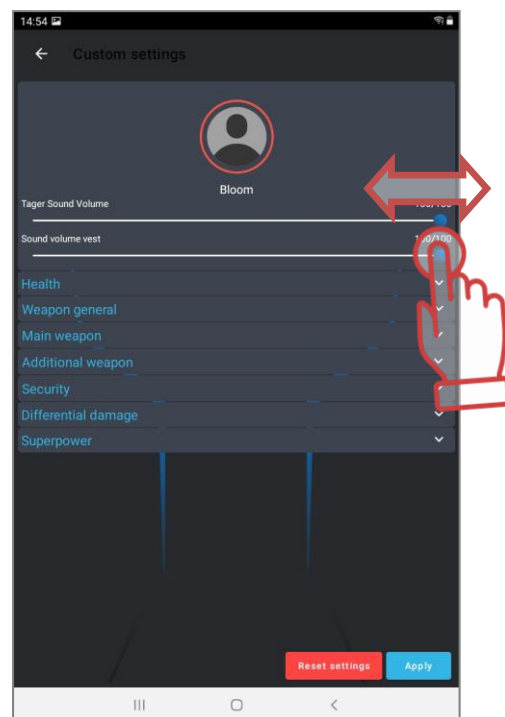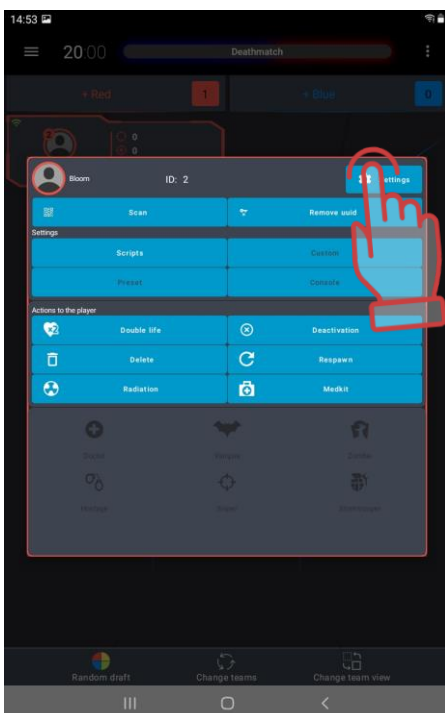
2. If you click on the <u>ID number,</u> the window for changing the identification number of the kit is called up.
3. To <u>customize the kit</u>, click on the <u>Settings</u> icon.
4. To change the player's name or nickname, click on the line with the current name - the keyboard is activated, with which you can edit it (up to 10 characters are allowed, except for #,! and a tab character). The change must be confirmed by clicking on the Save changes button. Exit from the name editor - press the OK button on the keyboard.
5. In the window it is possible to adjust the volume of the sounds played by the blaster and vest speakers. Holding the blue circle on the slider and moving it to the right increases the volume, moving to the left decreases it.
6. Change the <u>kit settings</u> in the table below. The table is similar to the table of general settings in the scenario editor (see chapter 9.3.2.2. of this manual) and it is possible to change more than 30 parameters in it. To change it, click on the name of the parameter - a window will appear with which the parameter is configured.
7. Confirm the changes by clicking on the "Apply" button.

When you click on the bottom line in the table - <u>Reset settings</u>, the factory settings are returned. To exit the window, click on an arrow in the upper left corner of the window.
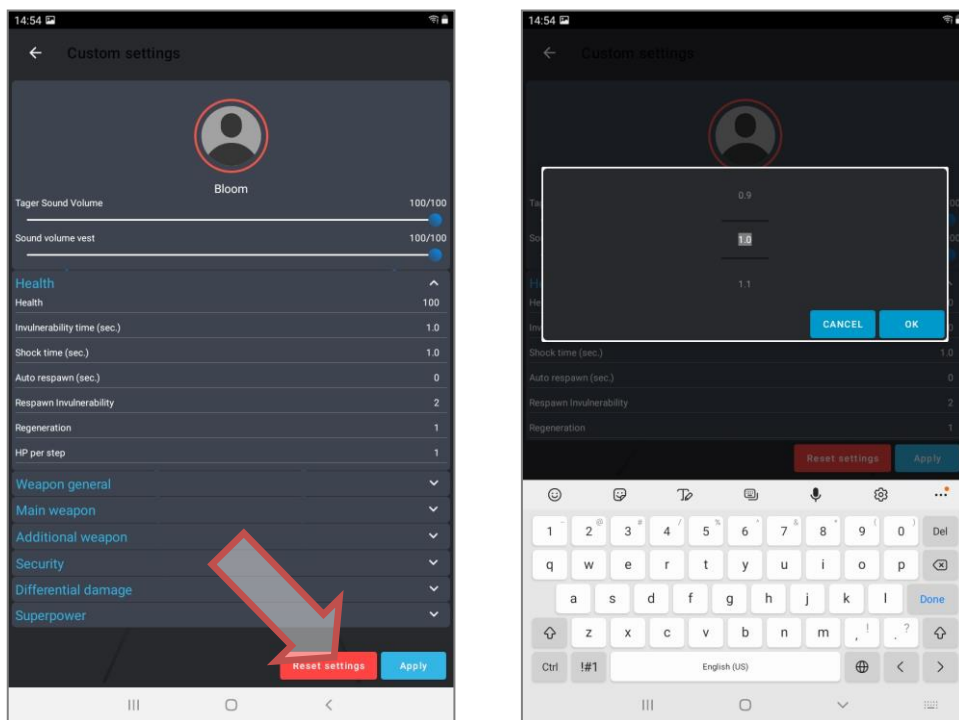
The field for setting access to personal statistics allows the instructor to synchronize the kit with the player's personal UUID registered in the personal statistics display application for the duration of the game:
1. On the player's smartphone, open the previously installed and configured program for displaying personal statistics.
2. Open individual QR code of the player.
3. In the Lasertag Operator program, in the field for setting access to personal statistics, press the "Scan" button and the tablet camera turns on.
4. Scan the player's QR code.

5. Now the player's UUID is synchronized with their kit ID, and a QR code icon appears on the player's card in the upper left corner.

The field of quick commands allows you to send a protocol command to the selected kit directly from the server. By clicking on the corresponding button, you can send the following commands:

- DOUBLE LIVES (double the number of health units)
- DEACTIVATION (deactivate the player, but keep in the game)
- DELETE (remove the player from the game)
- RESPAWN (return to the player starting kit settings)
- MEDKIT
- RADIATION (add or subtract health units).

10.5.2. Presets

In fact, presets are pre-prepared individual kit settings that can be quickly assigned to individual player kits after they are connected to the server.

10.5.2.1.   Built-in presets

In the lower part of the individual kit settings window, there are six preset icons - kit settings that give the kit its specific abilities.

By clicking on the corresponding icon, the player can get one of the roles:

- Doctor;
- Vampire;
- Zombie;
- Hostage;
- Sniper;
- Stormtrooper.

In this case, the selected icon becomes brighter, and its image will appear in the icon and on the player's card. In the field of indication and switching of settings, the card Preset settings will become active.
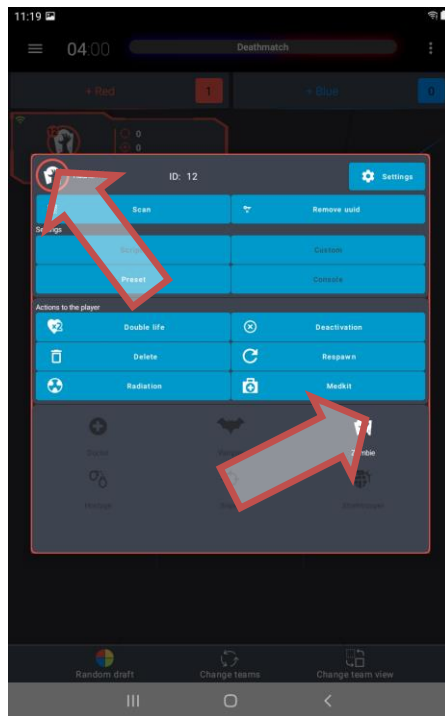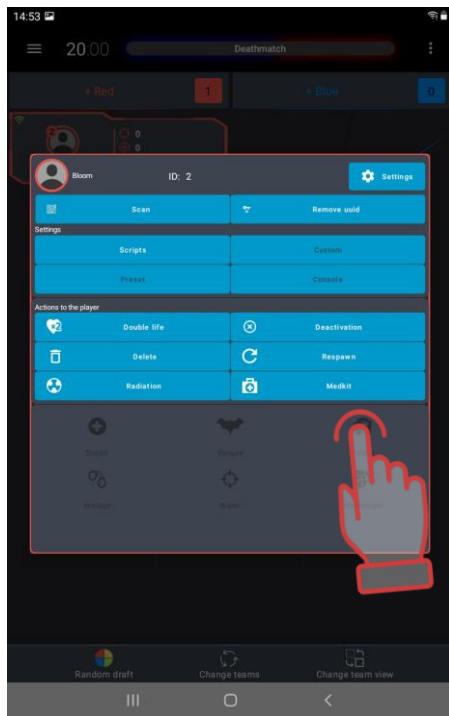
Below are the main characteristics of the factory preset settings:

Standard. The preset that is given to the player by default and when you first turn on the custom settings editor (Window of quick commands and kit settings/button Settings). 100 points of health. Weapon - Falcon with 25 damage. Auto-recharge is enabled.

Doctor. Number of health units - 100. It has two weapons - a Medkit, which, when only its own team hits a player, replenishes him 25 health units, and an assault rifle (damage 25 units).

Vampire. Number of health units - 250. It has one weapon - a bite, which not only takes 10 health units from the opponent player, but also attaches them to itself. The peculiarity of this preset is that during the game the kit loses 1 unit of health every 5 seconds (the so-called "thirst"), as well as the fact that radiation adds units of health to it, and the Medkit takes away.

Zombie. Number of health units - 200. Has one weapon - a claw. Double hitting the opponent turns the latter into a zombie too, i.e. "repaints" in its own color (unless configured otherwise). It has an inverse glow of the kit - the headband or vest is constantly glowing. Doesn't respawn. Doesn't hit zombies. Just like a vampire, radiation adds health units, and a Medkit takes away.

Hostage. Number of health units - 300. The weapon is a recorder, with which the hostage is marked upon reaching the final point of the route. The glow color of the kit is purple. Can be hit and healed (with kits as a Medic) by players of any team.

Sniper. Number of health units - 100. Has two weapons - a sniper rifle (damage 100 units) and a gun (damage 25 units). Strikes players of any team, including own one.

Stormtrooper. Number of health units - 100. Only affects players of other teams. Has two weapons - an assault rifle (damage 25 units), which shoots in bursts, and an under-barrel grenade launcher, which has 6 sec. of recharge, but damage is 100 units.

The program has the ability to edit settings, as well as create your own presets. Moreover, it is possible to edit settings this without kits connected to the server.

