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TEST REPORT

TILO-CHALLENGE 2018

ANDRES DEFENCE

TILO-3Z+



ENGLISH VERSION 

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Andres Industries AG



Andres Defence

a branch of Andres Industries AG

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The company Andres Industries AG is well known from many trade fairs in the police and military sector. Special forces (such as special ops commando units and mobile task forces) are using products their successfully. With the launch of the TILO-3Z+ they are now targeting also the civil user thus broadening the customer base.

We had the possibility to test the TILO-3Z+ extensively for 4 weeks within the "TILO-Challenge" organized by Andres Industries AG. We received the TILO-3Z+ in a robust plastic case with many accessories (helmet adapter, headband, eyecup, user manual, 2 x lithium CR123 battery, tools to fasten the helmet adapter and an end user statement).

The TILO-3Z+ captivated us with its low weight of approx. 100 g (without accessories) and its tiny dimensions (width 64 mm, height 67 mm and depth 40 mm - without accessories / eyecup). The housing is very robust and valent. The cover of the ocular optics (lens) is made of sapphire glass which is extremely impervious to scratches.

The system is certified IP68 for water resistance (dust-tight and protected against continuing submersion) and MIL 810F 516 IV-certified for impact resistance (26 falls from 1.22 m). The temperature range for operation is indicated as -20 ° to +60 °C while for storage it is -40 ° to +80 °C.

The TILO-3Z+ has a video outlet. With an optional external power supply this can be alternatively used as power inlet. A battery pack extension can be applied to the system which prolongs the usage of the thermal imaging device from 3:15 h to up to 7:00 h.

We found it very handy that a lamp is integrated which can be used simultaneously. With the classic LED white light with 45 to 160 ANSI lumen (boost), LED red light with 24 ANSI lumen and invisible LED infra-red light (940 nm) with 15 ANSI lumen the TILO-3Z+ features a wide range of light sources for hunting and tactical situations in only 1 device.

Especially for outdoors the TILO-3Z+ offers a flash mode and an SOS mode for each of the luminous colors (white, red and IR). It is possible to deactivate the single LED lights partially or completely through the menu (e.g. to avoid that they are switched on accidentally).

The possibility to personalize the set-up of the lights is especially useful for covered police operations and for hunting. It assures that the own position is not compromised and animals are not scared off.



The transport case offers plenty of space for optional equipment. It contains a double bottom. Below the first layer (see photo) it is therefore possible to securely store additional accessories (as headband and external power supply).



The sensor of the TILO-3Z+ has a resolution of 320 x 256 pixel at 60 Hz (frame rate) and a thermal resolution of 40 mK (It distinguishes temperature differences of 0.04 K.).

The high refresh rate assures a flicker-free observation. In contrast a low frame rate can result in not fluid movements being displayed, which (in case of police or military use) can lead to endangerment due to unidentified persons / objects (TILO-3Z: 9Hz, <60mK).

The display has a resolution of 873 x 500 pixel and its brightness can be adjusted on a scale from 0 to 9. The video signal can be set either to NTSC (USA) or to PAL (EU). The field of view is 24° horizontally and 19° vertically.



The TILO-3Z+ has 5 digital zoom levels (0.8X, 1X, 2X, 4X and 8X). At zoom level 0.8X the field of vision is the widest (wide angle). With the thermal imaging goggles set to this level trip-proof running is possible starting from a distance to the objects of 1 to 2 meters.

At this zoom level the outstretched arms of an average built person are still in the field of vision. This facilitates the recognition and prevention of a potential imminent collision (especially in total darkness).



The eyecup is made of extremely flexible rubber, so it can be flipped very easily. In this configuration the TILO-3Z+ easily fits into a trouser pocket. Optional available is a shutter-eyecup: While applying pressure onto the rubber rim the ocular opens automatically and closes when the pressure is diminished.



