



# Andres Defence

protection for action

/ a branch of Andres Industries AG

## TILO™ Series 2019



The smallest thermal goggles in the world

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# TILO-Series

## The smallest thermal imaging goggles in the world

TILO stands for Thermal Imaging Light Optic and „light“ is the TILO in two respects. It is not only the worlds smallest (4–5.8 cm) and with a weight of 100–130 g the lightest thermal imaging monocular, it is also the only one with integrated high-performance LEDs. There is currently no comparable device that combines such high

technical performance in such a small package. The TILO has been designed from the outset as thermal imaging goggles. It can be attached to both the helmet and the headband. So both hands are always free. Its performance is in no way inferior to that of larger hand-held systems. The new TILO-6™ even features a high-reso-

lution 640×512 pixel thermal imaging sensor. The TILO is available in versions with a thermal resolution of less than 40mK. This means that temperature differences of less than 0.04°C can still be displayed. This is especially helpful in bad weather conditions, such as when searching for missing persons in the rain.



TILO-3™



TILO-6™

### Lamp mode

While using the lamp mode with the thermal imaging sensor turned off, the power consumption is mostly depending on the brightness-level.

**Brightness:**  
The three LEDs (white, red, IR) can be adjusted in brightness in 10 steps and have a luminous flux of up to 160 ANSI-lumen (booster mode white).

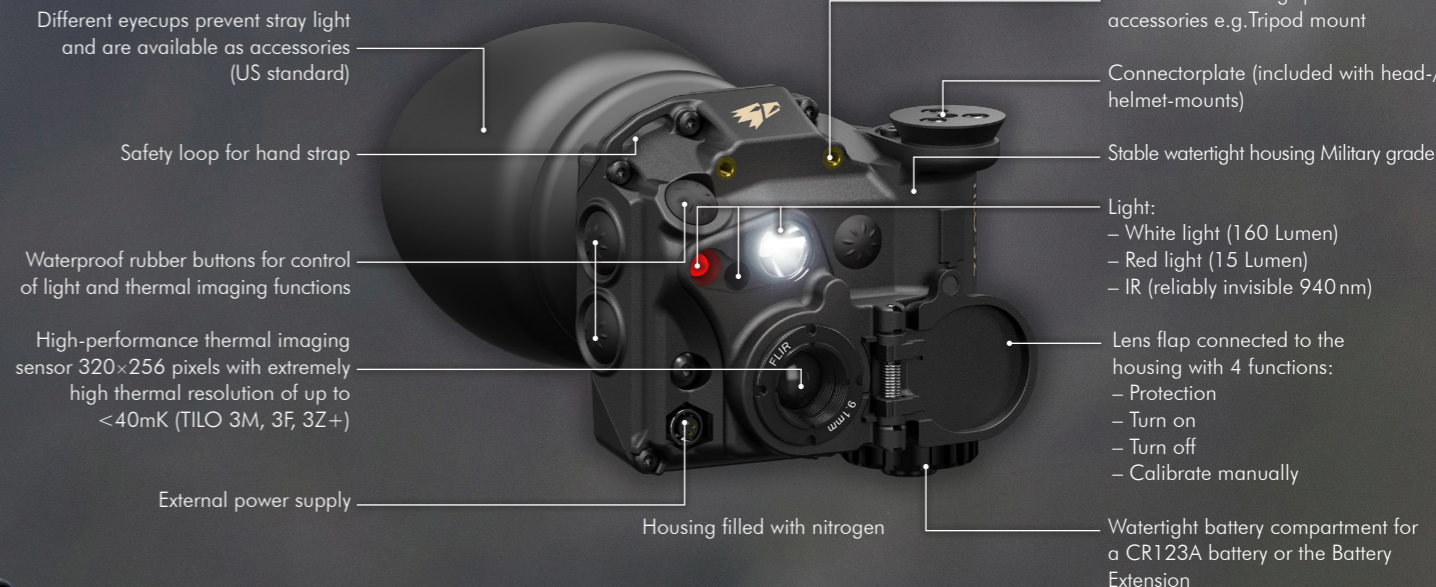
**Flashing function:**  
– Each colour with flashing function  
– SOS-function  
– Friend/IFF-encodings adjustable (government version)

**Combi Mode:**  
The lamp mode can also be used simultaneously with the thermal mode. Only the booster mode is not possible in this combination.

### Thermal mode

When the TILO is folded down and the lens flap is opened, it becomes a thermal imaging monocular, that has a very high thermal resolution of up to <40mK. This almost corresponds to the performance of large cooled thermal imaging devices and makes orientation possible even in indoor areas and low-dynamic environments. This is also due to the large viewing angle of 24°.

