

Modernization of artillery reconnaissance

Jiří Šotnar, Michal Carbol, Martin Blaha

Department of Fire Support Control,
University of Defence, Kounicova 65,
662 10 Brno, Czech Republic
martin.blaha@unob.cz

Abstract. The paper contains description of modernized artillery reconnaissance set LOS –M. It summarizes technical achievements which were made during the modernization process and it highlights the main advantages of the device. There is pointed out to importance of artillery reconnaissance and fast information flow. This is realized through modernized computers, software and generally through technical equipment. The modernization process is result of permanent need for better results and performance.

Keywords: artillery reconnaissance, reconnaissance device and vehicle, information flow, observing device, detection of targets.

1 Reconnaissance set LOS – M

All currently used means of artillery reconnaissance have during determination process of reconnaissance data specific limitations. These limitations can be solved by adding additional reconnaissance devices or resources, or their modernization throughout artillery reconnaissance system so that new devices are not doubling existing activities, but increasing the level of its quality.

Therefore, chief of artillery of the Czech Armed Forces adopted and already partially implemented projects related to modernization of artillery reconnaissance, both in yielding sets as well as in reconnaissance sets. By modernization or by inclusion of new devices will be cover the full spectrum of artillery reconnaissance tasks.

During the development of artillery reconnaissance devices is necessary to pay attention to connecting devices and their possibility of passing the real data to the required distance and in the required format. [5]

One of the first devices of artillery reconnaissance, which is currently undergoing modernization, is the observation set LOS. Its modernized version is called LOS - M.

LOS - M device is part of the fire control system of an artillery unit, which replaces an artillery observer. We count with its deployment mainly on exposed areas of the battlefield, where the standard observer of artillery fire control system would be exposed to unreasonable risk, primarily in terms of shelling enemy firing means, or from the viewpoint of chemical warfare agents, respectively other form of contamination of the surrounding environment. The LOS-M device will also be

preferably used at forward positions, which will be quickly stationed, or that are inaccessible to artillery observers and also for the securing the critical areas and objects, both civilian and military.

Observing device LOS-M has, in practical terms, benefits that due to extensive computer support for operator activities in comparison to the current level of artillery observers fire control system workplaces, significantly increases the efficiency of management of reconnaissance activities of the artillery forces.

Due to integrated connecting means is better communication between mechanized forces and artillery. LOS - M reconnaissance device allows by its modular concept prospective expansion to other exploration sensors and subsystems.

The design and the possibility of changing system operators LOS-M allows virtually continuous combat operations of artillery observer throughout the reconnaissance system.

Used subsystems for the reconnaissance and their relative configurations, allows to create reconnaissance equipment with long-range detection and identification of targets. Established SW structure largely taking into account operator comfort and allows modifications to the requirements and the experience of the user. LOS-M system is also equipped with a simple kit for conducting spare reconnaissance.

For the crew are intended four places. Original driver's seat was retained. Place behind a driver is designed for a substitute or an advanced forward air controller posts (FAC). Commander's workplace and integrated operator station is located to the left and right of the tower.

2 Function

LOS - M device allows, among other functions, to perform all tasks of the artillery observer fire control system ie.:

- Allows to search targets and determine their coordinates with high precision, day or night, and transfer them to superior.
- Plans and requires artillery and mortar fire.
- Correcting the results of shooting at different methods
- Coordinates the fulfillment of firing tasks of the artillery and mortar units in conjunction with combat activity of supported mechanized units.
- It provides the communication with the superior fire support coordinator and also fire control section and batteries.
- Allows monitoring of the tactical situation and enemy units on a digitized map, displaying areas of interest.
- It provides a connection to the commander of supported mechanized unit.
- It allows determination of their own stand and navigation using GPS.

3 Upgraded sensory subsystem

Upgraded sensory subsystem consists of the following components that are built into the sensory head:

- TV camera MERLIN-2;
- TV camera HK-170;
- Thermal imaging camera LIRC 640;
- LDM 38 laser rangefinder;
- INU TALIN 3000;
- Laser marker.