For operation a CR123A battery is inserted. With the battery pack extension, the TILO-3Z+ can also be powered by a rechargeable battery type 16650.



The TILO-3Z+ can be used as handheld device, on a tripod, with the headband or mounted on a helmet. If the TILO-3Z+ is attached to a helmet or headband it is usable as a headlamp.

An accessory offered by Andres Industries is an adapter for a 30 mm lens, which allows the coupling of the TILO-3Z+ with a digital camera or a riflescope (the latter is allowed in Germany only with a special permission).



To allow a better judgement of the usability of the TILO-3Z+, it was tested for different applications (In order to perform the test as authentic as possible the following images show the real image the user sees on the display of the TILO-3Z+.).

Scenario Alpha: It was tested how to spot an unconscious / helpless person with the 10 available thermal filters.

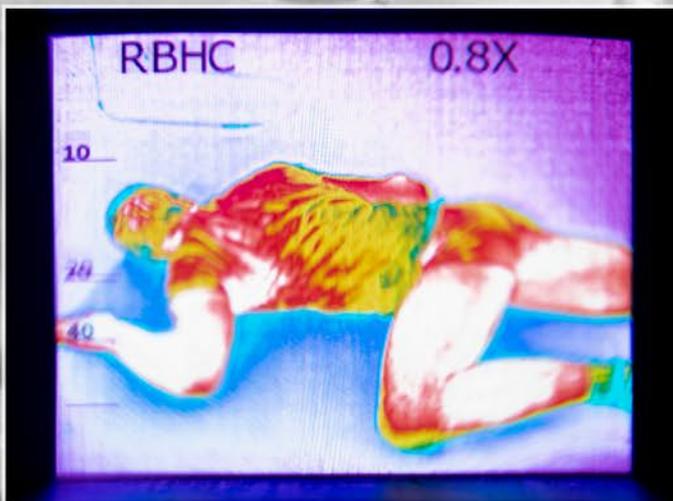
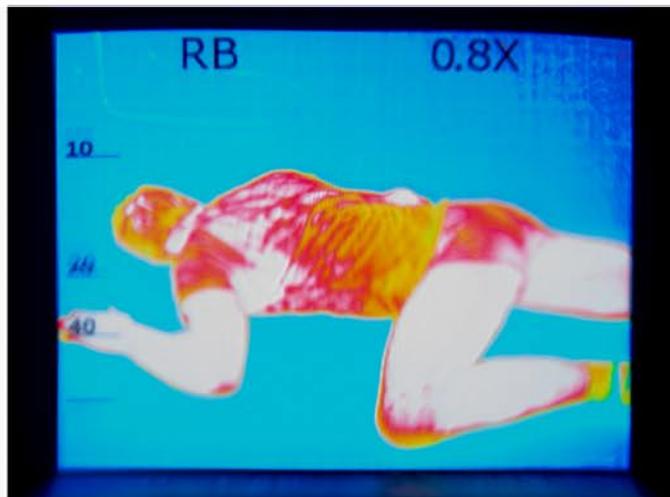
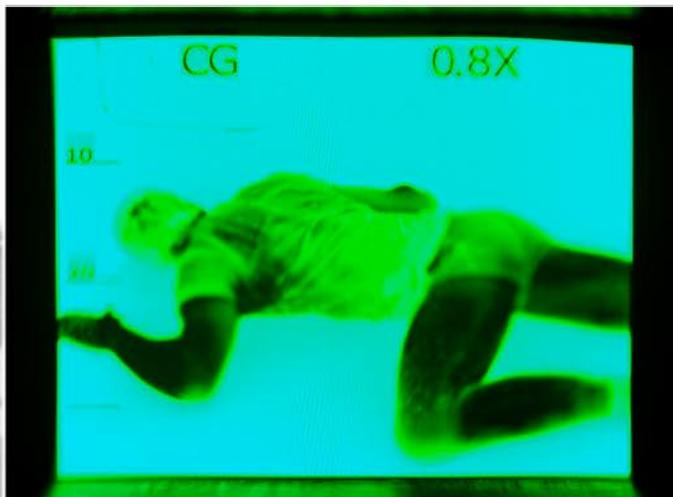
The task was to spot a lifeless person in complete darkness. All thermal filters were applied (one after the other) at an external temperature of approx. 20° Celsius. This was done to utilize the spectrum of possibilities offered by the TILO-3Z+ and to evaluate its full potential.