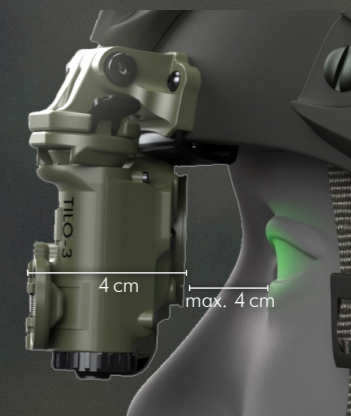
## Technical specifications



## Function & Options

With a conventional linear optic, the TILO™ would not have become the shortest thermal imaging device in the world. Anyone who has good binoculars knows that such a lens would be longer than the entire TILO™. Therefore, we developed a specially folded eyepiece optic. It is

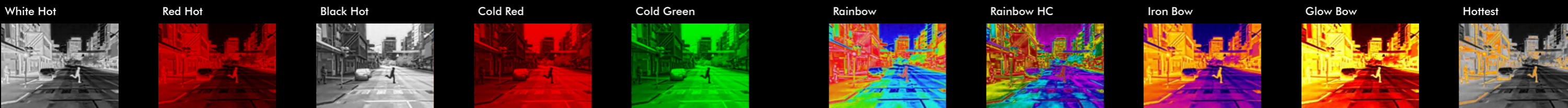
very good-natured in its eye position. This means that the eye distance can vary over a wide range, which is particularly important when used as thermal imaging goggles on helmets. Of course, optical and protective goggles can be comfortably placed between the eye and TILO™.



More information about TILO



## Thermal filter





### TILO-3™

With 320x256 Pixel sensor resolution

The TILO-3™ is currently the smallest of the small ones. It is extremely popular in its various versions. With the CR123 battery, it reaches a remarkable runtime of over 3 hours in thermal mode. In the Z-version it is already available at a low starter offer.

### TILO-3Z+ 2x™ NEW

With 2x optical magnification

This is a TILO-3™ with a more powerful lens. That makes it more suitable for long-range reconnaissance. Due to the double optical magnification, the TILO-3Z+2x™ has a high detection range of 1000 meters, just like the TILO-6™, but for a more comfortable price. With the TILO-3Z+2x™, the viewing angle drops from 24° to 12° due to the stronger magnification.

### TILO-6™ NEW

With 640x512 Pixel sensor resolution

The TILO-6™ is our new flagship in thermal imaging. With its 640x512 pixel sensor resolution and a thermal resolution of <40mK, no wishes are left unfulfilled. The Z-version, on the other hand, offers a low-cost entry with 60 mK thermal resolution.

## Comparison of the TILO models

optical magnification (w/o digital zoom)



TILO-3Z+™



TILO-6Z+™



TILO-3Z+ 2x™



TILO-6Z+™ with 3x Mag. lens

#### TILO comparison video

In order to be able to compare all TILOs™ professionally, we have built a special construct on which all TILOs™ are next to each other. The supplied picture was recorded, so that now a comparison video was created. Which TILO™ do you need for your purposes? Find out!

The image of TILO-3Z+™ corresponds to TILO-3M™ and that of TILO-6Z+™ to TILO-6M™.

(to ensure an objective quality the film must be loaded from our FTP server with approx. 300Mb)



<http://marketing.andres-industries.de/TILO/Videos/TILO-Vergleich%20Spartanat.mp4>

# TILO-M

## The Military Version

The TILO-M™ series is already equipped with a bayonet connection on the eyepiece side and can therefore also be used as an attachment both on short dots scopes and on the Elcan Specter DR 1-4x. This makes it not only the smallest thermal imaging goggles, but also the smallest clip-on in the world.

The following two models belong to this military series:

- TILO-3M™
- TILO-6M™



The ELCAN Specter will only be a few centimetres longer due to the TILO.

#### Sale only to authorities:

The TILO-M™ series is sold exclusively to government customers, preferably military users and intelligence agencies. The devices are ITAR-free. Users from these areas only need a COC approval, which is granted within the EU and the following states without problems: Australia, New Zealand, Switzerland, Norway. Private customers do not regularly receive any authorisation.

#### Technical classification:

Apart from the color and the bayonet connection, the TILO-3M™ corresponds to the civil TILO-3Z+™ and the TILO-6M™ is otherwise identical to the TILO-6Z+™. These are the most powerful models with 320x256 or 640x512 pixels.

