ARE LIGHT HOWITZERS STILL NEEDED ON THE BATTLEFIELD?

Even though 155 mm and 152 mm self-propelled howitzers are the most common of the artillery assets utilized globally (only in some cases: supported by towed systems of the same calibre), the smaller calibre artillery is also, quite commonly, utilized. This is justified by operational and economic reasoning. One cannot make effective and reasonable use of advantages offered by heavy howitzers everywhere, while the lighter systems are cheaper to operate.

Usually the advanced 155 and 152 mm modular self-propelled artillery platforms play a key role on the battlefield. They are the basic support means for the forces involved in the conflict at short and medium distance. The short ranges are secured by mortars, the long ranges are secured by larger calibre rocket launchers. 105 mm light cannons, based on wheeled platforms or taking on a towed form, are an intermediary measure, between the mortars and the heavy self-propelled artillery.

The effectiveness of artillery and rocket systems depends on numerous factors alongside their calibre - but the calibre indeed plays the most important role here. Undoubtedly, the systems that allow for rapidly obtaining the target coordinates and location of the nearest friendly assets and elements can be listed among the factors above. Every soldier, every system, every element and every unit on the battlefield, when creating a proper warfighting tool, shall yield full control over that tool and remain aware of the events around.

The approach as such is to make it possible to remain one step ahead of the enemy or at least to hamper his actions, which would in consequence make it possible to maintain tactical or even operational advantage. This is done mainly through increased mobility, enhanced situational awareness and use of advanced technologies, including non-kinetic means (cyber warfare and new generation electronic warfare) and solutions readily available on the market.

All of the armament systems available shall be embedded within the holistic battle management system so that they form a complementary scheme. To meet this assumption one should be driven towards acquisition of multi-purpose armament that can act against a wide spectrum of threats, with objective assessment of operation and own financial capacity. Numerous armies are aware of that and they are trying to skillfully merge the contradictory requirements related to acquisition of advanced armament, high cost of maintenance, and lack of an ability to implement the planned modernization initiatives simultaneously.

Not only do the 155 and 152 mm self propelled howitzer systems include the cannon itself, as they also should encompass a system that secures the operations. This is complemented by an effective training process created for the howitzer crews and for the auxiliary personnel. Furthermore the user should also be making efforts to procure new types of ammunition and secure the modernization of those. Equipment as such may be very effective, but it must be coupled with an expansive and costly
support system.

And thus some countries also introduced cheaper counterparts of systems as such: towed systems of the same or smaller calibre. Here the economic factor is not the only reason that needs to be taken into account. There was also a need to provide artillery support for units that carry out operations in specific terrain where use of the heavy tracked or wheeled systems would be difficult and cost-ineffective.

This also applies to low- and medium-intensity conflicts that have been, recently, quite common. Manoeuvrability, pace and dynamics involved in such operations, often separated from the support elements, and limited airlift capacity and rough terrain, usually exclude use of heavy towed systems as well.

However, the towed 155 mm howitzers are still quite common nowadays. The older heavier models fall behind the self-propelled platforms, when it comes to the offered capabilities. The latest solutions such as the M777A2 system (or the newly developed M777ER solution) have been tailored for being used by special units of the US Army or USMC. The M777 is a very good, yet expensive howitzer, also requiring special tactics for being employed effectively.

So, is there still any space available for towed systems of smaller calibres? It seems so, but on condition that they meet several fundamental requirements. First, these cannons need to be cheap to acquire and operate. Secondly, the design and principles of use should be simplified. These assets should be very rugged and resistant to the environments in which they would be potentially used.

The simple design does not equate to lack of adaptation to use of the modern positioning systems, system that would support laying down fire or use of modern rounds. Light cannons also need to be able to fire the rounds rapidly, to act against potential targets in a short period, with a high intensity of fire. They should also be tailored to use many types of ammunition, both the older ones, as well as the modern precision rounds or rounds of extended range.

The towed 105 and 122 mm cannons are still quite common in numerous armies around the world. Apart from the economics and the quantity of ammunition or cannons stored, other factors should be taken into account, including the ones related to the requirements entailed by some of the contemporary military operations (tactical and operational manoeuvrability and carrying out irregular activities). A major role is played by the specific terrain in which the systems as such are used (mountains, highlands, swamps, forests, deserts, etc.), or urbanized areas where the cannons are employed (narrow streets, tightly arranged buildings, bridges of low capacity etc.).

Considering the design features, the main advantages of the 105/122 mm towed artillery stem from its low weight, modular and simple design. One should also note that towed cannons are much cheaper to manufacture than their self-propelled counterparts, same applies to the maintenance or training (simplicity of use also counts here).