The thermal filter WH (white hot), RH (red hot) and BH (black hot) show the hot areas in the pertinent color. On the other hand, the thermal filters CR (cold red) and CG (cold green) show the coldest area in the pertinent color.

The thermal filters RH, CR and CG are tactical filters: Red is used to maintain one's night vision capabilities, while green reduces the amount of light reflected by the eye.

The filters RB (rainbow), RBHC (rainbow HC) and IORN (iron bow) are technical filters used e.g. to identify thermal bridges in building.



The filters GLOW (glowbow) and HOT (hottest) are special filters, which are particularly interesting for hunting, as they display the heat signature with colors, while minimalizing the glare.



Scenario Bravo: In this test the TILO-3Z+ was utilized extensively for hunting purposes. It was mounted on the headband which was worn under a hat.



During the duck hunt the TILO-3Z+ was successfully used for the night hunt. With the thermal vision goggles it was possible to spot and retrieve a male mallard duck extremely quick. The meadow and his heat signature contrasted excellently, so we did not need to bring in our German short hair she-dog. We used the thermal filter BH (black hot).



During our hunt we also tested if the device can be used to localize, identify and observe animals. It was found that the usage of the TILO-3Z+ is advantageous also during the day. Among others we were able to sight a male fox from a high seat and to hunt him down. Initially we could not observe him through the binoculars. With the TILO-3Z+ we could track his path through the woods continuously, until he reached the edge of the forest, where we could track him with the riflescope and slayed him.

Without thermal imaging we would have detected the fox only by coincidence. With the TILO-3Z+ it was possible to spot the fox minutes before it was slayed, and we could track his exact path until he reached the field of fire (outside of the forest).

The TILO-3Z+ was also used inside the forest. Here we found it to be advantageous versus the classical hunt (without night vision or thermal vision). Although it is allowed to hunt wild boar in Baden-Wuerttemberg with light, this method is intricate and difficult. The range of torches normally used for hunting is limited and the usage of brighter torches can dazzle and alert the animals.

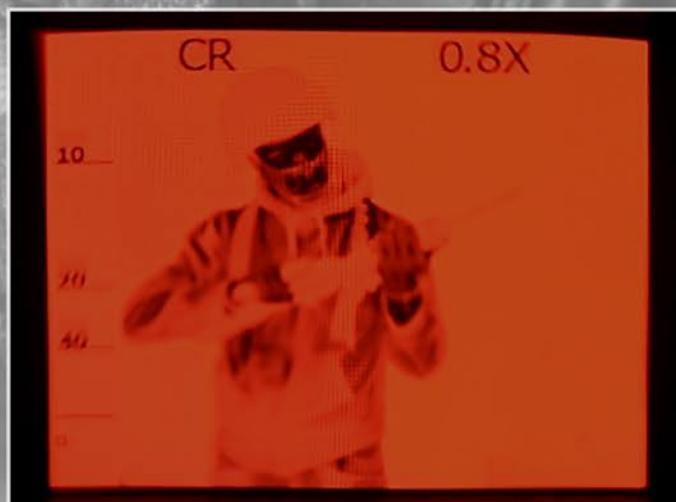
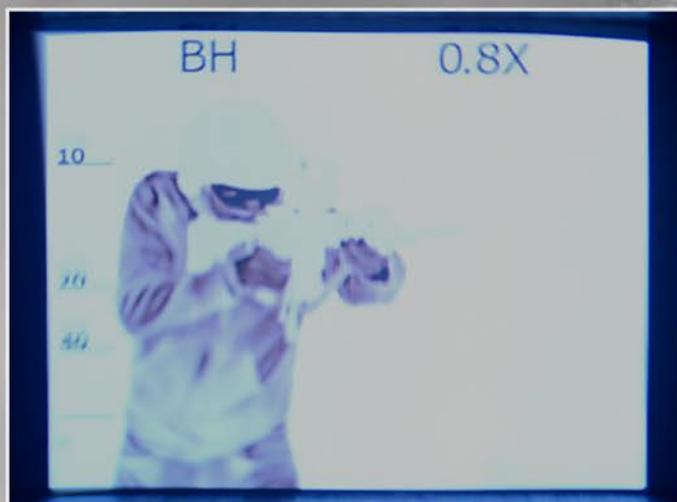


