

PROBLEMY MECHATRONIKI
UZBROJENIE, LOTNICTWO, INŻYNIERIA BEZPIECZEŃSTWA

ISSN 2081-5891



11, 4 (42), 2020, 93-104

PROBLEMS OF MECHATRONICS
ARMAMENT, AVIATION, SAFETY ENGINEERING

LOOK Container Systems for the African Market

Katarzyna BURNAT

*Zakłady Mechaniczne "Tarnów" S.A.
30 Jana Kochanowskiego Str., 33-100 Tarnów, Poland
Author's e-mail address and ORCID:
katarzyna.burnat@zmt.tarnow.pl; <https://orcid.org/0000-0002-3091-2866>*

Received by the editorial staff on 27 May 2020

The reviewed and verified version was received on 25 November 2020

DOI 10.5604/01.3001.0014.5647

Abstract. The light observation-protective container (LOOK) is intended for security and protection of soldiers/officers performing observation missions, defence and control tasks at checkpoints, military bases or other important strategic locations. It increases the level of protection of staff performing observation and defence tasks thanks to the container's armoured, technical means of observation in both visible and infra-red light spectrums, as well as offering the possibility of armoured the container with weapons. LOOK equipped with integrated weapons reduces personnel losses and effectively combats threats in surveilled zones. LOOK is equipped with an operator (guard commander) post enabling observation and control, a gunner-sentry post with a control and observation desk, communication system, armoured windows with firing positions on three sides and a hatch in the roof for an additional external manual shooting position. In addition, the LOOK container system is equipped with a ventilation and heating subsystem with air conditioning and can be retrofitted with an emergency power supply subsystem. High mobility and transportability by land and sea are characteristics of LOOK.

Keywords: observation container, container system, observation and protective container, LOOK container

1. INTRODUCTION

The light observation-protective container is intended to provide shelter and protection of soldiers/officers performing observation, defence and control tasks (at checkpoints, military bases or other important strategic objects) in times of peace, combat and during peacekeeping operations. LOOK can also be used to protect areas of responsibility or other important facilities, while ensuring autonomous operation with the possibility of incorporating it in the base or employee security system in hazardous areas, utilising the characteristics of the container, i.e. mobility and transport. The use of container systems increases the degree of protection of soldiers/officers securing important facilities, installations, control, observation and defence points (thanks to its armour and the use of technical means of observation in both the visible and infra-red light spectrums). The advantage of the container is its ability to ensure minimal personnel losses and to effectively combat threats in the surveilled zones by means of integrated weapons. The light observation-protective container works perfectly well during missions in various parts of the world, in both forested and deforested landscapes. The product is excellently suited to the needs of the African market, being competitive in terms of quality and price. Africa is a continent with huge economic and demographic potential and even better development forecasts.



Fig. 1. The concept of the LOOK container system

The advantage of the LOOK container system is its design based on the standard 20ft High Cube sea container, which facilitates easy relocation both by sea and land. The mobility of the container facilitates its transportation and set up at any location and the applied subsystems enable its use in difficult climatic conditions. These features are very important, allowing the container to be used in the conditions prevailing in Africa; in warm, arid or humid climates. LOOK can be located in sandy areas as well as in areas with a high density of vegetation. The light observation-protective container is resistant to ambient temperature ranging from -30°C to $+50^{\circ}\text{C}$ during operation and withstands temperatures ranging from -40°C to $+60^{\circ}\text{C}$. Thanks to the use of seals in doors, windows and the roof hatch, LOOK is perfectly suited for use in the field, in conditions of dense small-particle air pollution. The container has a drawn air filtration system and an appropriate ratio of air admitted in relation to the quantity of air expelled. This is a great advantage when the facility is used in desert areas with sand storms. The LOOK container system is resistant to increased humidity thanks to being equipped with a ventilation system with heating and air-conditioning functions, which dries the incoming air and eliminates condensation from the interior. This solution was provided in order to use the container in areas of high density of vegetation, high humidity and frequent intense rainfall.

