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FACT SHEET 11 —

WINNING THE ARMS RACE

Battlefield Sports is winning the arms race with is ideal weapons range and elegant infrared lensing system.

The new game of Battlefield Live is comprised of Battlefield Sports' guns and missions. Battlefield Sports weapons consist of the following physical components:

- Powder coated aluminium robust metal case
- Lens assembly with long tube, high grade glass lens and infra emitter
- Authentic and robust trigger mechanism (not just a button)
- 4 digit LED display
- Marine water resistant speaker
- Bright red LED for muzzle flash
- Custom 30mm Red Dot that is wired to main board (or Telescopic scope on Morita Rifle)
- Stainless steel spined trigger handle
- Main circuit board with all connections by plug so board can be removed easily and external components changed without soldering
- Forward facing gun sensor
- Integrated head sensor with 2 sensor domes to accept 360 degree hits.

WEAPONS RANGE

There is an ideal weapons range—we believe this is up to approximately 315 feet/125 meters. Anything above this reduces player enjoyment. While a lone sniper might get some gratification from picking off new players at great distance, our commercial game is actually all about the most fun enjoyed by the most people.

Although our guns are good combat sim tools, realistically our guns are never going to be as loud as a real firearm. But without that sound cue, the player has no chance to hear where the weapons fire originated from. This can reduce the fun.

Therefore Battlefield Sports weapons balance sound FX range and shooting range.

There are a number of variables that impact weapon range. There is also a difference between effective combat range and maximum range. Effective range is the range that an average player can make hits against an exposed target. Maximum range is the range achievable by an experienced player with well aimed fire. The factors that influence range are:

- How well the scope is zeroed (and type of scope)
- The type of lens used
- The state of the infrared emitter (a worn out emitter will reduce range)
- The type of sensor (standard or super sensor)
- The amount of sunlight shining on the target sensor.

The longer weapons have a larger lens installed so they will get longer range than the smaller weapons. Table 1 assumes the following:

- Infrared emitter is good working order
- Super sensors installed
- Standard scope is installed for the Model

TABLE 1: MODELS with Super Sensors	EFFECTIVE RANGE IN SUNLIGHT	EFFECTIVE RANGE IN SHADE	MAXIMUM RANGE IN SUNLIGHT	MAXIMUM RANGE IN SHADE
Spitfire Machine Pistol	100 feet / 40 meters	110 feet / 45 meters	120 feet / 50 meters	130 feet / 55 metres
Scorpion SMG	200 feet / 80 meters	225 feet / 90 meters	250 feet / 100 meters	277 feet / 111 meters
Commando Carbine	212 feet / 85 meters	240 feet / 96 meters	265 feet / 106 meters	295 feet / 118 meters
Pulse Rifle	212 feet / 85 meters	240 feet / 96 meters	265 feet / 106 meters	295 feet / 118 meters
Morita Sniper	225 feet / 90 meters	265 feet / 106 meters	275 feet / 110 meters	305 feet / 122 meters
M4/M16	212 feet / 85 meters	240 feet / 96 meters	275 feet / 110 meters	305 feet / 122 meters

TABLE 2: Con 1: Default Arcade Mode (Full Auto/Semi Auto Options)	Weapons Class	Clip Size	Rate of Fire (ROF)	Reloads	Reload Time in seconds	Default Hit Points	Hit Default in seconds
Spitfire	**Machine Pistol**	50	330 rounds per minute	15	8	9	3
Scorpion	**Sub Machine Gun (SMG)**	50	330rpm	15	8	9	3
Commando/M4	**Carbine**	50	330rpm	15	8	9	3
Pulse Rifle/M16	**Combat Rifle**	75	330rpm	9	12	9	3
Morita	**Light Machine Gun / Sniper Rifle**	99	330rpm	9	15	9	3

TABLE 3: Con 2: Military Mode (Full Auto/Semi Auto Options)	Weapons Class	Clip Size	Rate of Fire (ROF)	Reloads	Reload Time	Default Hit Points	Hit Default in Seconds
Spitfire	**Machine Pistol**	50	330 rounds per minute	15	6	2	1
Scorpion	**Sub Machine Gun (SMG)**	50	330rpm	15	6	2	1
Commando/M4	**Carbine**	50	330rpm	15	5	2	1
Pulse Rifle/M16	**Combat Rifle**	75	330rpm	9	5	2	1
Morita	**Light Machine Gun / Sniper Rifle**	99	330rpm	9	10	2	1

TABLE 4: Con 3: Early 20th Century (Bolt Action Rifle or Revolver)	Weapons Class	Clip Size	Rate of Fire (ROF)	Reloads	Reload Time	Default Hit Points	Hit Default in Seconds
Spitfire	**Revolver**	6	60 rounds per minute	20	8	2	1
Scorpion	**Revolver**	8	60rpm	20	8	2	1
Commando/M4	**Bolt Action Carbine**	10	60rpm	15	6	2	1
Pulse Rifle/M16	**Bolt Action Rifle**	10	60rpm	15	6	2	1
Morita	**Sniper Rifle**	10	60rpm	15	6	2	1

- The scope is well zeroed
- Hits are scored on head sensor only.

Clearly our sensors are a key component to your success, for more info about them see Fact Sheets 8 and 12.

WEAPONS SOFTWARE
When you first turn the guns on, the referee has the ability to set values for the following parameters:

- Weapon Mode (3 different configurations see below for details of each)
- Sound Scheme (modern weapons or sci-fi sounds)
- Hit points (number of times the player be hit before "dying").

Depending on the configuration selected there is a difference in the time delay between being able to be hit by your opposition. In arcade mode the hit delay is 3 seconds, in the military mode it is only 1 second.