The TILO-3Z+ enabled us to observe the wild until it reached the optimum distance to take a shot (We did not have to switch on our torches, only to find that the animals were too far away to take a shot.).



In the context of police and military work we tested the identification of persons and things. In order to allow a better comparison, we used again all 10 thermal filters.

Scenario Charlie: 1 person with Kevlar helmet and a long weapon (AR15) had to be identify at an ambient temperature of about 15° Celsius.



As expected, it was possible to identify the person with all thermal filters in this test.

The image of the weapon and helmet was best, when using the filters WH, RH and HOT.

When using these 3 filters there was a clear contrast between weapon/helmet and person/surroundings.





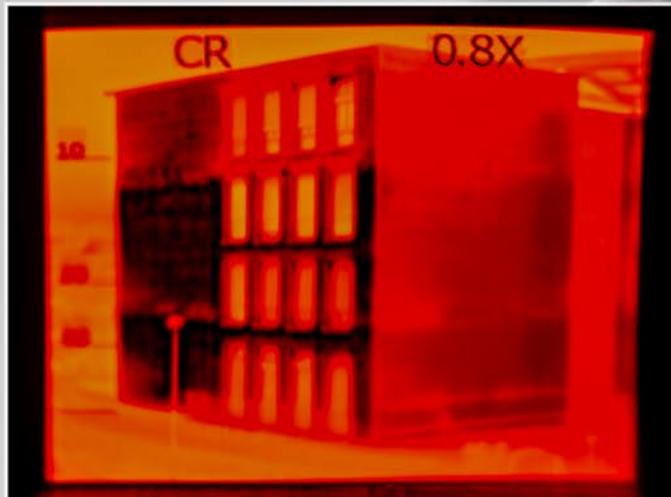
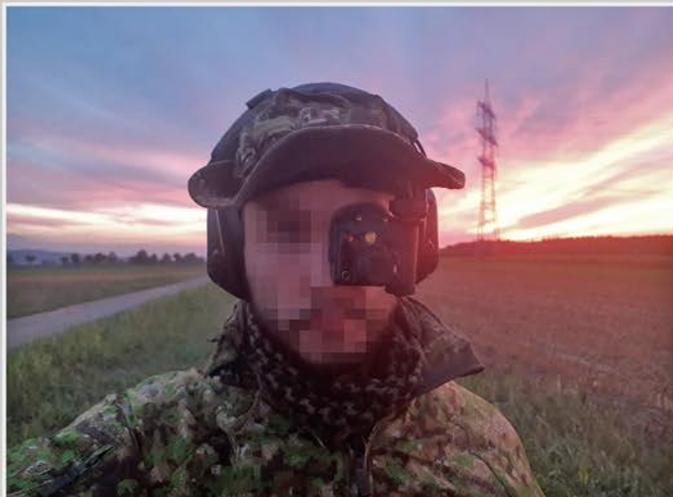
With the thermal filters RBHC and IRON the weapon and helmet could still be easily identified with good contrast in respect to the surroundings.