10.5.2.2. Built-in preset editor

To view and edit built-in presets in the main menu, click on the Presets section. A window with tiles of presets installed in the program will appear. The tile contains the preset

logo and its name. On the top right tiles, there with a gear - that opens the preset editor.
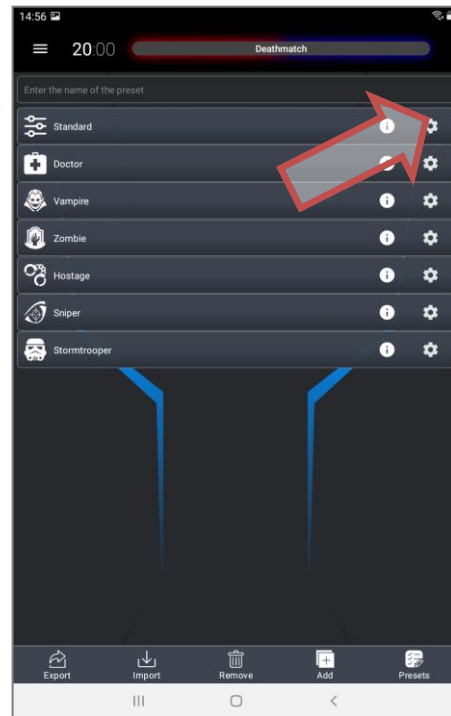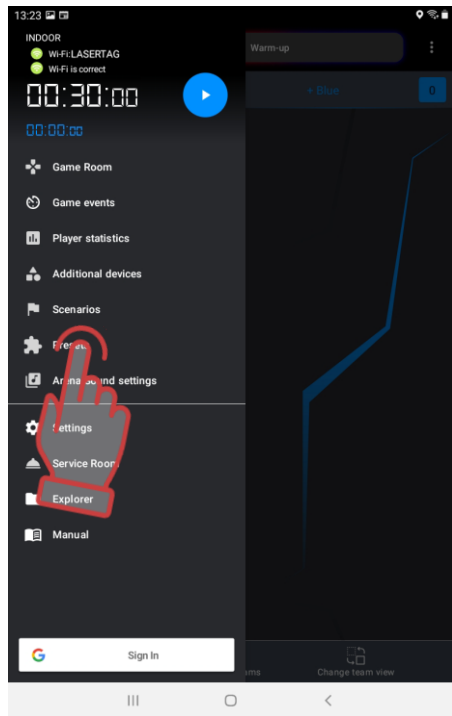
In this window, you can configure more than 50 different parameters.

The top line is the description given to each built-in preset.

The settings table is similar to the general settings table (see Ch.10.3.2.2.).

The only difference is that have been added the Special section In it you can choose what action the First-aid kit and Radiation commands perform on the player's kit - treatment, damage or nothing. The Vampire has the following parameter:

- Vampirism percent - the percentage of health units relative to their own damage settings, which the player in the role of Vampire attaches to himself after being included in the opposing player's kit (0-100%). For example, the opponent currently has 75 health units. Vampire weapon damage (bite) - 25 units. The percentage of vampirism is set to 50%. When the opponent enters the kit, 25 units are taken away from him (50 remains), and only 12 units join the Vampire (rounding down). At the same time, the total number of health units of the Vampire cannot exceed the starting value.

The Zombie preset in the "Special" section has a setting for actions when hitting an opponent with the "Zombie" protocol command (when choosing the "Zombie" damage type). Using the radio button, you can select one of the options:

- Infection - changing the starting role of the opponent to the role of the Zombie and moving to his team.
- Change team - move to the Zombie team without changing your role.
- Off - the function is disabled.
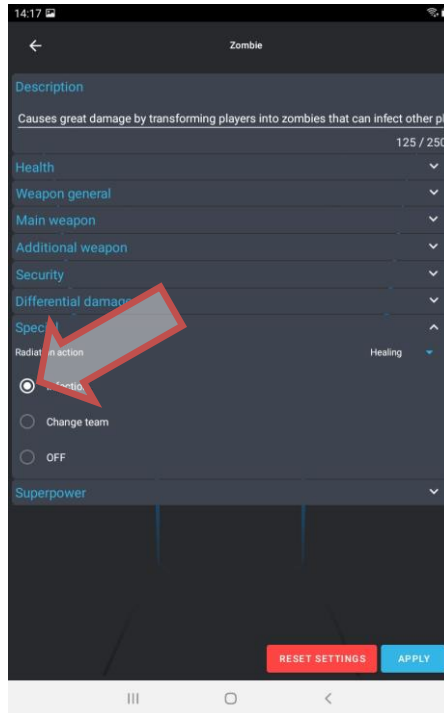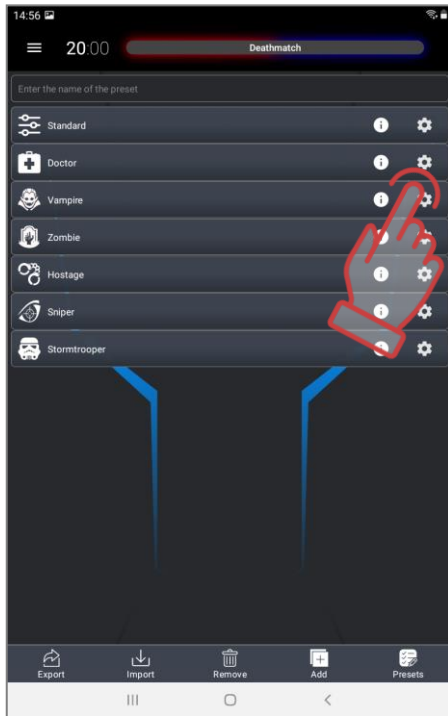
10.5.2.3.   Creating a custom preset

In addition to the fact that the settings of each built-in preset can be edited, the program provides the ability to create <u>custom</u> presets.

To do this, you need to:

1. In the preset editor window, click on the ADD button at the bottom of the window. A window opens asking you to specify a name for the new preset.

After entering the name, click the "Next" button and copy the preset settings from the existing ones, click "OK". The kit settings window opens, similar to the preset settings window.

2. In the settings window that opens after this, it is proposed to make a short description of the preset (no more than 250 characters). To enter or edit text, click on the pencil image to the right of the <u>Description</u> inscription. Closing editing - click on the tick mark that appears in the same place.
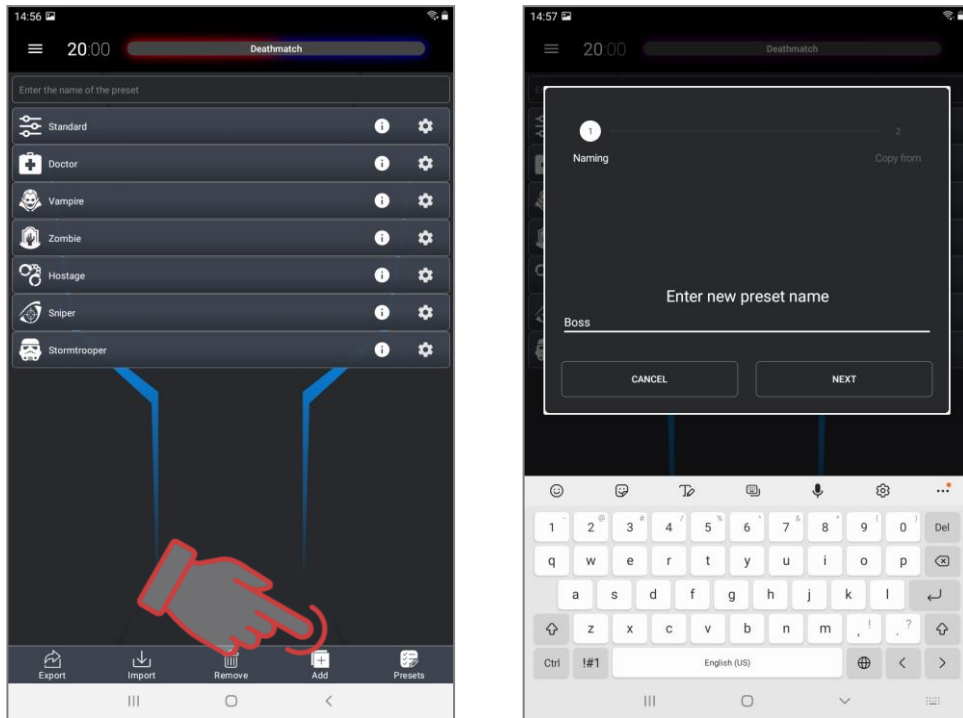
3. Set your own set of parameters, which is activated when this preset is selected.

Each preset can be assigned 2 virtual weapons.

If the player has two types of weapons in the preset, to switch them, you need to hold down the blaster reload button for 3 seconds until the sound signal plays.
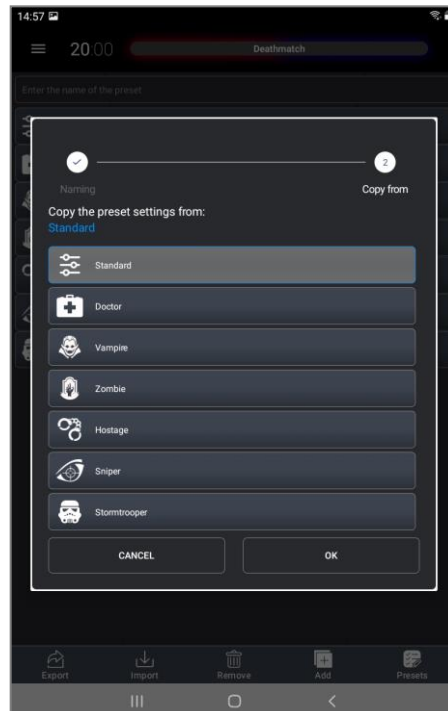
In fact, the types of weapons differ in their impact (take away or add health units, repaint, etc.) and the sounds accompanying the shot. Other parameters can be set at the desire.

The following settings are recommended for different types of weapons:

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Damage type/ Parameter	Dama-ge, health units	Auto-reload	Recha r-ging time, sec	Fri-endly fire	Endless maga-zines	Number of maga-zines, pcs.	Number of cartridges in magazine, pcs.	Shots in the burst, pcs.	Speed of fire, shots/ min	IR-beam power, %
Falcon	25	-	2,0	-	-	10	30	3	565	40
Assault rifle	25	-	3.0	-	-	10	30	3	565	40
Grenade	100	-	6.0	-	-	3	1	1	100	30
Sniper	100	-	4.0	-	-	5	10	1	30	100
Gun	25	-	2.0	-	-	3	15	1	180	50
Healing	25	-	2.0	-	-	10	30	1	300	40
Vampire	25	-	2.0	-	-	10	30	1	300	40
Zombie	25	-	2.0	-	✓	10	30	1	300	40
RPK	50	-	3.0	-	-	10	45	3	565	40
Radiation	25	✓	2.0	-	✓	10	30	1	300	40
Hostage	0	✓	2.0	✓	✓	100	100	3	565	2

4. To save the settings, click on the blue checkmark button.
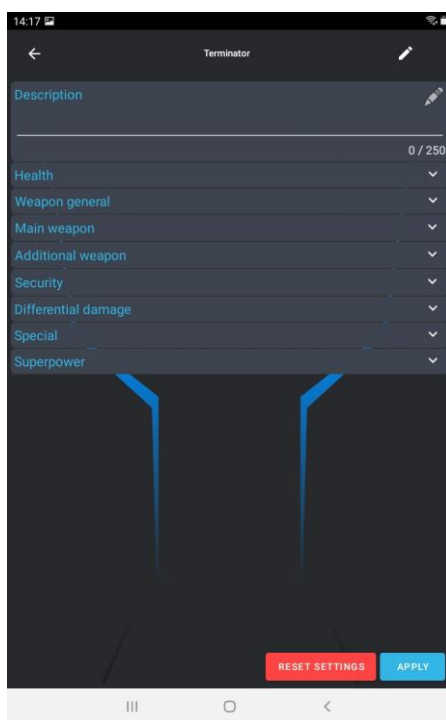
After that, the tile with the new preset will appear in the general list and on the second page of the individual kit settings window.