The overriding advantage of the LOOK system is the increased user safety through the application of armour and bulletproof glass. The design of the LOOK container system made of SECURE 600 armour plate with very good strength and hardness confirmed in ballistic tests, protects human life and the internal equipment. The armour plate used meets the standard defining the level of ballistic protection STANAG 4569 level 2 for 7.62x39 mm BZ bullets. The bulletproof glass used in the LOOK container system meets the requirements for testing with firearms according to the STANAG 4569 standard level 2 of ballistic protection for 7.62x39 mm BZ bullets. The armoured partitions, apart from their bulletproof properties, are intruder-resistant and offer resistance to mechanical impact from tools such as a hammer or an axe.

Another important aspect in favour of using LOOK is the possibility of independent operation in the scope of detection, recognition and identification of threats in the protection zone around a base, thanks to the possibility of equipping it with the Integrated optoelectronic module (ZMO-1). The applied sensors enable the identification and measurement of the distance to the detected target. The module functions are controlled using a multifunctional panel.

Another advantage of the LOOK container system is the ability to effectively combat the enemy using a shooting position on the roof of the container. The position with partial or all-round armour integrated with the firing direction is safe and protects the shooter.

The last, but equally important, aspect in favour of using the light observation-protective container are the social and living facilities it provides, thanks to which users do not have to leave the position during a time predetermined for the performance of a defence task. LOOK is equipped with a power generator, which enables its uninterrupted operation for up to 72 hours. This is important during missions carried out in remote areas with difficult conditions that prevail on the African continent. An additional advantage of using the LOOK container system is the provision of an active element for the construction/expansion of a multifunctional base protection system with its office and social facilities provided by the container.

2. THE INTENDED USE OF THE LOOK CONTAINER SYSTEM

The light observation-protective container allows for modular composition of the equipment depending on the size of the container as well as its dedicated task and the selection of equipment according to the customer's specifications, so that LOOK meets the desired requirements.

The LOOK container system can be delivered in versions suitable for the execution of the following tasks: defence and protection, observation, control, office, social and living. LOOK can be fitted with specific observation and aiming devices for the observation and detection team and aiming devices for the shooting position. Thanks to the development of special software, the LOOK container system ensures the integration of the activities of the container observation and aiming devices with the shooting position aiming devices or the Remote Controlled Weapon Station (RCWS). It is very important to detect, identify and destroy the target as soon as possible. The LOOK container system allows for automatic detection of an intruder within the field of view of optoelectronic devices and radar by registering changes in the image transmitted from observation detectors (radar or thermal imaging camera) without the operator's participation.

The LOOK structure, made of armour plate, is resistant to machine gun fire with 7.62x39 mm BZ bullets and provides protection against a thrown grenade or an explosive charge under the container. The container is equipped with large, bulletproof windows, a remote-controlled shooting position and observation and detection sensors. The configuration of LOOK can be composed freely, in accordance with the customer's requirements, depending on the intended use and economic factors.

The essential technical parameters of the LOOK container system are presented in the table below (Table 1).

Table 1. Technical specifications of LOOK

Container length	6.06 m
Container width	2.45 m
Container height	2.59 m
Weight	9 tonnes
Usable space	9,65 m ²

3. ARMAMENT OF THE LOOK CONTAINER SYSTEM

Depending on the tasks to be performed, the LOOK container system can be equipped with various weapon systems for self-defence and attack. Depending on the configuration, the containers are equipped with remotely controlled weapons modules, mobile shooting and observation stations and machine guns.