## TILO 3x Magnification lens

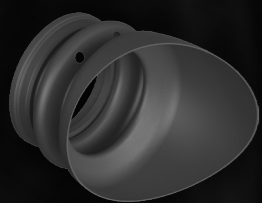
Increase the range of your thermal imaging device considerably

With the 3x magnification lens you increase the range of your thermal imaging device considerably. The special feature of this auxiliary lens is that despite the 3x magnification there is no noticeable loss of dynamics. The image remains high in contrast even in unfavourable thermal conditions. The magnification lens covers the entire lens surface of the TILO and there is no „light loss“

(heat loss). By pressing button 1 twice, the large lens can be calibrated within seconds. Together with the 3x magnifying lens, you get a practical attachment system with which you can attach and remove the lens in front of the TILO (only TILO-3Z+2x™ and TILO-6™ models) within seconds. This turns the smallest thermal goggles into a device for long-distance observation.



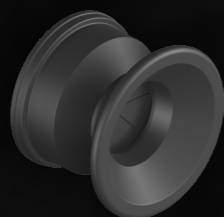
## Accessories



### 1 | Eyecup Standard

- US standard (suitable for many NVGs)
- Protection against stray light
- Additional protection of the ocular optics during transport

No: 240061



### 2 | Eyecup Shutter

As shown in 1 |, however, the ocular opening opens by pressure against the rubber rim. It closes automatically when the pressure is removed. This provides an even better protection against stray light.

No: 240070



### 3 | TILO Headband incl. Adapter

- Works like the standard helmet adapter but is attached to the usual headband
- All adjustment possibilities as with the helmet
- color: black
- suitable for all TILO-3™ and TILO-6™ models

No: 382022



### 10 | TILO-3M™ and 6M™ Camera Adapter

With the 30mm camera adapter, our reseller ACTinBlack offers a practical camera adapter with which the TILO can be mounted in front of corresponding digital cameras. This way you can take photos directly via the TILO eyepiece optics.

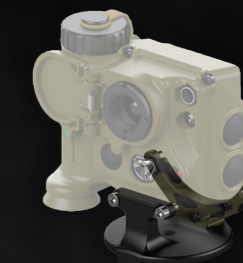
(Available by ACTinBlack)



### 11 | TILO 40mm Camera-Adapter (ELCAN)

Same as 9 | but as 40mm adapter. Also suitable for ELCAN.

(Available by ACTinBlack)



### 12 | Tripod Adapter

With the tripod adapter, the TILO can be mounted on a standard tripod. It is mounted upside down. The video recording function is correct in this orientation, so it is not upside down.

No: 382013



### 4 | TILO Battery Extension

Made of space aluminum and black hard anodized, the new battery extension is resistant and scratch. If this is screwed to the TILO instead of the normal battery cap, either two normal batteries or a rechargeable battery (5 |) can be used. The operating time of the TILO can thus be more than doubled to 6–7 hours.

No: 382014



### 5 | TILO Rechargeable Battery 16650

As soon as the battery extension is attached to the TILO, this battery can be inserted. The running time of the TILO-3M™/-F™/Z+™/Z+2×™ is thus increased to 6:30 hours and with the TILO-6 Models to 4 hours. High-quality Sanyo cell with long service life and high cycle stability. The cell is currently one of the most powerful 16650 battery cells. The diameter is just under 17 mm.

- 2500 mAh
- 3,7V
- 9,25 Wh

No: 382015



### 6 | TILO Battery Charger 16650

A very practical charger, as it can charge almost all types of batteries. It works fully automatically. It lights red when charging and green when the battery is charged. In addition, the charging current is also displayed. Thanks to the reverse polarity protection, the indicator light goes out and the battery can be correctly reinserted.

- Input voltage: DC 5 V
- Input current: 500 mA
- Charging current: 500 mA+ –0,05 V
- Operating temperature: 0–40°C

No: 382016



### 13 | TILO 3× Magnification lens

With the 3× magnification lens you increase the range of your thermal imaging device considerably. The special thing about this lens is that despite the 3× magnification there is no noticeable loss of dynamics. The image remains high in contrast even in unfavourable thermal conditions. Suitable for TILO 3Z+2×™ and TILO-6™ models.

No: 382017



### 14 | TILO extension piece for helmet adapter

With the TILO extension piece the helmet adapter is extended and thus offers a larger distance between TILO and eye.

No: 382018



### 15 | Standard helmet adapter (color: green)

- Suitable for ballistic helmets
- Shroud remains free to attach image intensifying night vision devices
- suitable for all TILO-3™ and TILO-6™ models
- By operating the release lever the TILO can be removed within one second

No: 382020



### 7 | External power supply

The external power supply can be attached to the back of the helmet. The operating time in the thermal imaging mode thus increases up to 8 hours.

No: 382026



### 8 | Power-Cable for TILO-3/6

Cable is used to power the TILO-3/6 from Andres Industries AG via the waterproof connector (IP68). The USB side is NOT waterproof!