To open the second page (or the next, if there are several pages), you need to swipe to the left of the presets section.
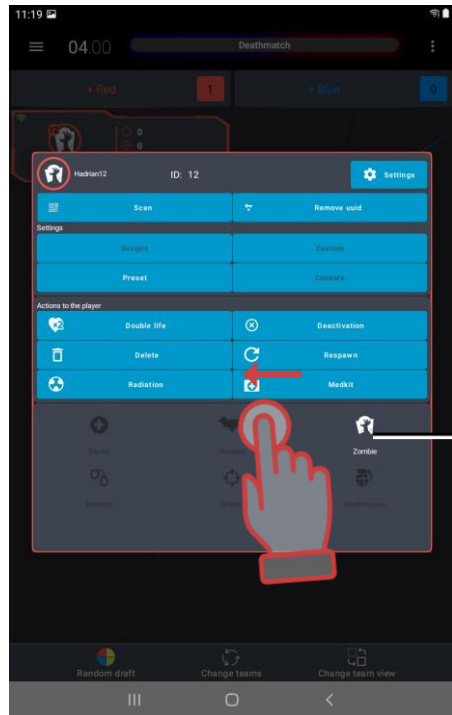
Opening the next page of presets

Export, import and deletion of presets is carried out by analogy with scenarios, using the corresponding buttons (see chapter 10.3.3. of this manual).

To find files of saved scenarios on the device, click on the Explorer main menu item, and then select the Scenarios tab. Preset files will have a .jsonPreset extension.
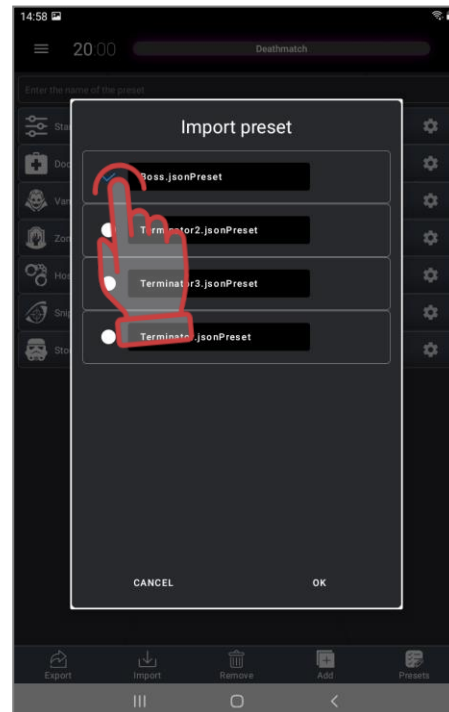
10.5.2.4.   Assigning individual settings

Switching between options of individual settings is possible using special buttons in the window of quick commands and kit settings.

If the custom settings were changed before starting the game, the corresponding button will become active. When you click on it, the inscription Custom settings becomes bright, thereby indicating that these settings have been applied.

If you click on one of the preset icons, including custom ones, the inscription on the Preset settings button will become bright, indicating that the kits have received a setting using a preset.

Pressing the Scripts settings button returns the settings assigned by the scenario for all or for a specific team of the player.
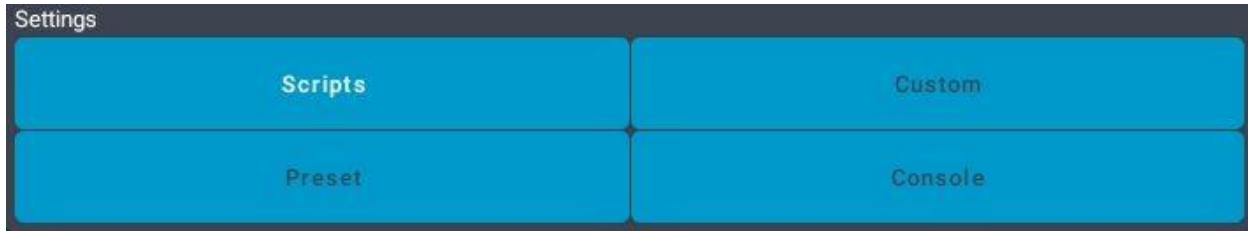
10.5.3. Setting the scenario time

To set the scenario time, you need to go to the main menu (swipe to the right or press the button ▤):

1. Tap on the big white numbers at the top of the menu. The window that appears allows you to set the time of the game round.
2. There are three ways to choose the game time. The first way is to choose one of the preset options (presets) of the round time in the leftmost column - 3, 5, 7, 10, 25 minutes. Time presets can be edited after a long press on the tiles..
3. The second method involves manually selecting the time in the corresponding hours (0-23 h), minutes (0-59 min) and seconds (0-59 s) by shifting the numbers vertically.
4. The third way - setting the time can be done using the numeric keypad, which appears when you click on the number that needs to be corrected.
5. Confirm changes - click on the inscription OK, if you refuse to change - click on the inscription CANCEL.
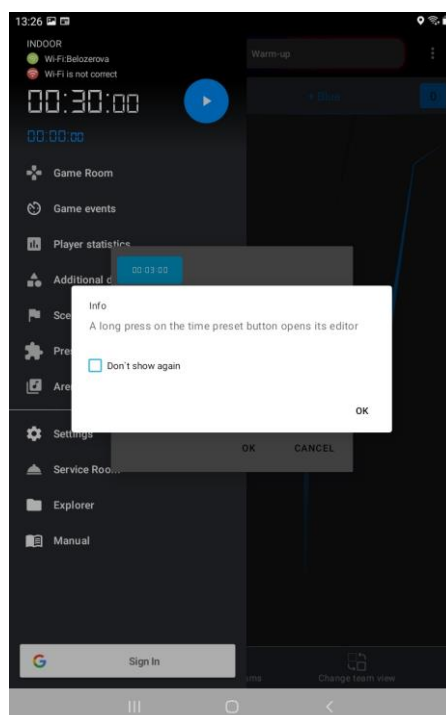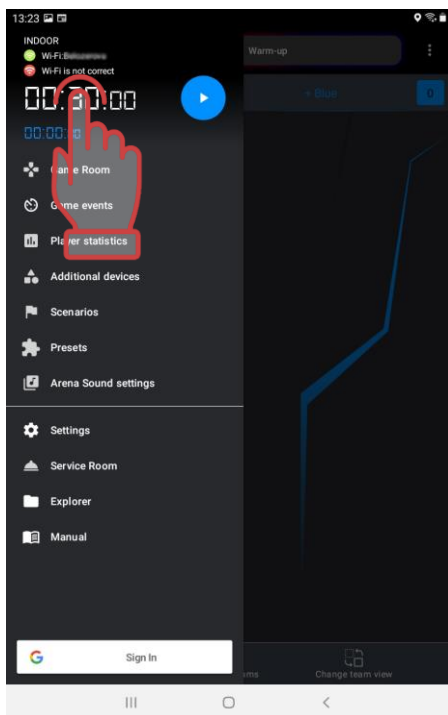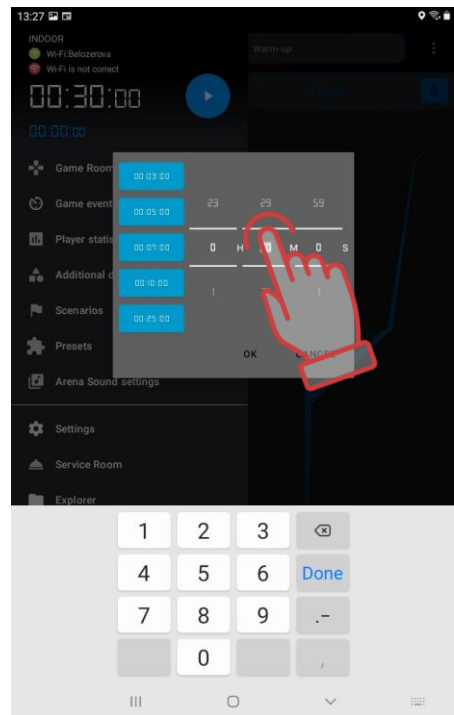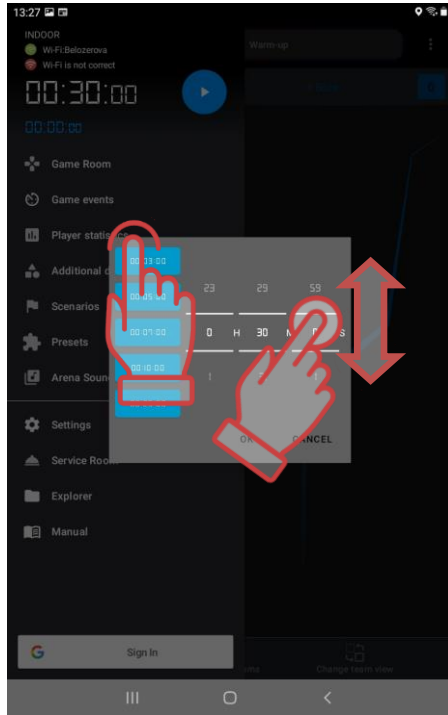
6. The start delay is set in the same way. The delay timer is displayed in small blue numbers below the main timer. When you click on them, the time setting window is also called. The only difference is that the preset time options are given here in seconds - 5, 10, 15, 20, 30 seconds, respectively.
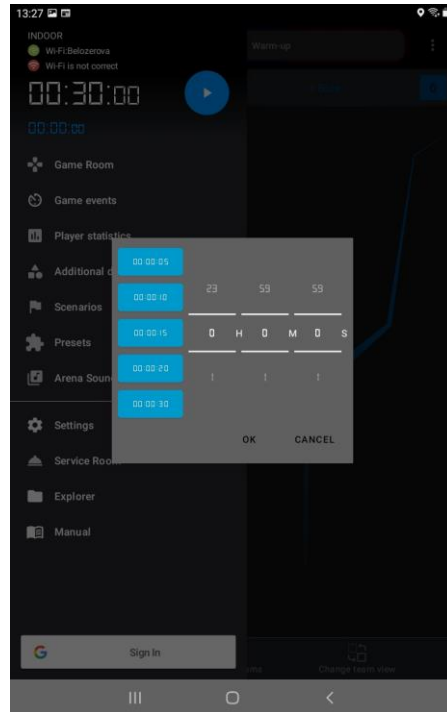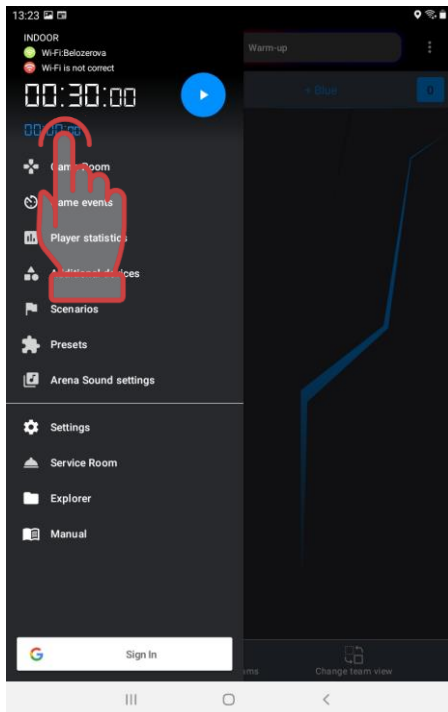
10.6.   Arena sound settings

Sound accompaniment, along with lighting design, is an indispensable attribute of indoor laser tag games. The equipment produced by the company uses two types of sound effects that are reproduced:

- blaster and vest speakers;
- external acoustic system.

10.6.1. Individual kit sound effects

The blaster speakers reproduce the sound of a weapon being used (a shot, radiation, a medkit, a zombie growl, etc.), a misfire, a ricochet sound, as well as some system signals (weapon breakage, barrel overheating, etc.).

Mainly voice messages are displayed on the vest speaker - about the start of the game, about the readiness of the superpower, about the capture of the Domination Box, etc.

In the Lasertag Operator program, it is possible to select the language of sound messages (English or Russian) reproduced by the speakers of the set - Main menu/Game room/Button with 3 dots in the upper right corner of the window/Change language (see section 9.4).