With the thermal filters BH, CR, CG, RB and GLOW the weapon and helmet could still be easily identified but the contrast to the surroundings was weak.



With its wide variety of thermal filters, the TILO-3Z+ is a very useful tool for police and military. It enables the fast identification of persons and objects at day and night.

By pressing its buttons only few times the best filter and brightness settings can be selected quickly to adjust the TILO-3Z+ to the local environment (forest, city, hot, cold, etc.).



WHAT WERE OUR REQUIREMENTS (POLICE/MILITARY)?

We were looking for thermal imaging goggles (TIG) which could be used for police and military actions as well.

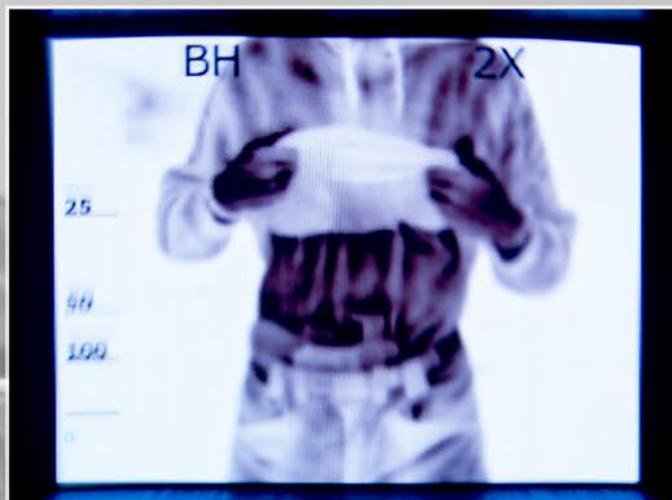
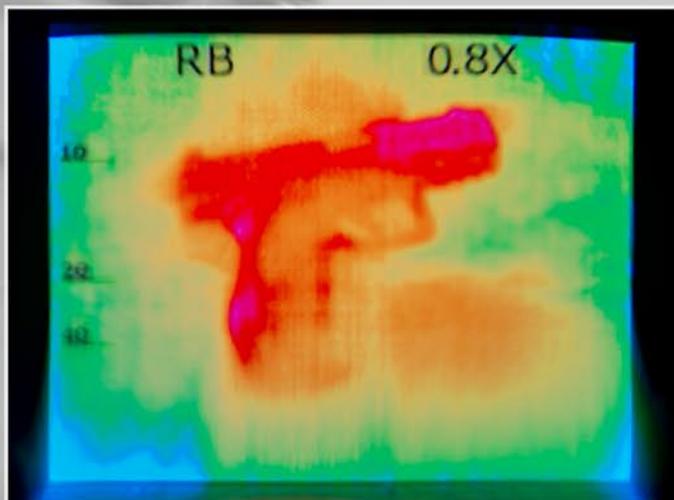
The possibility to identify heat sources of any kind (persons, vehicles, weapons and other objects) was important to us. Furthermore, we wanted to still be able to spot and retrieve objects which had been dropped minutes before.

The TIG should be very resilient and durable. Its weight should be minimal in order to work efficiently on missions of a few hours up to several days. To allow resupply of consumables during worldwide operations the device should use standard batteries.

The size of the device had also to be adequate in order to be stowed away easily and transported (especially for covert operations).

It should be easy and intuitively to us, in order to prevent mistakes in critical situations such as arrests. The possibility to wear it on the head or on a helmet was also essential to us. Furthermore, it needed to be mountable on a tripod for static usage in order to be able to conduct long term observations of buildings and residential streets.

The TIG needed different zoom levels to enable an adjustment of the field of vision for the tasks on hand. It was essential to have a flicker-free imaging to assure that movements are displayed fluidly, to avoid that the eyes get tired. The TIG needed to also be quickly ready for usage.



WHAT WERE OUR REQUIREMENTS (HUNT)?