Furthermore, 105 mm cannons may also be based on commonly available platforms such as the multi-purpose high mobility wheeled vehicles (such as the HMMWV platform). The currently operated reconnaissance, command and precision targeting as well as fire assets (including precision guided rockets and rounds) seemingly make the towed cannons less valuable tactically, while the cannons themselves are becoming vulnerable. Considering the above, it is required to employ special tactics and procedures of operational use and ensure a high degree of cooperation with other armament and support systems. It is also required that cannons as such are operated by the selected military units, where the advantages would hide or at least balance out the noticeable deficiencies.
Selected Examples

Several types of 105 mm howitzers are known around the world, with the US M101/102, British L118/119 and Italian Modello 56 systems being the most common ones. The British solution is operated by numerous armies, also in modified variants. The Italian Modello 56 system, weighing 1273 kilograms, may be disassembled into 12 elements (in 3 to 4 minutes), and the heaviest element does not weigh more than 132 kilograms. This is thus a solution which is good for the highland infantry units using horses or mules to transport the artillery assets in the areas where use of vehicles is impossible. Chinese copy of the aforesaid solution designated as DWA01 may be disassembled into 11 components. P15 version of the said copy can be mounted on a light all terrain vehicle derived from the SX2110C truck.

122 mm D-30 cannon developed in the USSR is yet another common design that has been often modified by the final users. In China a self-propelled 122 mm CSK002 howitzer has been developed for the airborne units, with an unusual way of assuming a firing position - the gun is removed from a carrier with a 180 degrees rotation and placed on the ground.

The recent Maneuver Fires Integrated Experiment (MIFX) exercise carried out by US Army proves that lightweight 105 mm howitzers are still usable. During that operation ultralight Hawkeye artillery systems (105 mm sphs with 33-calibre long barrels) were used, based on the M1152A1w/B2 HMMWV platform. This type of experimental training is conducted to introduce these systems into service within the IBCT elements. The new 105MWS system could replace or complement the towed 105 mm M119 and digitalized M119A3 systems, towed by the light M1097 tractors operated by the US Army.
Hawkeye uses a digital M9000 fire control system, LN-270 positioning unit, it is operated in conjunction with the MVR-700C artillery radar and it also is embedded within a modern network of datalinks. The system weighs only 1157 kilograms without the carrier and remains capable of attacking targets at distances of 11600 metres (M1 and M760 HE rounds, M1130A1 HE PFF BB rounds, M134 illuminating and M60/M60A2 smoke cartridges). Meanwhile, the M913 HERA round offers a range exceeding 19.5 kilometres. Maximum rate of fire is defined as 8 rounds per minute.

The French Nexter company, which now is a part of the KNDS umbrella company, designed a 105 mm LG1 gun, with a 30-calibre long barrel. At least 3 generations of this cannon entered production. One of the derivatives of this cannon was deployed to Poland during the NATO Noble Jump 2015 exercise. It was used by the Belgian forces involved in the operation. The weight below 1600 kilograms (this is the lightest gun of the type in the world), semi-automatic breach and theoretical rate of fire of up to 12 rounds per minute or a wide range of aiming angles (elevation: -30 to +70 degrees, azimuth - 360 degrees - (180 left and right), and tilt up to 10 degrees in any direction) can be listed among the main advantages of the system.
The howitzer may be towed by a Land Rover or Toyota Hilux class vehicle and it may be fitted with a fire control system coupled with an INS/GPS guidance unit or a ballistic computer. It may also be
transported as an underslung load of relatively small helicopters or by airlifters - a single C-130 should be able to carry four cannons as such.

A well trained crew should be able to be ready to change the firing position in less than 30 seconds. The very same amount of time is usually needed to fire the first 6 rounds. Maximum range is defined as 17 000 metres for Nexter rounds and more than 11 000 metres for the M1 family rounds. The gun is compatible with all kinds of the 105 mm NATO rounds which paves the road towards utilizing precision guided munitions. Effective range of direct fire is defined as 2000 metres. Change of the direction in which the gun fires the round, related to changing the position of the cannon in 360 degrees range, takes only a few seconds.

**Summary**

Light towed 105 and 122 mm howitzers, along with their self-propelled versions, have become an important part of many military units. Air-mobile forces, highland and light infantry and airborne units all make use of such guns, as they match their operational requirements. IBCT elements of the US Army also operate guns as such, as the tactics employed by those brigades and the equipment they use force them to utilize such solutions. Hawkeye or SX2110C systems could also act as an alternative solution in places where conventional methods are ineffective or less effective.

Even though the heavy self propelled systems are dominant, they cannot be used effectively by the aforesaid units. This is complicated even further by the natural and artificial limitations imposed by the operational environments. Moreover, the number of those systems will always be insufficient and considering the wide spectrum of threats, using them may not always be rational, economy-wise. Thus the cheap and simple to use towed howitzers should also become a part of the units supporting the operational forces, such as the territorial defence elements.
Not only is the effectiveness of the towed artillery going to be dependent on their low weight, simple design and simple operation or high rate of fire, as fitting them with integrated positioning modules and computers calculating the firing solution and using them with precise ammunition also play an important role within that regard. Furthermore, proper tactics need to be employed when using them and embedding them within the battle management system - these factors would also play a relevant role here.