INFINITION

OT-01 Optical Trigger

A Zero-Delay Muzzle-Flash Trigger for Artillery, Rockets and Large-Calibre Doppler Radar Measurements

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1. Introduction

Every Doppler radar measurement starts with an accurate time zero: the instant the projectile leaves the muzzle. The OT-01 optical trigger provides that reference by detecting light. It reacts to the flash of a projectile exiting the muzzle, the ignition of a rocket motor, squibs or explosions, and sends a trigger signal to the acquisition system, which starts the recording and anchors the time axis of every result – muzzle velocity (V0), velocity at any distance, drag and trajectory.

Because light reaches the sensor instantly, the OT-01 introduces no trigger delay: there is nothing to compute and nothing to correct. And because it sees the event rather than feeling the blast, it is the trigger of choice for large-calibre artillery, rockets and any firing where an acoustic sensor cannot be placed close enough to the muzzle.

> **Zero delay by design: the OT-01 marks the muzzle exit at the speed of light, from a position away from the muzzle blast.**

2. How the OT-01 Works

A 75 mm plano-convex lens focuses the light of the event on a large silicon detector with a 100 mm² detection surface. The detector is followed by a high-gain FET amplifier in a photoconductive (biased) configuration, which gives both a fast rise time – under 5 µs – and a high sensitivity.



On its tripod head



The 75 mm lens

Figure 1 – The OT-01 optical trigger.

- **No sensitivity adjustment required** – the light detector is AC-coupled to the amplifier, so the sensor responds to rapid changes in light rather than to the ambient level.
- **Fast detection** – rise time under 5 µs (200 kHz frequency response minimum).
- **Analog differential output** – higher immunity against the electrical noise found on firing ranges.
- **Very rugged construction** – aluminum enclosure built for the field.
- **Standard mounting** – fits any standard photo tripod with a 1/4-20 mounting screw.

3. Installation and Use

The OT-01 is mounted on a tripod and aimed directly at the muzzle (or at the nozzle of a rocket motor), then connected by its trigger cable to the trigger input of the acquisition system (JB-6e junction box or BR-2401 radar). Its field of view of 7.6° requires reasonably accurate pointing; the table below gives the diameter of the area seen by the sensor at several distances. Figure 2 shows a typical set-up on an artillery firing position.