> ⓘ **You can change the sound scheme of the kit and introduce your own sounds only when flashing the microcontrollers of the devices using a special program. For advice on updating the firmware of device microprocessors, contact the company's technical support: https://lasertag.net/support**

10.6.2. External announcements and music

The Lasertag Operator software allows you to create the right atmosphere in the game space using sound effects and musical compositions.

The external acoustic system of the playground plays background music, as well as more than 50 voice messages that automatically sound in accordance with emerging situations in the game.

An external acoustic system is connected to the tablet/smartphone, depending on the device, either through the audio socket or via Bluetooth.

Pressing the Arena sound settings item in the main menu opens a window with two tabs: Events table and Foreground voice acting.
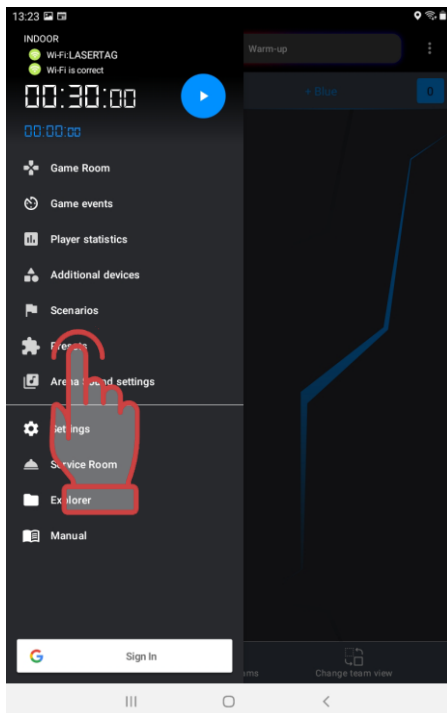
The first time you open the Arena Sound menu item after installing the Lasertag Operator program, it is recommended to download event sounds and musical compositions from a remote server. Accordingly, it requires an Internet connection. To download, click on the "Download sounds" item at the bottom of the screen. The process is quite long (about 2 minutes) and can be observed in the device's notification menu.

After loading sound files, it will become possible to listen to voice messages - when you click on the selected line of the message, the sound is played in parallel by the speakers of the tablet and the external acoustic device. This function can be useful for manual mode, when the operator needs to reproduce a specific sound command in the arena. In other cases, messages sound automatically, depending on the situation in the game

To do it, it is necessary to move the On/Off switch for scoring of events to the On position.
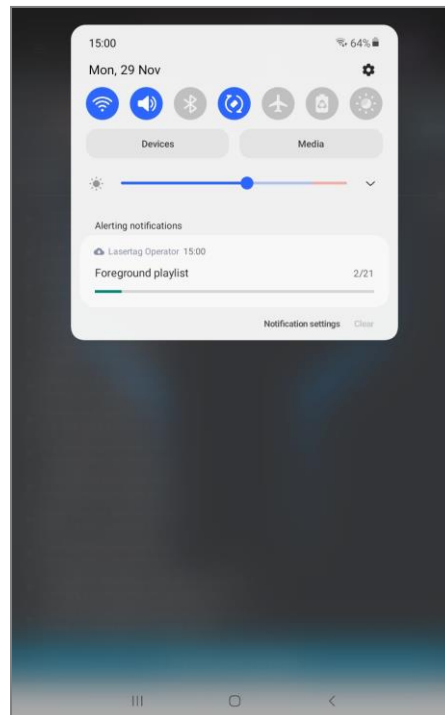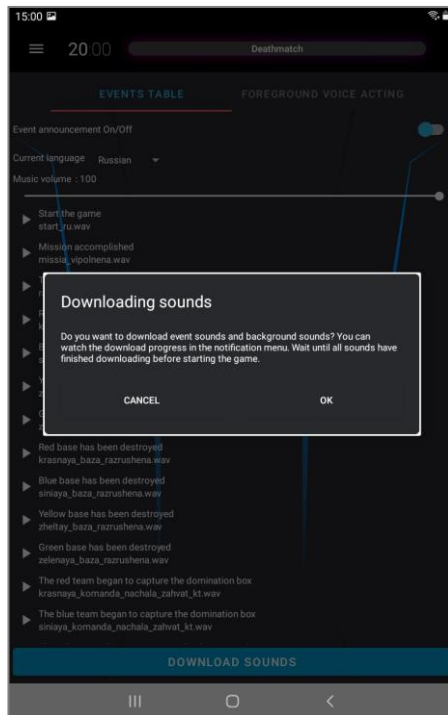
It is possible to select the language of events scoring. If you click on the triangular button to the right of the inscription Current language, in the drop-down menu you can select one of four languages: English, Russian, Spanish or French.

In the Background Audio tab you can control the music that plays on the playground during a round. The program allows you to turn on/off music playback, as well as select a pre-formed playlist (a list of played music) - for this you need to click on the selected line.
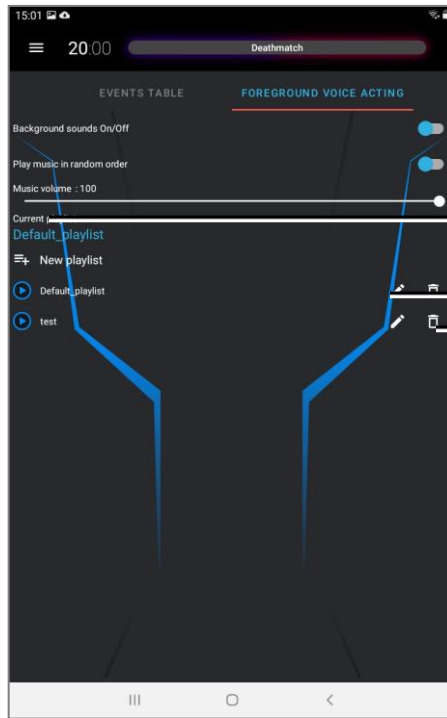
Current playlist name

Edit playlist

Remove playlist

If necessary, you can create a new playlist, edit the list, or delete it.

To create a new playlist, click on the <u>New playlist</u> button . The program first suggests you to name the playlist. The name can be connected with a specific scenario, the theme of the game, an event (birthday) or a category of players.

After confirmation with the OK button, the playlist name will appear in the general list. Now the playlist needs to be created.
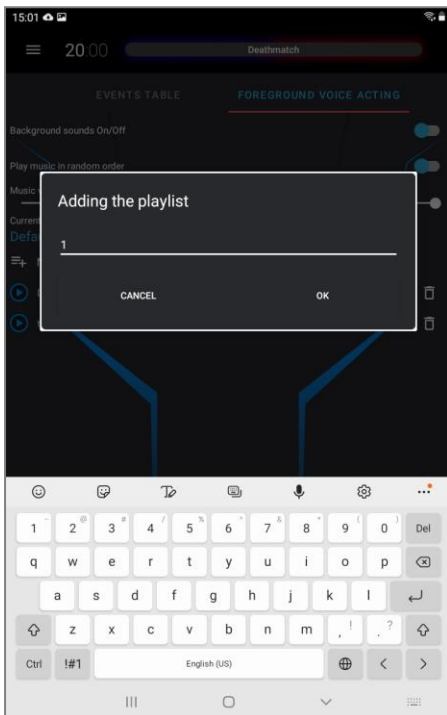
1. Click on the button with the pencil image .

2. In the window that opens, click on the line Add New Sounds. The device file system window will open.
3. Select the required music compositions (files with the .wav, .flac and .mp3 extensions are supported). The file search order depends on the version of the tablet or smartphone operating system.
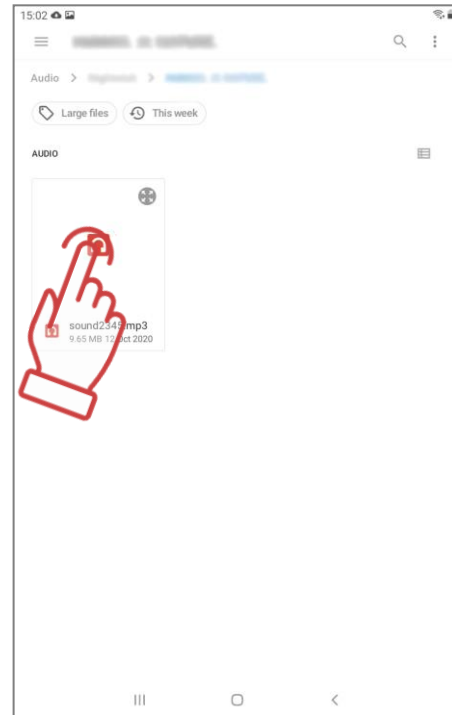
4. The file names appear in the song list. If desired, you can rename them - click on the button with a pencil .
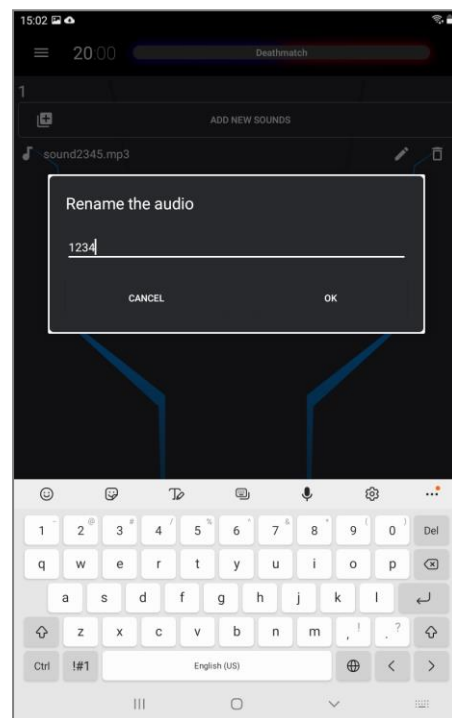
5. The list can be supplemented (repeat the procedure for inclusion in the playlist) or shortened by clicking on the button with the urn image to the right of the file name.

The playlist is deleted in the same way.

Now, at the start of the game, the melodies will be played depending on the selected playlist and in the order as they are located in the list. The playlist is controlled from the standard player of the operating system. Volume control - by controlling the volume of the device and speaker system.
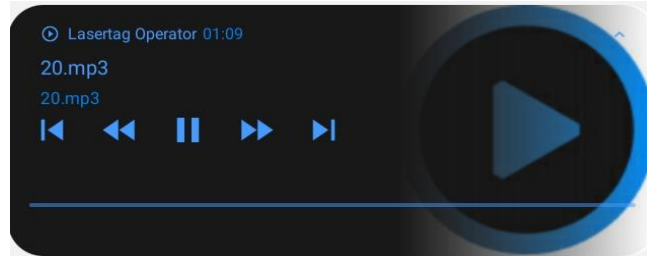
10.7.Game control and monitoring

After choosing a scenario, if you need to customize the kits, soundtrack and round time, you can start playing the game directly.