3.1. Remote Controlled Weapon Station (RCWS)

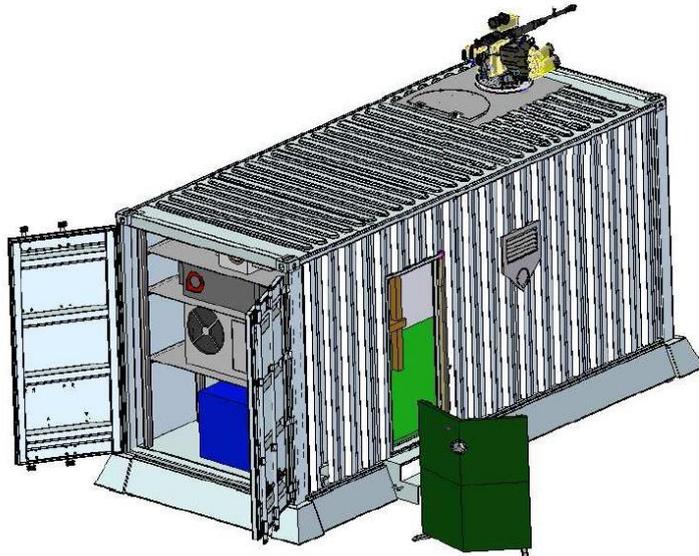


Fig. 2. LOOK container system version equipped with RCWS

The remote controlled weapon station is equipped with a 7.62x51 mm UKM-2000C machine gun or a 12.7x99 mm WKM-Bm heavy machine gun. Other types of weapons can be adapted to the RCWS system according to the customer's requirements (e.g. multi-shot grenade launcher). The RCWS allows the crew to accurately and effectively fire on the battlefield from inside the container without being exposed to enemy fire. The wide range and power of the weaponry systems in terms of the angles of fire and the fire control system used, with the appropriate speed of aiming at the target, allows for the effective implementation of the LOOK container system in self-defence tasks. In addition, LOOK provides fire support for ground units, being effective against personnel and technical equipment, light armoured vehicles, stationary and mobile targets moving at different speeds, as well as low-flying air targets, in day and night conditions, in various climatic zones. It enables fire in conditions of chemical and radioactive contamination. RCWS present in a container can be used in two modes of operation. In the automatic mode, the control panel at the LOOK operator's position is used and in the emergency mode, with manual operation of the weapons and firing using the container hatch. The remotely controlled weapon station can be operated by one person. The total weight with the rifle and ready-to-use ammunition is about 170 kg in the version with the WKM-Bm rifle and about 152 kg in the version with the UKM-2000 rifle. The RCWS is supplied with ammunition from inside the container, which allows the user to fire on the battlefield from inside the container without being exposed to direct enemy fire, as well as while refilling ammunition. The amount of ready-to-use ammunition is 150 cartridges of 12.7 x 99 mm or 250 cartridges of 7.62 x 51 mm.

The essential technical parameters of the Remote Controlled Weapon Station are presented in the table below (Table 2).

Table 2. Technical specifications of RCWS

Weaponry	WKM-B	UKM-2000C
Ammunition	12.7 mm x 99 mm	7.62 mm x 51 mm
Effective range	2,000 m	1,500 m
Weight	170 kg	152 kg
Firing Unit	150 bullets	250 bullets
Supply and reloading	electric	electric

A light observation-protective container equipped with RCWS with an optoelectronic head has the ability to detect, recognize, identify and measure the distance to the detected object.

The observation and tracking head is equipped with a TV camera, a thermal imaging camera and a laser rangefinder, allowing for observation and determination of the position of the object. The operator of the station observes the area on the monitor screen and uses a manipulator to control the weapons and the RCWS warhead mounted on the roof of the container. The head sensor system allows for detection of an object within the field of view both during the day and at night.

The essential technical parameters of the optoelectronic head are presented in the tables below (Tables 3-6).

Table 3. Technical parameters of the optoelectronic head

Length	280 mm
Width	167 mm
Height	173 mm
Weight	about 8.2 kg
Operating temperature	-45°C to 65°C

Table 4. Day camera

Wide field of view	14° x 11°
Narrow field of view	3.5° x 2.5°
Target detection (wide field of view)	600 m
Target recognition (wide field of view)	200 m
Target identification (wide field of view)	100 m
Target detection (narrow field of view)	4,000 m
Target recognition (narrow field of view)	2,000 m
Target identification (narrow field of view)	500 m

The Remote Controlled Weapon Module in one of its variants can be equipped with a 12.7 mm WKM-Bm heavy machine gun, which is an automatic machine gun firing 12.7 x 99 mm NATO (.50 BMG) ammunition. The WKM-B rifle is designed to destroy lightly armoured targets, firing units, low-flying air targets and personnel whilst offering some slight shielding. The WKM-B rifle, in addition to the weaponry on the remote controlled weapon station, can also be mounted on various supports: pole, tank, hatch turntable, universal tripod and ground tripod, which from the point of view of the container offers great versatility.