In addition to the requirements listed on the previous page for police and military, it was important to us to be able to identify game of any kind and to determine the species, sex and as the case might be also age).

The TIG should be suitable to search game (especially hoofed game) at night even on rough terrain (forest, reed, corn).

During police work, military use and hunt the TIG had also to be waterproof. It needed to remain operational in case of cold, heat, rain, snow, mud and contact with water.

HOW AND WHAT DID WE TEST?

First, we studied the manual of the TILO-3Z+. It was provided with the device as a color copy. We were able to quickly understand the mode of operation and handling, so that we could start our testing. How to utilize the device was trained at daylight. Afterwards we started with scenario Alpha.

The TILO-3Z+ was held in front of the eye, while the subject was walking through completely darkened rooms in order to spot a helpless person. This test was performed with all 10 available thermal filters to assess them individually.

Then we started scenario Bravo: We used the TILO-3Z+ on different hunts (most of the times with headband). Due to the nature of the hunt (game is moving) we were able to take photos of dead game only (We refrained from using the video output signal.).

Furthermore, we tested the lamps of the TILO-3Z+. The red and white light was used to safely climb high-stands, as well as for night search and to support the cutting of game.

We could not test the IR-light as we were not in possession of a night vision device.

In scenario Charlie we tested the capability considering police and military aspects. All thermal filters were used. Persons had to be clearly identified as well as the objects they were carrying (weapons).

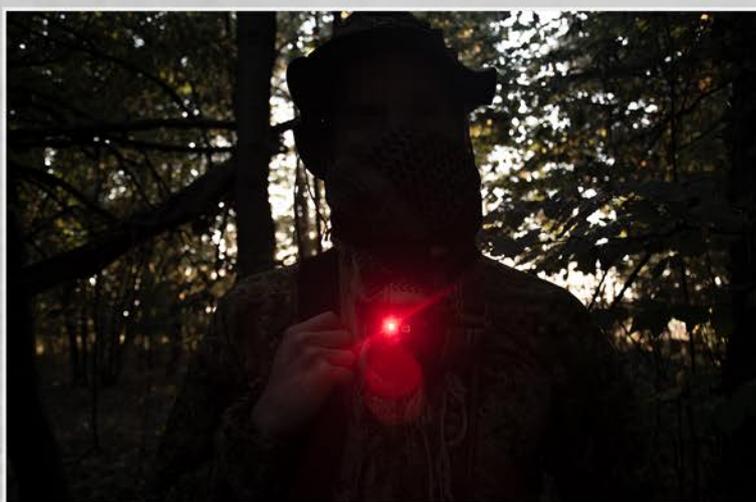
CONS WE NOTICED

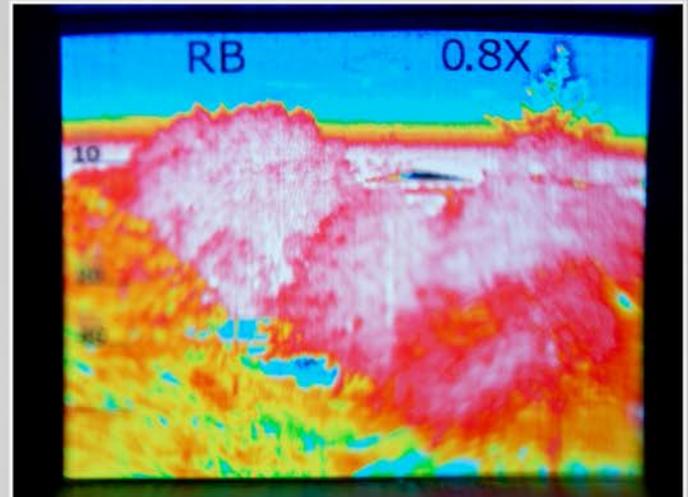
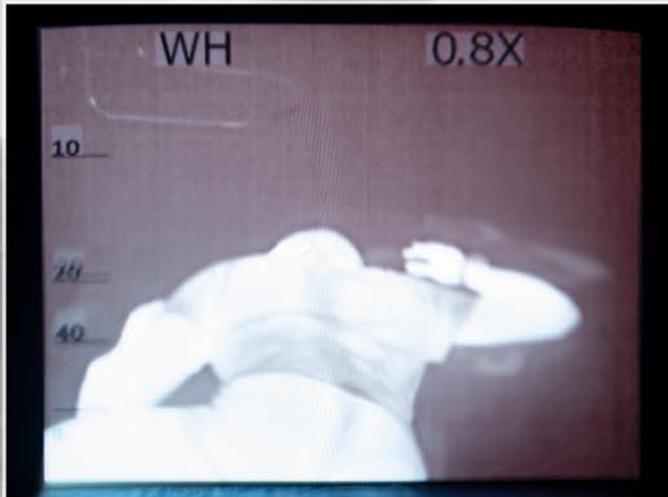
The handling of the TILO-3Z+ seemed very complicated at the beginning. After some hours of practice, we found it to be logical and intuitive. At his point change in luminous color and thermal filter could be performed with few pushes of buttons easily, without thinking.