The term "Game" means a gameplay in which the same teams play a certain number of rounds. It can be either one or several rounds. "Round" is a gameplay with a certain scenario, limited either by time, or ending when a condition specified in the scenario occurs (capture of DB, reaching a specified level of points, etc.).
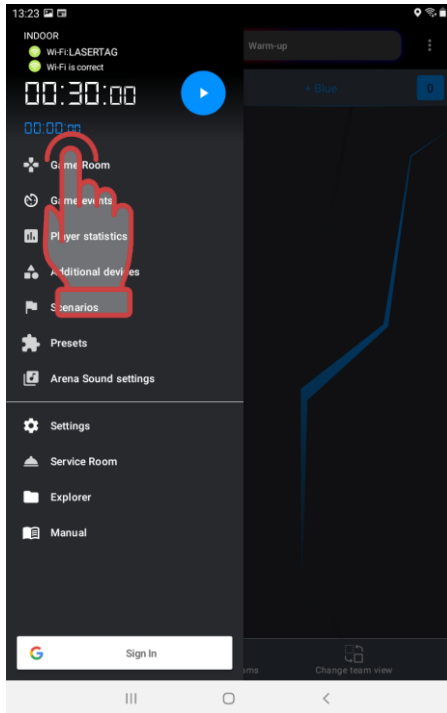
To start, you must use the control button in the main menu.
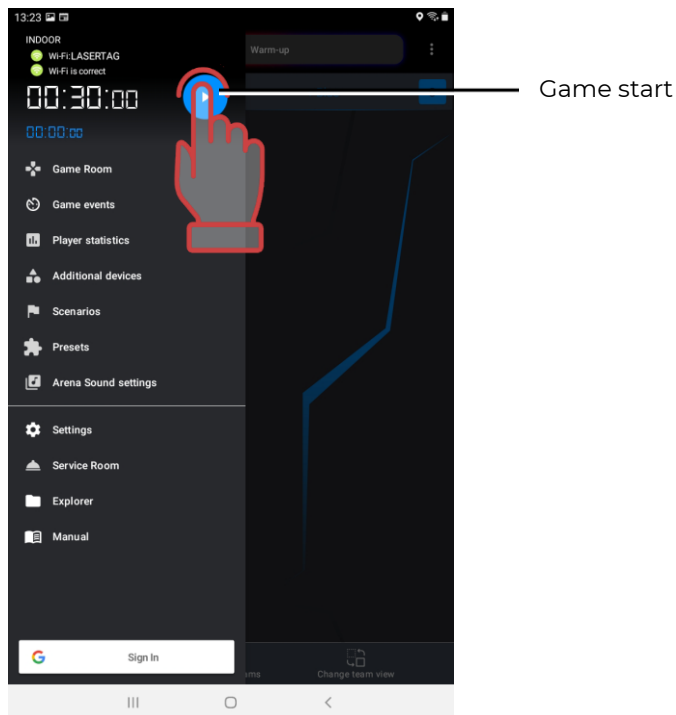
Game start

After the start of the game, the timer in the main menu starts counting down (after a delay, if it was set).

The process of the game one can observe in the Game room by pressing the corresponding button in the main menu.

88
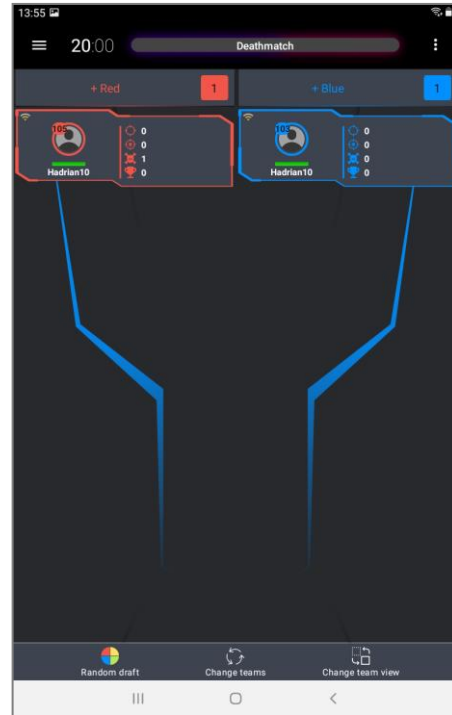
The status bar on the player cards will show a green bar proportional to the remaining health points.
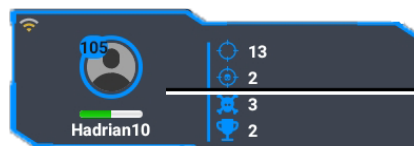

Kit in the game, 100% health

Kit in the game, 25% health

Player pending start or removed from game

Kit in the game, 50% health

The player suffers a defeat

Displaying a warning about aggressive actions of the player*

*The blaster's accelerometer detects sharp and dangerous movements with the blaster, information about this appears on the screen of the instructor's tablet, as well as on the screen of the player's blaster (see paragraph 1 of this manual).

Similarly, you can control the status of the additional devices involved in the scenario by pressing the button of the main menu Additional devices.

During the game, one can see a log on the screen - a report on the main events taking place on the playground. Moreover, the log can be viewed both in expanded and short display - just check/uncheck the "Turn on detailed game logging" item in the "Settings" menu.

In the expanded display, you can see all the events taking place in the game, including every hit of an opponent by all players. In the short display, you can see only key events, such as the beginning and end of a round, capture of a Domination Box, etc.

In order to show the log on the screen, you need to go to the main menu item "Game events" during the game.
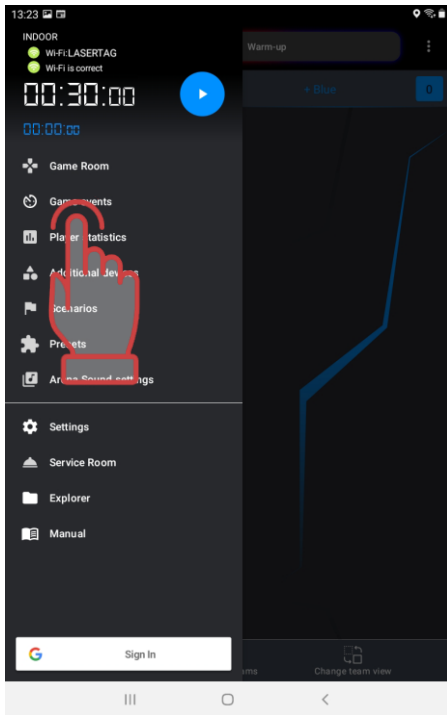
Also, as in standby mode, during the game you can change players between teams - by long pressing on the card, first activate it, and then move it to the field of another team. However, the statistics of the game will not be correct.

Round ends:

- on timer,
- when the condition specified in the scenario occurs,
- forcibly pressing the Stop button.

The "Stop" button during the game appears in the main menu in place of the Start button.
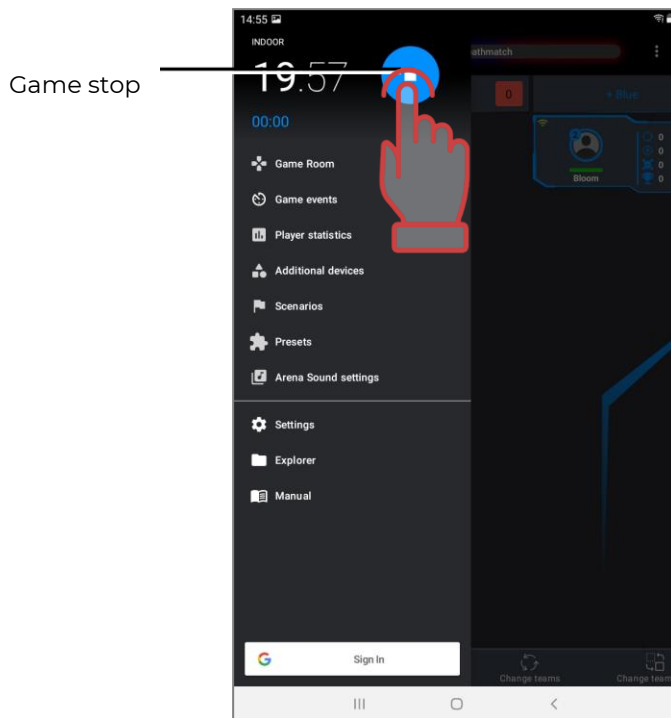
Game stop

10.8.   Game statistics

Game statistics can be observed both during the game (current) and after its end (final). Moreover, its indications will depend on how the game statistics is configured - reset after each round or accumulate before the forced reset (see Ch. 10.2).

Pressing the button <u>Game statistics</u> of the main menu (swap to the right) displays the corresponding window. There are 3 tabs in it, which are called by clicking on their name.
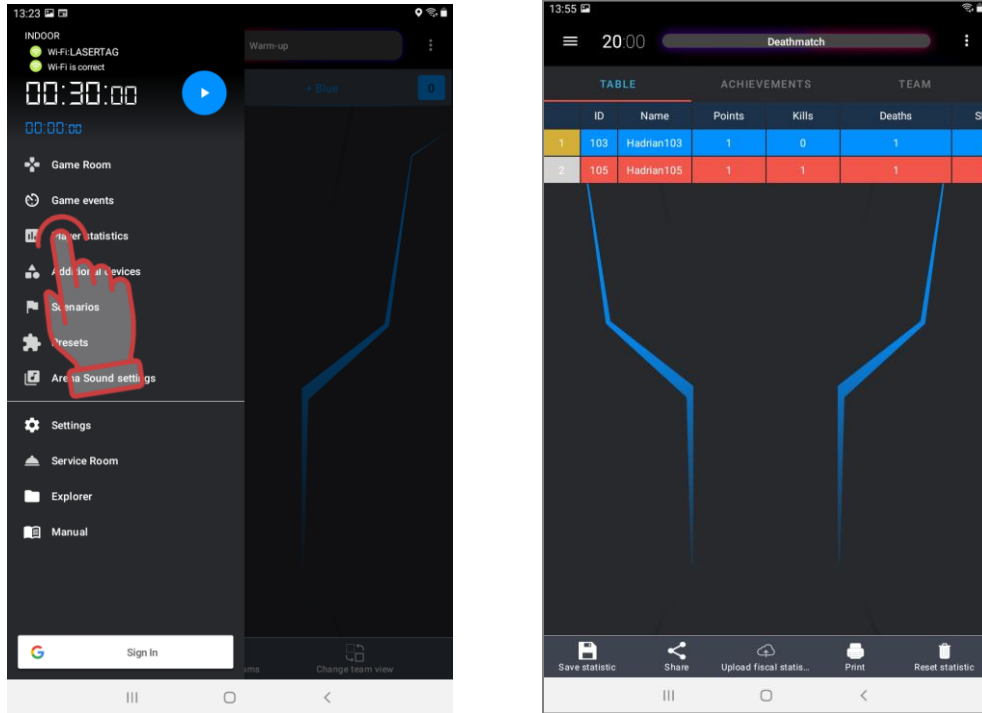
The <u>Table</u> tab in real time and at the end of the game shows for each kit participating in the game, the number of frags, shots fired, captures of Domination Box, points scored, damage inflicted and received, differential damage, the number of bomb shots and a step counter in game (step counter), etc.
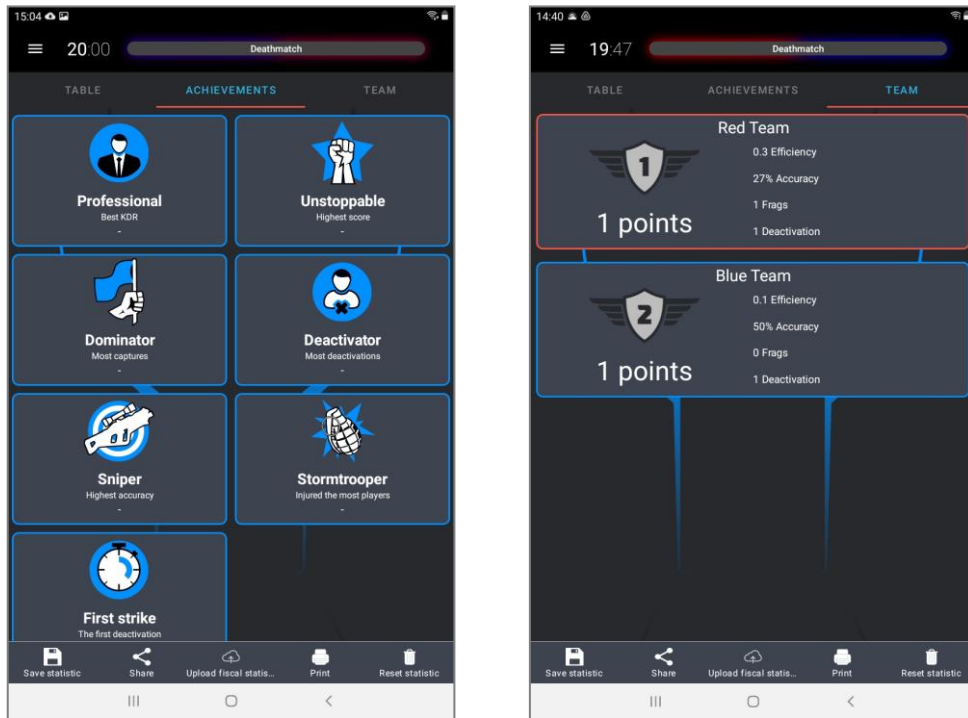
The Achivments tab displays the current nominations depending on game indicators - accuracy, number of hits, number of points scored, etc.