Table 5. Thermal camera

Wide field of view	14.3° x 10.7°
Narrow field of view	4.5° x 3.5°
Target detection (wide field of view)	4,200 m
Target recognition (wide field of view)	1,400 m
Target identification (wide field of view)	500 m
Target detection (narrow field of view)	6,800 m
Target recognition (narrow field of view)	2,300 m
Target identification (narrow field of view)	900 m

Table 6. Laser rangefinder

Rangefinder measurement range	10-5,000 m
Distance measurement range	2,400 m

The rifle can be used in all climatic zones and weather and lighting conditions. The RCWS can be armed interchangeably with the 7.62 mm UKM-2000C general purpose machine gun. The 7.62 mm UKM-2000C is a machine gun designed to destroy personnel, firing units and technical equipment in any terrain and weather conditions, both during the day and at night. The UKM-2000C rifle with an electro-trigger is devoid of a stock, pistol grip and mechanical sights and can be mounted on LOOK container systems on a turntable, on the hatch, on a tank turret, personnel fighting vehicle and other armoured vehicles.

3.2. Mobile shooting and observation positions and machine guns

The 7.62 mm UKM-2000C general purpose machine gun or the 12.7 mm WKM-Bm heavy machine gun can be mounted on a mobile shooting and observation turntable or on a movable base on the light observation-protective container. The shooting position can be mounted on a turntable and be partially or fully armoured with a retraction mechanism system inside the LOOK container system, or optionally dismantled by the crew for transport.

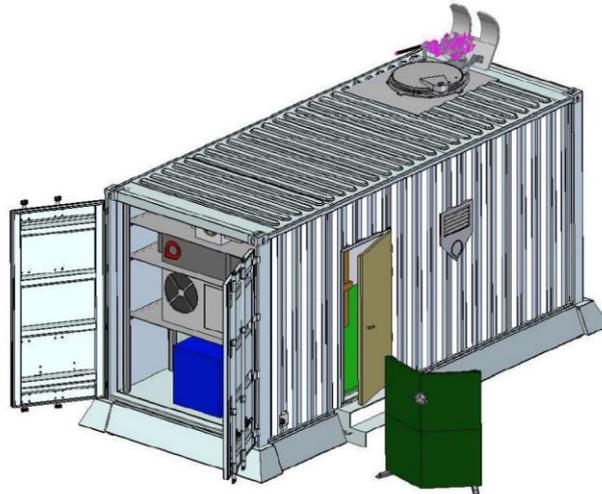


Fig. 3. LOOK container system in the version with a mobile shooting position.

4. TECHNICAL DATA OF THE LOOK CONTAINER SYSTEM

The LOOK basing on 20ft container

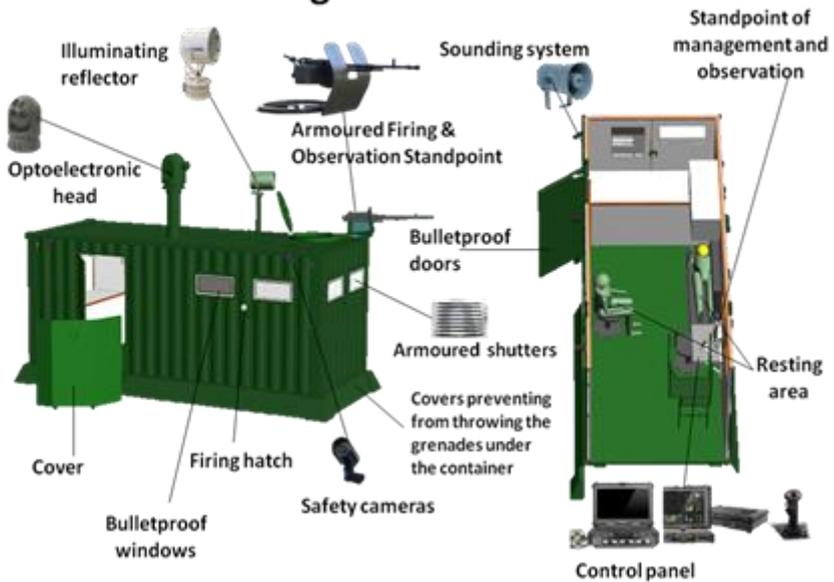


Fig. 4. LOOK container system equipment

4.1. Container armour

The light observation-protective container is made of armoured steel resistant to small arms fire. The windows are equipped with large, bulletproof panes covered with armoured steel shutters. The container armour and the container housing subsystem shield and protect against projectiles and prevent a grenade from being thrown under the container.

SECURE 600 armour steel:

- ballistic protection level 2 according to STANAG 4569,
- 7.62x39 mm BZ ammunition,
- recommended 8 mm sheet thickness.