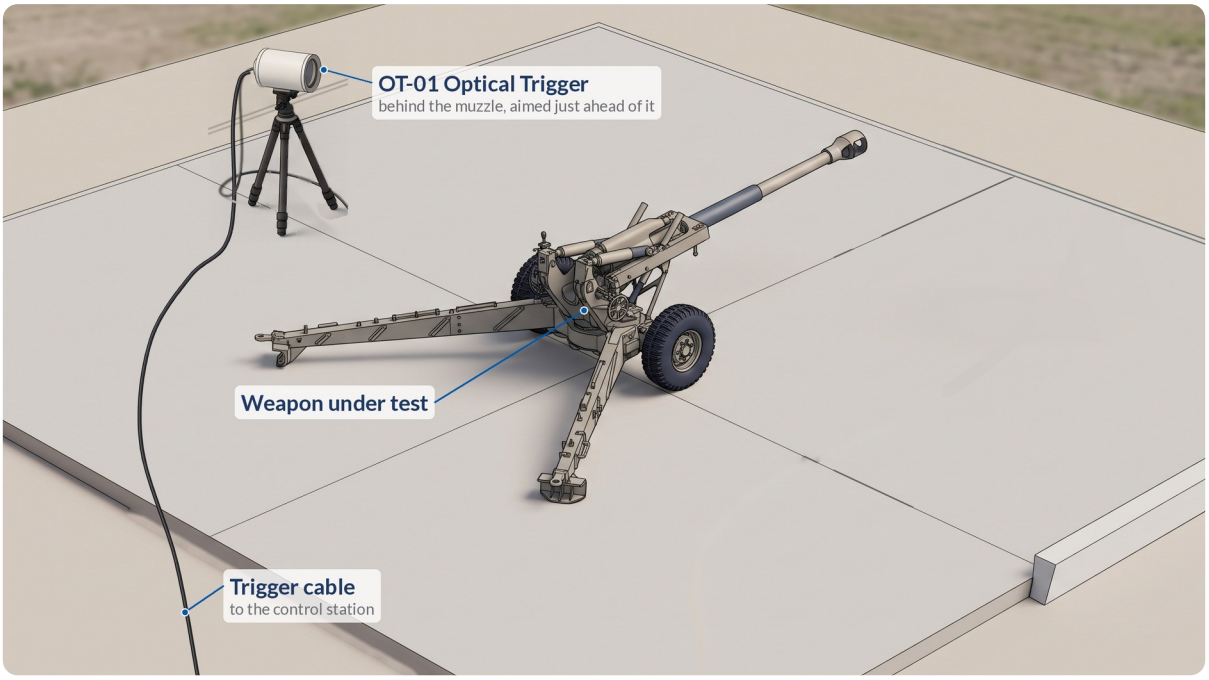

Figure 2 – The OT-01 on its tripod, behind the muzzle and clear of the blast, aimed just ahead of the muzzle; its trigger cable runs to the control station (typical artillery set-up).

Distance from the sensor	Diameter of the field of view (approx.)
5 m	0.66 m
10 m	1.3 m
20 m	2.7 m
30 m	4.0 m
50 m	6.6 m

In TestCenter 7, the OT-01 is used with the Standard trigger source, a trigger delay of 0 ms and a trigger level of 1.0 V or higher. Because it responds to light, the OT-01 can react to strong changes in ambient lighting (direct sunlight, artificial lighting): if false triggers occur, the trigger level is simply raised to reduce the sensitivity. The sensor can be checked before firing: arm the system and produce a flash of light in front of the lens – the acquisition starts.

Typical applications:

- Large-calibre guns and artillery, where an acoustic sensor would have to be placed too far from the muzzle.

- Rockets and missiles – detection of the motor ignition.
- Squibs, explosions and other events that produce a flash.
- Any measurement that requires a time zero free of acoustic propagation delay.

4. Technical Specifications

Lens diameter	75 mm
Lens focal distance	75 mm
Field of view	7.6°
Detector spectral response	600 – 1 050 nm
Detector area	100 mm²
Rise time	< 5 µs (200 kHz frequency response minimum)
Output signal	± 2 V differential, 50 Ω
Typical trigger level	1.0 V or higher (TestCenter 7)
Trigger delay	None (speed of light)
Sensitivity adjustment	None, threshold set by software
Power supply	12 V, 12 mA
Operating temperature	-20 °C to +50 °C
Enclosure	Very rugged aluminum enclosure
Mounting	Standard photo tripod, 1/4-20 screw
Weight	3.6 kg
Compatibility	JB-6e junction box, BR-2401 integrated acquisition and all Infinition radar systems operated with TestCenter 7
Cables	Trigger cables of 20, 50, 75 and 100 m, with or without cable reel

5. OT-01 or AT-01?

Infinition offers two trigger sensors. Both connect to the same trigger input and work with the same TestCenter 7 settings. The AT-01 acoustic trigger is the general-purpose choice for small and medium calibres; the OT-01 takes over where acoustic triggering is not practical. The AT-02 trigger is also available for low-noise and subsonic shots, such as suppressed weapons, air rifles, quiet ammunition and subsonic ammunition. A TTL signal from the range instrumentation can also be used as trigger source through the optional BNC adapter.

Criteria	AT-01 (acoustic)	OT-01 (optical)
Detects	Muzzle-blast shock wave	Muzzle flash, rocket motor ignition, explosions
Trigger delay	Small, computed by TestCenter 7 from distance and temperature	None – speed of light
False-trigger resistance	Excellent – very rare false triggers	Good – sensitive to changes in ambient light
Placement	Close to the muzzle (a few cm to 1 m)	Aimed at the muzzle, can stand away from the blast
Recommended for	Most applications, small to medium calibre	Large-calibre artillery, rockets, events without a usable blast

6. Availability and Support

The OT-01 is available on its own, as a spare, or as part of a complete Infinition radar system. It is supplied with its tripod mounting head; the trigger cable is ordered at the length required by the range layout, and a standard photo tripod can be supplied with it.

Infinition designs and manufactures its trigger sensors, radars, acquisition hardware and software in-house, and provides installation, on-site training and calibration services worldwide.

7. Contact

Request a quotation, a demonstration or technical information

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