The missing information regarding the remaining lifetime of the battery is negative (There is only a flashing battery symbol). Therefore, the remaining operation time can only be estimated. An optional indication of the residual battery life would surely be useful for police and military usage.

There are limitations to operate with the TILO-3Z+ in narrow rooms, as even with the zoom level 0.8 a person can be only fully encompassed starting from 5 m distance.

The capacity of the CR123A rechargeable batteries is too low. The battery expansion is needed to efficiently operate the TILO-3Z+.





PROS WE NOTICED

We were very positively surprised by the small dimensions and low weight of the TILO-3Z+. It was also astonishing for us that it is operational only seconds after opening the protective flap.

The wide range of accessories offered by Andres Industries for TILO-3Z+ to allow a customization to the special needs of the user is positive too.

An advantage is the possibility to route the thermal image through a video outlet. The TILO-3Z+ has a strikingly robust construction. It is operational from -20° to $+60^{\circ}\text{C}$ while being protected from water and mud and while being impervious to scratches thanks to the use of sapphire glass.

The long battery life (about 3h during our tests) was surprising as the TILO-3Z+ is run with only 1 CR123A battery (which can be purchased during operations worldwide).

We found the identification of persons and objects to be child's play with the TILO-3Z+. This was possible even in case of extremely small temperature differences between objects and the surroundings (when a suitable thermal filter had been selected). We succeeded in the identification and observation of wild game from more than 100 m. To determine the sex of wild boar is unproblematic up to 40 m.

After some practice the handling of the TILO-3Z+ is very intuitive. The buttons have a tactile trigger point, which practically prevents that the lights are switched on accidentally.

OUR CONCLUSION

With the TILO-3Z+ Andres Industries AG has created a masterpiece in the sector of thermal imaging goggles. Rightly renown to be the smallest thermal imaging goggles of the world. The small dimension and the low weight make the TILO-3Z+ a formidable device for covered and long-lasting operations by police and military as well as for the hunt (at day and night). It can be carried easily in a pocket, with the headband, on a helmet, attached to a sight (in Germany only with a special permission) or mounted on tripod.

Overall the TILO-3Z+ has convinced us fully (apart from a few points of criticism such as missing information regarding the remaining battery life). We used it successfully during hunt and policework. Due to the handiness and the special feature (to be at the same time a head lamp with 3 different luminous colors) of the TILO-3Z+ we see worldwide not alternative to this device. The TILO-6Z+ with twice as many pixel (horizontally and vertically) has been already launched.

We enjoyed very much to test the TILO-3Z+ within the scope of the "TILO-Challenge" and would love to test it more extensively in the future. Greetings to Berlin from TACTEAMONE.COM.



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