Bulletproof glass:

- ballistic protection level 2 according to STANAG 4569,
- 7.62x39 mm BZ ammunition,
- 80 mm thick.

4.2. Masking and thermal insulation

The LOOK container system is thermally insulated through the use of mineral wool and stone mineral wool ensuring good thermal, acoustic and fire protection parameters. These materials are flame-retardant and moreover are characterised by their hardness. LOOK is also equipped with a multilayer insulating mat that reflects the emitted thermal energy from solar radiation in summer and reduces energy transmission in winter. This solution can work well in a dry climate and a sandy area, where the temperature is very high during the day requiring container cooling as well as at night with a large temperature drop and the need to heat the facility.

The LOOK container system is painted with camouflage paint. Depending on the destination, the colours are selected by the customer's special request. The colour of the container shown in the illustrations is designed for customers from African countries who need to locate the container in a sandy area and minimise their visual profile on the environment. Of course, if necessary, the container can be colour-adapted to an area with dense vegetation. The container can be easily equipped with camouflage paint dedicated to the tasks it is to perform. You can easily apply a forest camouflage to the container.

4.2. Additional LOOK equipment

LOOK can be equipped with a mechanism for lifting and lowering devices located on the roof of the container. It is equipped with a monitored observation and control station for the commander/operator, a shooter-sentry station with a monitored control and observation panel and a manipulator.

It is equipped with a telephone and radio communication subsystem and electric and IT connectors.

The container is equipped with armoured windows with bulletproof glass on three sides, with fire stations inside the container and a hatch on the roof for manual operation of the shooting position. In addition, the container has a ventilation and heating subsystem with air conditioning, a power supply subsystem with an integral power generator, necessary living facilities for service personnel and sanitary facilities. Inside the container, there is a separate enclosed area with a toilet and a washbasin. Hot and cold drinking water is also provided.

The functionality to be fulfilled by the container depends on equipping it with a set of devices for detecting and locating moving objects appearing in the monitored area. Detection can be achieved using:

- optoelectronic head of the remotely controlled weapon module,
- radar devices,
- different types and varieties of optoelectronic sensors.

The devices, technologies and economically selected materials used in the LOOK Container System make the cost of the planned production small compared to the expected protective and tactical effect of the container. The above-mentioned observation and tracking elements are optional and have a decisive impact on the final costs of the container.

FUNDING

The author received no financial support for the research, authorship, and/or publication of this article

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Systemy kontenerowe LOOK na rynek afrykański

Katarzyna BURNAT

*Zakłady Mechaniczne „Tarnów” S.A.,
ul. Kochanowskiego 30., 33–100 Tarnów*

Streszczenie. Lekki obserwacyjno- obronny kontener (LOOK) przeznaczony jest do zabezpieczenia i ochrony żołnierzy/funkcjonariuszy pełniących zadania obserwacyjne, obronne i kontrolne punktów kontrolno-obronnych, baz lub innych istotnych obiektów strategicznych. Zwiększa stopień ochrony użytkowników pełniących zadania obserwacyjno- obronne poprzez zastosowanie opancerzenia kontenera, wyposażenie w techniczne środki obserwacji w zakresie światła widzialnego i podczerwieni, jak również możliwość doposażenia kontenera w uzbrojenie. LOOK doposażony w zintegrowane uzbrojenie pozwala ograniczyć straty personelu oraz skutecznie zwalczać zagrożenia w dozorowanych strefach. LOOK wyposażony jest w stanowisko operatora (dowódcy warty) umożliwiające obserwację i sterowanie, stanowisko strzelca-wartownika z pulpitem sterowniczo-obszernym, system łączności, opancerzone okna z trzech stron ze stanowiskami ostrzału oraz właz w dachu dla dodatkowej ręcznej obsługi stanowiska strzeleckiego. Ponadto System kontenerowy LOOK wyposażony jest w podsystem nawiewno-grzewczy z klimatyzacją oraz posiada możliwość doposażenia w podsystem zasilania awaryjnego. LOOK charakteryzuje się wysoką mobilnością i transportowalnością drogą lądową i morską.

Słowa kluczowe: kontener obserwacyjny, system kontenerowy, obserwacyjno-obronny kontener, kontener LOOK