The Teams tab displays team statistics.

To forcibly reset statistics, press the Reset statistics button in the lower right corner of the window.
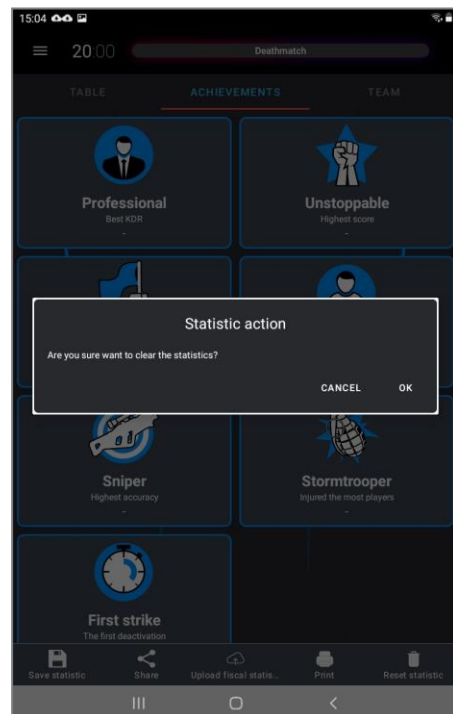

At the end of a round or game, the program has the ability to process statistics.

After clicking the SAVE STATISTICS button, the program resets the current results to the device memory at the address: My files/Documents/pdf/ (the address may be different depending on the version of the operating system). At the same time, three graphic files of

general statistics are saved: Game_statistic_XX: XX.pdf, Cross_statistic_XX: XX.pdf and Honor_desk__XX: XX.pdf, where XX: XX is the file saving time.

Individual statistics of all players who participated in the game are also saved there - files Player_statistic_XX: XX Nickname.pdf, where Nickname is the name or nickname of the player.
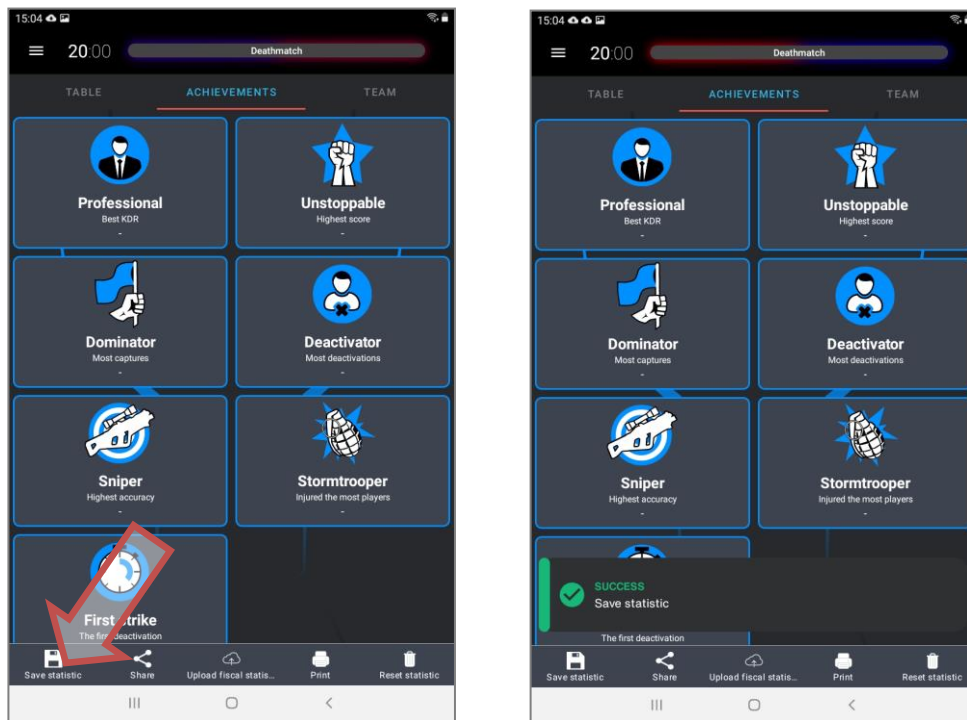

You can find these files, as well as files of game logs, saved scenarios and presets, if go to the "Explorer" sub-item of the main menu and then select the "Pdf" tab (first from the left). In this menu, you can expand files by date, select all, delete all or individual files, share via e-mail or social networks.
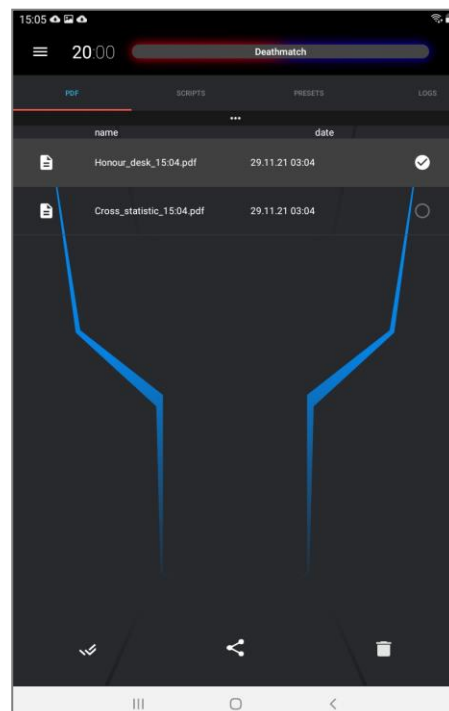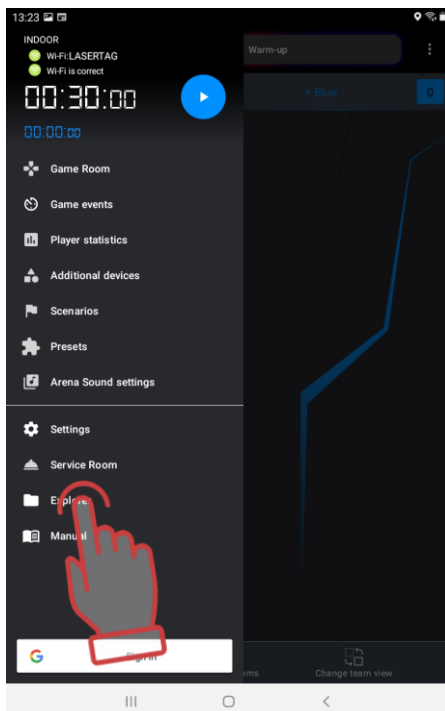
Using the operating system program, you can view the generated files. They later can be sent by mail or printed on a remote printer.

The <u>Share</u> button opens a window in which the user is prompted to publish graphical statistics files via mail, Google Drive or social networks, depending on the programs installed on the device.

ⓘ You can share the result of the game after connecting the device to the Internet.
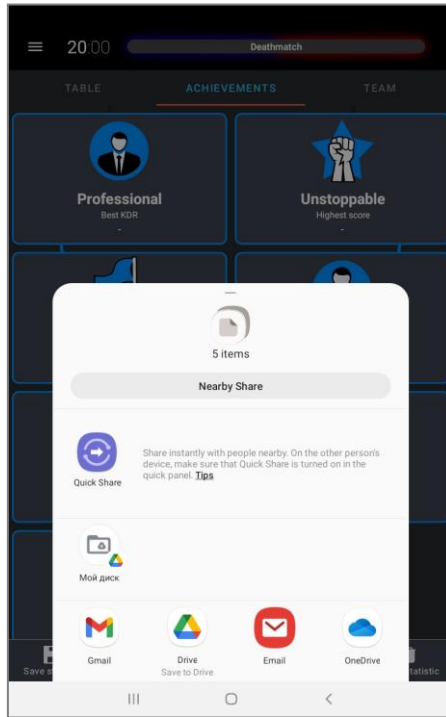
When you click on the <u>Print</u> button, a dialog box appears in which you can choose to save the report as pdf files specially prepared for printing.
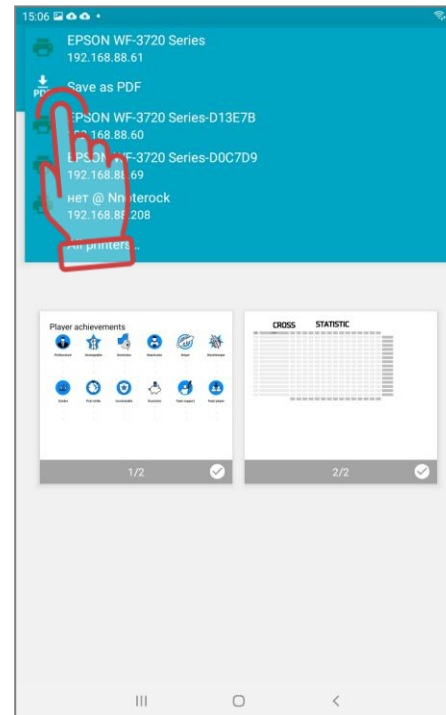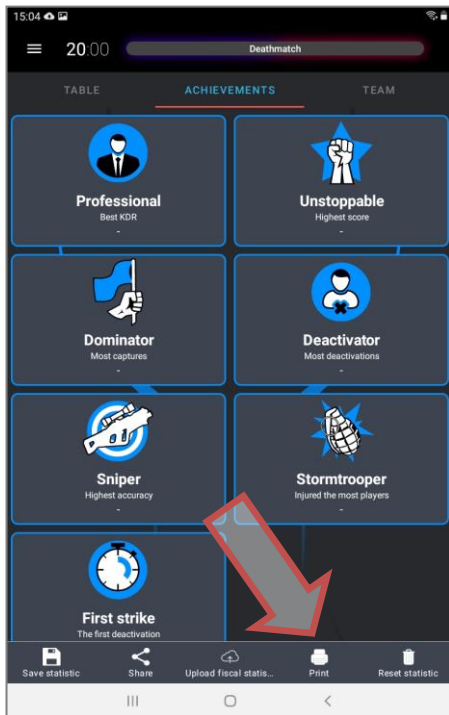
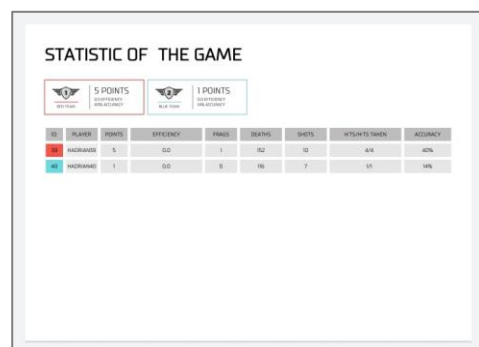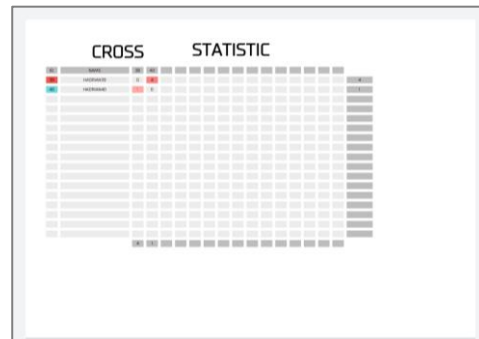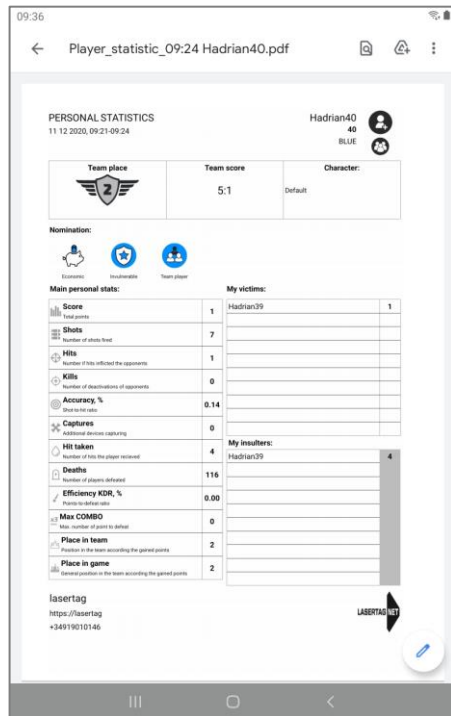If you select a printer connected via Wi-Fi to the device in the dialog box, report forms can be printed immediately. It is also possible to customize printing. The printing preferences dialog box depends on the version of the operating system installed on the device.