WEAPONS USEAGE
One of the strengths of the Battlefield Sports system is its inherent flexibility. Our guns can be used by very young players, by teenagers, or by adults. Likewise it is flexible as to what sort of terrain you can play in. See table 5

More on Winning the Arms Race....

TABLE 5: Weapons Usage—Terrain/ Group Type	Indoor Maze	Jungle	Woodlands	Urban	Sparse (grassland/ desert)
Pre-teens	Scorpion	Scorpion Spitfire	Scorpion Commando Spitfire	Scorpion Commando	Scorpion Commando
Teens	Scorpion Commando	Commando Pulse Spitfire Scorpion	Morita Pulse Commando Scorpion	Morita Pulse Commando Scorpion	Morita Commando Scorpion
Corporate	Scorpion Commando	Commando Pulse Spitfire Scorpion	Morita Commando Scorpion	Morita Commando Scorpion	Morita Commando Scorpion
Military theme—adult	Any	Morita M4 M16 Spitfire	Morita M4 M16 Spitfire	Morita M4 M16	Morita M4 M16

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for a summary of this flexibility.

REFEREE PISTOL

The purpose of the referee gun is to allow rapid re-spawns of dead players by the referee without having to use the key. When the player moves back to the referee while dead, the referee shoots the player and this starts a 10 second boot sequence restoring the player to full health and ammunition. The settings for weapon mode, hit points and sound scheme are exactly the same as those last set by the referee.

The referee gun means that one referee can effectively perform re-spawns for LARGE numbers of players with ease. It is highly recommend for mobile deployments or fixed battlefields with 40 or more weapons.

SCOPES

Unlike airsoft and paintball, the pistol or rifle scope is vital for game play in Battlefield Live. This is because there is no visible fall of shot with an infra-red system. All Battlefield Sports weapons therefore come with some type of scope for aiming. It is vital that the scope is regularly zeroed by the operator to make sure the scope is closely aligned with the actual infra-red beam (typically done using an indoor target range with an infrared camera and TV monitor, never try to zero the muzzle flash as this is off centre).

On most models a 30mm red dot scope in installed at the factory during manufacturing. These scopes are especially made for Battlefield Sports with 2 wires for powering the scope from the main internal circuit board. This wiring system has two advantages over standard red dot scopes which are:

- The scope automatically turns off when the weapon is turned off and is automatically turned on, when the weapon is turned on.
- The scope battery does not go flat, a common problem with powered scopes; instead the scope is drawing power via the main circuit board from the large 3000mAmp NiMH battery installed in each weapon.

Red Dot scopes are very easy to use and therefore suitable for players of all ages and experience levels. The Morita, on the other hand, comes standard with a 3-9x 40 telescopic rifle scopes to suit its role as a sniper rifle. The Pulse Rifle, M4, M16 and Commando carbine can all accept a telescopic scope instead of a red dot scope. Telescopic scopes are more accurate than red dot scopes, however they are challenging to use well so a typical battlefield should only have a small proportion of these.

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LED DISPLAY

Each weapon comes with a 4 Character LED (Light Emitting Display) that provides with useful information during game play. Depending on the current state of the weapon, the LED provides the following information:

- Health measured in hit points (Ranging from 1 to 99, 5 is standard)
- Ammunition in the current clip
- Number of reloads left
- Says “Ouch” when hit
- Says “Dead” when dead

Generally the first two characters are green in colour that show current hit points.

The last 2 characters are red in colour and generally show the ammunition in the current magazine.

HOW DOES THE LENS ASSEMBLY WORK?

The lens assembly is one of the key technologies used to create the realistic battlefield experience. In traditional indoor laser tag the infrared beam was very wide, so wide, that aiming was almost unnecessary to score hits. Battlefield Sports solved this problem by research into advanced glass optics to focus the beam from standard infra-red transmitter into a fairly tight beam. The beam could not be as tight as a real laser as such a system makes it just about impossible to make hits versus our sensor system.

Using different lenses with varying focal lengths and diameters has allowed Battlefield Sports to achieve crucial differentiation between models in the performance in terms of range and ease of making hits.

In broad terms, the wider the diameter of the lens used, the more infra-red light that is collected and focused into a forward direction leading to greater range. The longer the focal length the less infra-red light that is collected, but the tighter the beam and a tight beam lead to greater range at the cost of greater accuracy needed to make hits.

The spitfire for example has the widest beam and shortest range of all the Battlefield Sports guns with its 25mm lens.

The Morita/M4/M16 models on the other extreme have very long focal lengths and a 50mm lens assembly resulting in long range but require very degree of skill to use effectively.

Very short range hits are achieved easily with all models, because a significant amount of infrared light does not hit the lens directly and therefore leaves the front of the lens assembly at odd angles. The power of these indirect beams is limited because they are not focused, but are effective at ranges less than 1 metre in most conditions. At ranges greater than 1 metre, it is easy to hit with aiming.

One of the interesting features of the system, is towards the centre of the beam is the highest level of infra-red intensity (brightness) which means only the centre of the beam makes hits at long range. This is quite unlike a laser based system where it becomes easier to make hits the further the target is from the firer due to the spread of the beam. With Battlefield Sports it takes genuine skill (or sometimes luck) to make hits at extreme range.

ARMS RACE SUMMARY

The Battlefield Sports system is a fine balance between innovative technology and practical gaming experience to produce the most robust, most widely used commercial battlefield live equipment in the world today.

How to get started

Battlefield Sports training, tools and techniques are a vital ingredient in the operator’s success. Call us to see what we can do for you.

To your success,
Peter Lander