No: 382026



### 9 | TILO Pouch Molle

Small modular pouch that can be attached to a belt or to MOLLE-webbing. Ideal to store a TILO and some accessories, e.g. headband or eyecup. Including removable cushion.

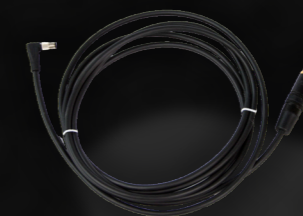
- No: 382029 black
- No: 382010 olive
- No: 382011 coyote



### 16 | TILO-VRC

Depending on the SD card used, up to 3 hours can be recorded with the device, which is a bit the size of a cigarette packet. Includes video-cable for TILO.

No: 382017



### 17 | TILO-Video cable

After connecting it to the TILO-3M™, 3Z+™, 3Z+2×™ or 6Z+™, the video signal can be output via the RCA connector. Compatible with the TILO-VCR.

No: 382015



### 18 | TILO Video and Power cable

Like 17 | with additional power connection (USB).

Best.Nr.: 382016



Sponsored by:



		TILO Thermal helmet lamp					
Model	TILO-3M™	TILO-3Z™	TILO-3Z+™	TILO-3Z+2X™	TILO-6M™	TILO-6Z™	TILO-6Z+™
Order number	380101	380103	380104	380105	380108	380106	380107
Price in €							
Usergroup	military only		available for private customers		military only		private customers
Resolution microbolometer	320×256 pixel 60 Hz	320×256 pixel 9 Hz	320×256 pixel 60 Hz	320×256 pixel 60 Hz	640×512 pixel 60 Hz	640×512 pixel 60 Hz	640×512 pixel 60 Hz
Temperature resolution	<40 mK	<60 mK		<40 mK		<60 mK	<40 mK
Radiometric	—						
Zoom (digital)				0,8x, 1x, 2x, 4x, 8x			
Optical magnification				2x			
Spectralband / Pixel Pitch		1x				1x	
Suitable for sun light				7,5-13,5µm / 12µm uncooled microbolometer			
Filter modes		White Hot, Black Hot, Red Hot, Cold Red, Cold Green, Rainbow, Rainbow HC, Iron Bow, Glowbow, Hottest					
Video-output	PAL/NTSC	n.a.		PAL/NTSC		n.a.	PAL/NTSC
Field of view		horizontal 24° / vertical 19°		horizontal 12° / vertical 9,5°		horizontal 24° / vertical 19°	
Display (OLED) Resolution				color 873×500 pixel			
Battery	light only			up to 24 h			
	thermal only	about 3:15 h	about 3:30 h	about 3:15 h		about 1:45 h	
2 x CR123	about 7:15 h	—		about 7:15 h		about 4:30 h	
Lithium Accu	about 6:30 h	—		about 6:30 h		about 4:00 h	
Helmet mount				adapter for ballistic helmets optional			
Head mount				Head mount adapter and head band optional			
Light (three colors)				white: (boost: 160 ANSI lumes) normal 45 ANSI lumes, red (626nm): 24 ANSI lumes, IR (940nm)			
Flashing, SOS				yes			
Brightness control				yes			
Temperature	operating: -30°C to +60°C / storage -40° to +80°C	operating: -20°C to +60°C / storage: -40°C to +80°C	operating: -30°C to +60°C / storage -40° to +80°C			operating: -20°C to +60°C / storage: -40°C to +80°C	operating: -30°C to +60°C / storage -40° to +80°C
Water resistance	IP68	IP65		IP68		IP65	IP68
Shock				MIL 810F 516 IV (26 drops from 1,22 m)			
Material	housing: polyamid, cold break resistant, reinforced with nanotubes; cover eyepiece made of crystal sapphire	housing: polyamid, cover eyepiece made of hardened PMMA-plastics	housing: polyamid, cold break resistant, reinforced with nanotubes; cover eyepiece made of crystal sapphire		housing: polyamid, cover eyepiece made of hardened PMMA-plastics	housing: polyamid, cover eyepiece made of crystal sapphire	housing: polyamid, cold break resistant, reinforced with nanotubes; cover eyepiece made of crystal sapphire
Dimensions	length: 40 mm; width: 64 mm; height: 67 mm (without accessories e.g. eye cup)	length: 67 mm (without accessories e.g. eye cup)	length: 58 mm; width: 64 mm; height: 67 mm (without accessories e.g. eye cup)			length: 67 mm (without accessories e.g. eye cup)	length: 67 mm (without accessories e.g. eye cup)
Weight	approx. 100 g w/o accessories	approx. 128 g w/o accessories	approx. 128 g w/o accessories			approx. 128 g w/o accessories	approx. 128 g w/o accessories

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