❗ The printer must be connected to the same network as the tablet or smartphone.

10.9. Fiscal statistics

Another menu item of the statistics window is associated with uploading fiscal statistics, which allows the club owner to control the number of games played on the playground.

When sending the kits, the owner is given the address, login and password from the server, where he gets access to the statistics of his club. There he creates accounts for administrators, and reports the details of them to administrators.

The username and password that the club owner provided to the administrator or instructor must be entered in the Fiscal statistics section (Main menu/Settings).

You can send fiscal statistics from the Working with statistics tab after connecting your mobile device to the Internet.

For detailed instructions on working with the fiscal statistics server, please contact the company's technical support service https://lasertag.net/support/.

During all working hours, statistics will be accumulated in the background on the device until the button SEND FISCAL STATISTICS is pressed. The user (this can be both the administrator and the owner of the club, who logged in with his own name and key), after connecting the tablet or smartphone to the Internet, dumps statistics to the server. This clears the statistics on the device.

❗ Uploading statistics to the server takes place for games from 3 minutes, so that short test and verification games are not taken into account.
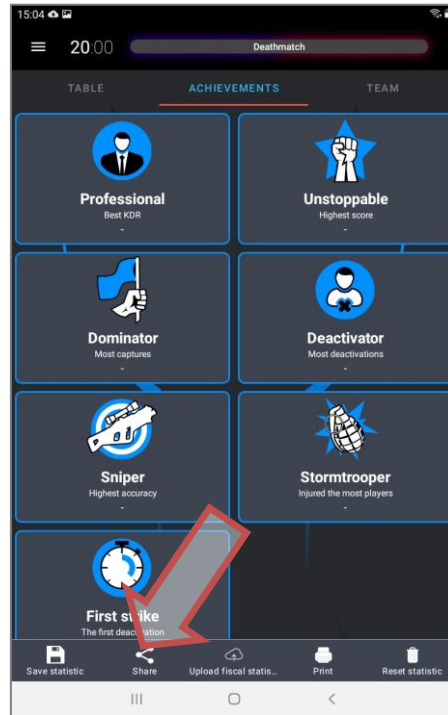
Now information about the games played (date, time of the start of the game and the end, duration and number of sets participating in the game) will be stored on the server and will be available only to the owner of the club.

10.10. Log in with Google account

The current version of the program now has an option for authorizing the program via Google account. To log in, click on the button with the Google icon "Login" in the main menu at the bottom of the screen, select an account and log in.
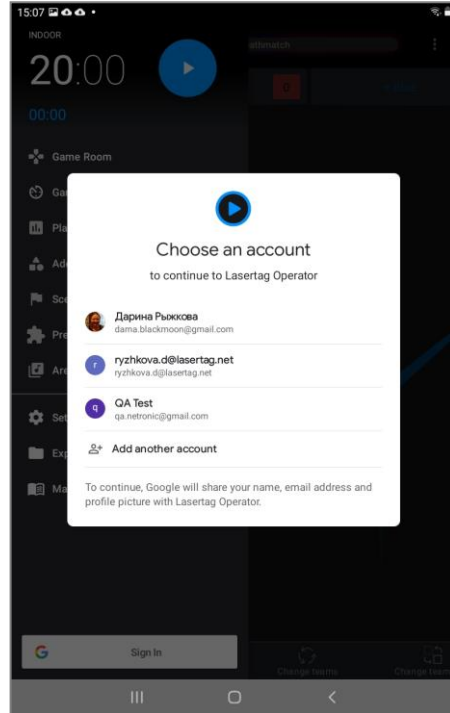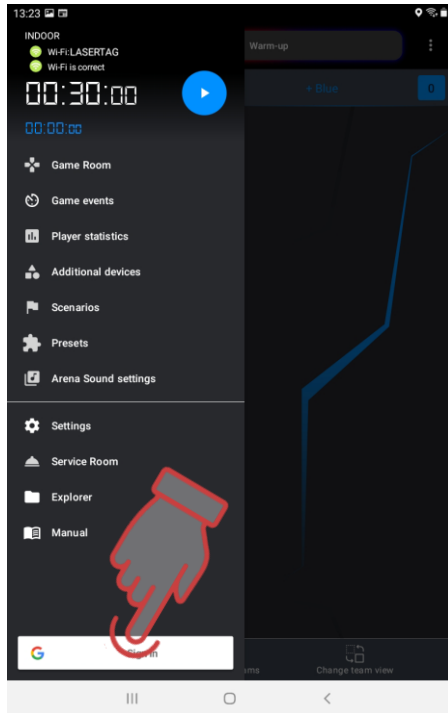
After successful authorization, the developer can receive authorized error notifications and backlog. And in the future (now this option is being developed) you will be able to receive notifications about updates in the program on your device, as well as join the customer loyalty program.

11. Broadcasting statistics on an external screen

Broadcasting operational and post-game statistics on a TV screen or a projector installed in a non-game area (waiting area, administrator's room, etc.) allows:

- during a game round, control individual statistics of players, mode and status of additional devices;
- by observing the operational changes in statistics, to involve in the gameplay the players waiting for their turn, as well as their fans;
- each player, immediately after the game, evaluate his own achievements and the achievements of the team;
- as one of the advertising elements - to attract new visitors.

For this purpose, the company has developed the LaserTagStatistic program included in the delivery set.

The program is installed on any device (smartphone, tablet, PC, Android TV, set-top box) with the installed Android operating system version no lower than 5.0.

To install or update the program, you must:

1. Check for LaserTagStatistic software on the device. If an irrelevant version is installed, it must be removed.
2. Connect to a Wi-Fi network with Internet access.
3. Download the installation file of the program to the device (at the time the manual is being written the current version LazerTag2.5.3.apk).
   https://lasertag.net/support/ Indoor / Software for Android mobile devices / LaserTagStatistic program to transmit statistics to an external display.
    or in the Play Market application – program TVOUT Laser tag Scoreboard

   https://play.google.com/store/apps/details?id=ua.com.Netronic.TVOutLasterTagSco reboard
4. Start the installation process by clicking on the installation file.
5. Wait for the program to install.
6. Connect to the LASERTAG Wi-Fi network enter the password 2015LT2015 (the access point name and password may be different, depending on the router settings).
7. Run the program.
8. After opening the LaserTagStatistic program, move the cursor to the lower right corner of the program start window. A gear icon appears, which you need to click on.
9. In the window that appears, check the compliance of tablet's or smartphone's IP and port number with the data specified in the Lasertag Operator program (Menu/Settings/TV OUT Settings). If different, change manually by clicking on the corresponding value.
10. Select the program background if necessary. It is possible to use a custom background available in the device's memory.
11. Confirmation of changes - press the checkmark button.
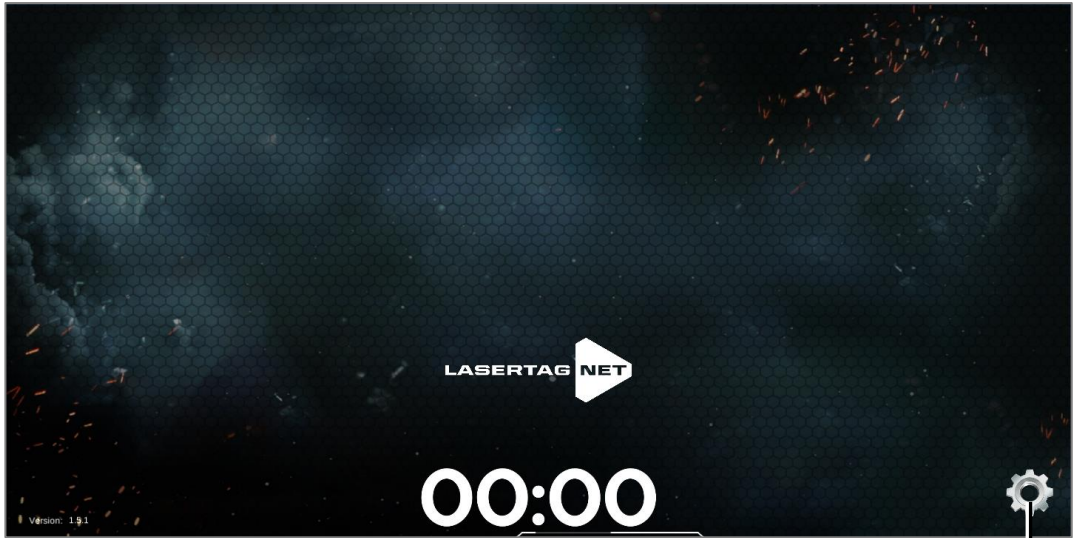
Button <u>Program settings</u>
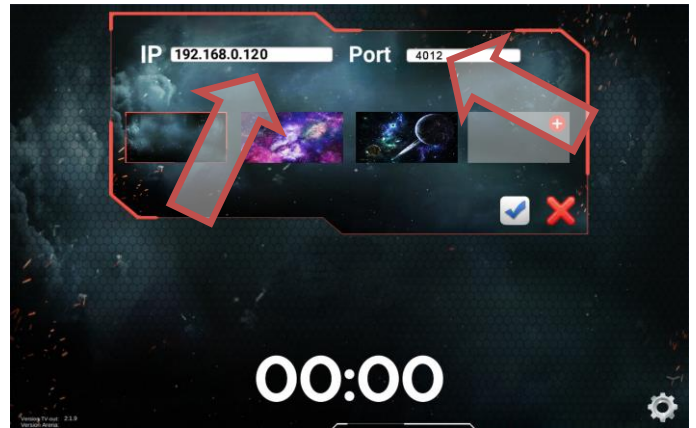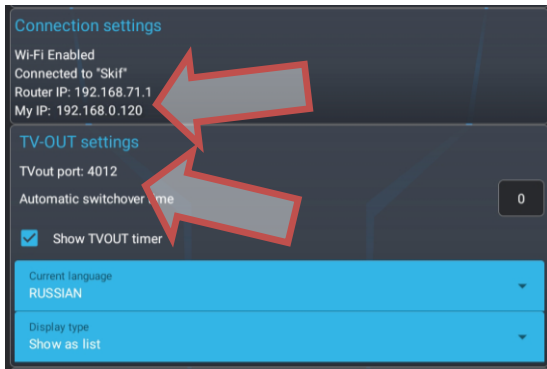
12. If the settings are correct, after starting the game, the LaserTagStatistic application will automatically start, which will display the game statistics.