TV camera MERLIN-2

It is a color / monochrome (Day & Night) TV camera that is designed for close, especially for remote optical reconnaissance for the day and at dusk.

Detection of 16 km;

Reconnaissance 5 km;

Identification of 2.5 km.

TV camera HK-170

This is a TV camera mounted monochrome CCD sensor, which can be used as a sensor reconnaissance and combat means of orientation in the field, the field reconnaissance, to search and detect targets during the day and at dusk.

Detection of 10 km;

Reconnaissance 3,5 km;

Identification of 1.5 km.

LIRC 640 Thermal Camera

It is a thermal Module 3 generation operating in the spectral range to 10 micron.

Detection of 9.0 km

Reconnaissance of 3.0 km

Identification of 2.0 km

Laser rangefinder LDM 38

It is a high performance module eye safe laser rangefinder. It features a ruggedized compact design and is designed for installation in military applications.

Minimum distance measuring 100 m

Maximum distance measuring 20,000 m

Accuracy of distance measurement ± 5 m

Laser marker

It will provide marking of the observed target for other units that are equipped with observation devices operating in a narrow band near IR region of the spectrum.

4 Software

Application software will provide two basic modes of research:

- Viewing Mode
- Monitoring Mode

Viewing mode will be used to reconnaissance of the field and will be fully dependent on the operator's activities, ie. It is integrated in the operator's workplace, he will operate reconnaissance subsystem by his instructions and will concentrate on field observations.

Monitoring mode will automate surveillance activities in the form of programmed activities, which will perform autonomously without operator intervention. The operator defines interest points, which will focus sensory subsystem, and after running the tracking mode, image sensors scan the set area. The monitored area can also set motion detection area, the system will automatically inform the operator of its integrated workplace disruption of any monitored area.

5 The following facts

Artillery Reconnaissance set LOS - M is supplemented, as opposed to the original type, by surveillance subsystem of the commander, who will provide him an overview of the vehicle's surroundings full 360 ° both in the day and at night. This subsystem is solved by integration of camera modules on the outside of the vehicle and display elements of the system on the commander's inside. [8]

The modernization of reconnaissance device will also replace existing radios for modern radios fully compatible with radios used by other NATO armies. The vehicle has been fully implemented by system BVIS-V, which is the basic communication node of today's military devices in the Army.

The big advantage is the replacement of the original yielding electric generator, which is built into the body of the vehicle and will apply without taking out. It is equipped with a means of air conditioning units that ensure suitable working environment and service deployment in climatic conditions quite different from those on which the original reconnaissance vehicle was designed.

It is also calculated with a modifying of software, to ensure a smooth transition of operators between the upgraded reconnaissance set and other reconnaissance sets with the modernization or development, is expected in the future. [10]

For the modernization of LOS set has been extensively used test subsystems that are used in the vehicle PANDUR, especially in the reconnaissance version KBV-Pz. This is complete integrated reconnaissance subsystem, which will make extensive use of components and subsystems identical with integrated reconnaissance system KBV-Pz, which greatly simplifies the logistics of LOS-M set.

Reconnaissance LOS-M device is assigned to the degree of artillery unit at the same level as an artillery observer, respectively artillery reconnaissance team. Inclusion of set LOS – M in the structure of artillery sections intended for direct fire support is subordinated to the appropriate commander, or it is subordinated to the

commander of a mechanized unit for which this reconnaissance vehicle is destined.
[9]

If artillery fulfills tasks of general fire support is the inclusion of LOS-M device directly subordinated to the commander of the section.

6 Conclusion

Modernization of reconnaissance set LOS was focused on advancement of the overall utility performance to the level of today's modern reconnaissance systems and was also focused on eliminating the existing gap, which was particularly manifested during its deployment in international missions of the Czech Armed Forces.

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