Scenario title   Timer   Events log   Players' tiles
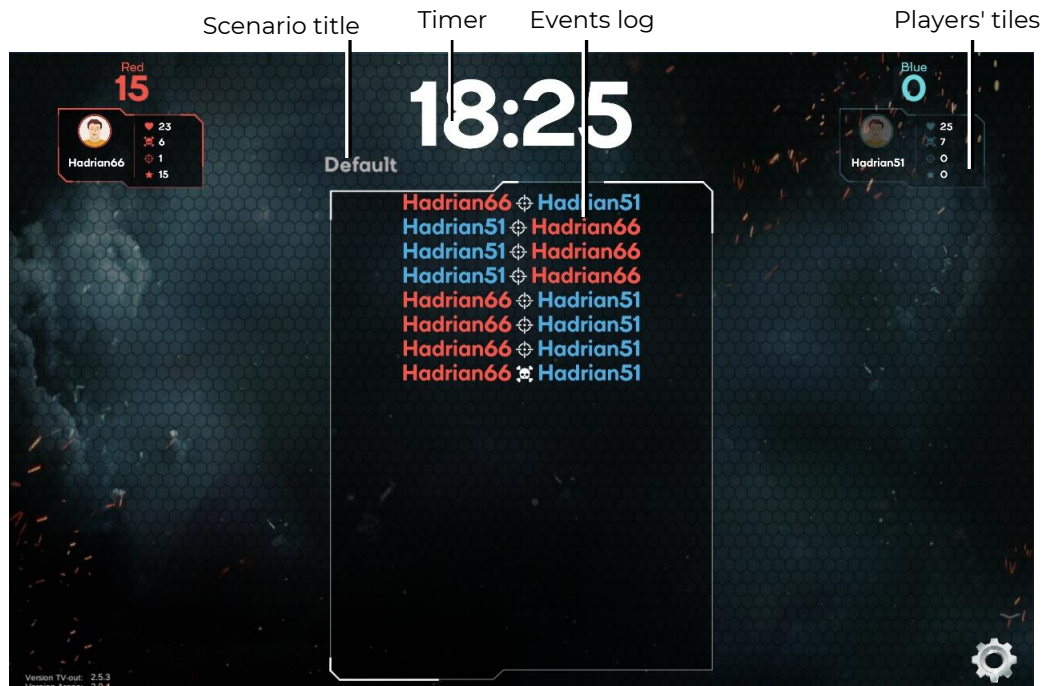
When the kits are connected to the server, the images of the players' tiles are displayed on the screen.Each tile kit displays the individual characteristics of players in real time.

Kit name from the standard list

Number of health points
The number of defeated opponents
Hit count
Number of scored points

In the same way, the tiles of additional devices are displayed on the screen, if they are involved in the scenario.

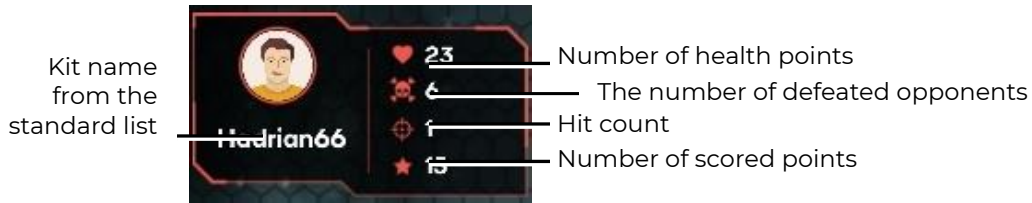In the central part of the screen a log of events occurring on the playing field is displayed, with the latest events displayed on the top line, gradually moving the list down. Information on which player, which team (font color) hit or hit another player, capture of the base, exposure to radiation, etc. is displayed on the screen.

Hadrrian51 from the blue team hit Hadrian66 from the red team

Had from the blue team captures base

Hadrian66 from the red team killed Hadrian51 from the blue team

During a game round, statistics can be displayed both in the form of player tiles and in the form of a table. The display type is selected in the settings of the Lasertag Operator program (Main Menu/Settings/TV OUT settings).

During the broadcast of statistics, it may turn out that not all the tiles or lines of the players fit on the screen. In this case, the program splits the display into pages and the frequency of page turning in seconds is set by the TIME OF AUTOMATIC PLAYER CHANGE parameter(Main Menu/Settings/TV OUT settings).

At the end of the round, personal and team indicators are displayed on the screen: points scored, number of shots fired, damage done, number of opponents hit (frags), accuracy (ratio of shots fired to number of hits), number of captures of additional devices, damage received and number of defeats (deaths).

On the same screen tiles of team statistics with the current or final place, the number of points scored by all players of the team and average accuracy are displayed.

Team statistics tile

ID	Player	Score	Shots	Hits	Frags	Accuracy	Captures	Hits taken	Deaths
66	Hadrian66	15	40	100	1	10%	0	75	6
51	Hadrian51	0	7	75	0	42%	0	100	7

Version TV-out: 2.5.3
Version Arena: 2.0.4

12. Safety procedures

The components of the laser tag equipment supplied by the company are complex devices that require careful and accurate handling.

Do not allow moisture to get into the devices. If nevertheless it happened - quickly turn off the equipment and dry it for 4-5 hours at room temperature.

Protect plastic equipment enclosures (blaster, vest sensors) from excessive mechanical load. If the equipment was stored in a room with minus temperature, keep it warm for at least 2 hours before turning it on and use it in heated rooms. This measure is necessary to avoid damage to the electronic components due to condensation.

Equipment for the indoor laser tag has a built-in battery, so you should follow the <u>safety rules when working with lithium-ion batteries</u>.

The lithium-ion batteries used in our equipment have a number of advantages over traditional batteries. They are light in weight, have a long service life and a large specific capacity per unit mass and volume. Storage and operation batteries do not pollute the environment; they comply with all international environmental standards.

However, lithium-ion batteries also have disadvantages. One of the main ones is sensitivity to overcharges and overdischarges. Recharge is usually accompanied by increased heating and bloating of the battery case and, as a result, its irreversible failure. The deep discharge of the device leads to the same result. To prevent negative consequences, each battery supplied by our company is equipped with an internal circuit protection against overcharging and deep discharge, as well as against exceeding the permissible temperature (above +90 °C).

However, the safe handling of Li-ion batteries should be payed serious attention.

Do not use the battery at high temperatures (for example, in direct sunlight, near a heat source or open flame) - overheating increases the gas pressure inside the battery, and this can lead to an explosion or at least shorten its service life. When the battery cools below 0°C, the power decreases to 40-50%. Maximum allowable temperatures at which lithium-ion batteries can be used: from –40°C to +50°C.

Do not use the battery under static electricity conditions - protection devices may fail and problems may arise in the safe use of the battery.

Do not squeeze, throw, or expose the battery to mechanical stress.

Do not short-circuit the positive and negative terminals of the battery with metal objects or wires.

When connecting multiple lithium batteries, use batteries from the same manufacturer - of the same rating, in the same technical condition.

Do not use the battery without an electronic protection circuit.

Do not reverse the polarity of the battery terminals.

Do not connect the battery to devices that are not designed to be powered by it.

Do not use bloated batteries - they must be replaced.

Do not disassemble the battery or puncture it with sharp objects - it may become depressurized and leak, overheat and catch fire.

Do not immerse the battery in water, do not throw it in a fire - it may explode!

Do not solder the battery directly to the plane.

Do not bring the battery to a minimum charge. Frequent recharging is preferable - this does not harm the battery.

Charging a battery

Use a ventilated and fire-safe room to charge the batteries. If the batteries could ignite, they can't cause a fire in the entire room.

Burning lithium-ion batteries cannot be extinguished with water (hydrogen is formed) and carbon dioxide fire extinguishers (lithium reacts with carbon dioxide). You can use dry sand, salt, baking soda, as well as cover the burning battery with a dense heat-resistant cloth. Therefore, we recommend storing sand near the battery charging point.

Do not charge non-rechargeable lithium batteries! An attempt to charge these devices can cause an explosion and ignition, which spread toxic substances.

❗ **If the battery is damaged, do not recharge it!**

Use only chargers that are designed for this type of battery and which were equipped with the delivery.

❗ **Do not use the power supply of the router to charge the batteries of laser tag equipment!**

The temperature mode of the charge of lithium-ion batteries affects their capacity, which decreases when charging in the cold or in the heat. The charge can be carried out at an ambient temperature ranging from +4°C to + 40°C, but the optimum charging temperature is +24°C.

Before using the charger, check the correctness and quality of the connection of all wires. If any wires of the charger are damaged, they must be replaced before using the device.

When charging, install the equipment on a flat, stable, non-combustible surface. Remove nearby flammable objects.

When charging equipment with a built-in battery, the electrical safety rules must be observed.

It is not recommended to keep the battery charger in a power outlet if it is not being used for its intended purpose at this time.

When unplugging the device from the mains, unplug it from the power outlet by holding the plug, not the power cord.

❗ **Do not leave equipment unattended while charging!**

If a specific odor, heat, smoke is released when charging the battery, or the case is deformed, immediately disconnect the charger from the network, and the battery from the charging device.

The charging cycle for fully discharged blaster-vest batteries is 5-6 hours. Full charge is achieved after the voltage reaches its maximum value, and the charge current decreases to 0.1 … 0.07 A depending on the battery model.

If the cell swells when charging, then never puncture the element, especially when it is still hot. It should be placed in salt water and wait until the element cools down. After cooling, carefully pierce the outer shell, and then place the cell in salt water again. After that, the battery must be utilized.

In the event of an emergency, lithium cells may be damaged by short circuits inside. Moreover, the element itself may seem whole. In any case, it is better to remove the battery and watch it carefully for 20 minutes.

In case of depressurization of the battery and electrolyte contact with hand skin or eyes, immediately rinse the affected area with running water for 15 minutes and consult a doctor. Otherwise, it may cause a chemical burn, partial or complete loss of eyesight.

Storage and disposal of batteries

Lithium-ion batteries are not subject to long-term storage and are designed for active continuous operation. From the moment of manufacturing, their service life is 2-3 years, regardless of the intensity of operation.

If there is a need to store unused batteries for more than 1 month, they must be charged up to about 50%. Long storage in a discharged condition can lead to battery failure.

Store at +5°C... +20°C (preferably +5°C) in a place protected from direct sunlight.

Do not store the battery in rooms with high temperature or in rooms with high humidity.

Do not store the battery with metallic objects such as paper clips, pins, etc.

Battery protection circuits have a low internal consumption, but nevertheless sufficient so that the battery voltage can decrease to 2.5 V in a few months. Therefore, if the battery is not used in cycling mode, it must be recharged periodically (about once every 6 months).

If during storage of the battery you notice that it is very hot, hissing gas escapes, the appearance of caustic white smoke, then immediately move it to a place safe for people. If electrolyte spills from the battery, do not allow it to come into contact with skin, ventilate the room, and dispose of the battery.

The lithium contained in Li-ion batteries melts and boils at a relatively low temperature. When water enters, a reaction occurs with the release of hydrogen. Accordingly, such a battery is potentially explosive during prolonged uncontrolled storage and can cause environmental damage.

In order to avoid undesirable consequences, the used elements must be collected and delivered to specialized recycling centers. Meanwhile, they are ought to be packed in such a way as to avoid electrical contact with the container or other battery. Pack leaking elements in such a way as to locate the leak. Use protective equipment: gloves, eye protectors, appropriate work clothing, a respirator, and sealed plastic bags.

❗ Do not dispose of lithium-ion batteries in trash cans!