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The Aerial Kites of Captain Ulyanin

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The Aerial Kites of Captain Ulyanin

In recent years, alongside the development of aerial flights at home and abroad, a rather new subject has arisen, that of the military application of aerial kites. This means using kites for reconnaissance, correction of artillery fire, photography and so on.

Captain Ulyanin, the former commander of the Aerial Unit of the Warsaw Fortress, had been for several years experimenting with kites. As a result, he created the type of kite most suitable for military purposes mentioned above. I collaborated with Captain Ulyanin and would like to share with the reader the design of his kites and how to operate them.

What qualities should a military kite have?

Such kites should have a simple design, be light, easy to transport and carry, be stable in the air and preferably be able to automatically reduce pressure on the flying line in strong gusts of wind. The Ulyanin military kite meets all these requirements. This is a box kite with triangular soft boxes. When disassembled, the kite can be rolled up, stored

and transported in a very convenient manner. The kite assembled for launching and laid out on the ground is flat, but during launching the soft triangular boxes stretch due to wind pressure and the kite takes the box form. The kite is made of bamboo sticks and canvas; it has flexible wings on either side that are attached to the middle part of the kite by rubber. In gusty wind conditions the wings bend backwards and stretch the rubber so that the overall surface of the kite decreases. When the wind slows down the wings tend to return to their primary position thus increasing the surface of the kite. In this way, the stronger the wind the smaller the surface of the kite becomes, and vice versa, the weaker the wind, the larger the surface of the kite. This provides for a rather even stretch of the flying line and lessens the chance of it breaking.

For assembly, the kite should be unfolded and stretched out with its bridle facing down. Then:

1. Put in the sidewise bracing pad– insert its hooks into the braces of the side rods.
2. Hook the wing rod by its hooks onto the rings of the wings and stretch the straps of the wing rod (by letting them over the side rods) until the wing is fully stretched. Insert the wing rods so that they lie on top of the wings but under the side rods.
3. Stretch the rubbers. One end of the rubber attach to the side rod near the sidewise bracing pad and hook the other one with the ring at the end onto the hook of the wing rod. Note: let the rubber pass under the middle rod of the kite.

For kite’s disassembly one should:

1. Unhook the rubbers;
2. Remove the wing rods;

3. Remove the bracing pad;
4. Rotate the kite so that the bridle is facing upward, put all removed rods in the middle of it, fold in half and roll it up around the middle rod.

Lifting of observers by kites

Kite launches and lifts are done in the following manner:

Usually 6-12 kites are launched on two ropes of different strength, the main and the additional rope.

The ropes are put together with a rafter and a loop, and one serves as a continuation of the other. The main rope's burst strength equals 2080-2240 kg; the additional rope has a burst strength of 480-640 kg.

The flying line combined of two ropes provides for safer lifting. Half of the kites are attached to the main rope, the other half - to the additional one, so if in a sudden strong gust of wind the additional rope were to rupture, the basket with the observer would smoothly land on the main rope with the remaining kites.

A fairly large launching pad is needed for lifts, at least 215-320 m long, preferably clear of houses and trees, as well as a team of 25-30 enlisted men. The team can be much smaller, but then the launch will take longer.

The winch with the main rope of the flying line reeled on it is set at one end of the launching pad. Then immediately the main rope is laid out in the direction of the wind. This rope has loops 12 m apart; to these loops the kites are attached. Several people set the winch and fasten it to the ground. To do it a common cart is placed between the shafts of the winch; in front of each shaft two pegs are driven down at 45 degrees angle, then

each wheel of the winch is tied up to the appropriate wheel of the cart and further on to the pegs.

Thus the winch is firmly attached to the ground.

At the same time other team members carry the kites forward away from the winch in the direction of the laid out rope, as well as the basket with the dynamometer (which serves to measure the pulling force of the kites), ballast box, additional rope and the side guy lines which serve for pulling down the basket during the launch.

The kites are assembled and clipped on to the loops of the main and additional ropes with the bridles. This is done by placing a kite under the rope and letting the rope through the so called fork of the kite. A piece of rope 6-7 m long is added to the main rope between the kites and the winch, closer to the kites; it carries the dynamometer. This added rope is as strong as the main rope itself. Here the main rope slacks in slightly, so the pull of the kites is transferred to the piece of rope with the dynamometer and the observer can measure at any given moment the pulling force applied to the flying line. This added piece of rope has 4 rafter nails: two for attaching the basket and two for the side guy lines. The ends of the guy lines flow through the blocks of the ballast box, loaded with ballast bags.

As was mentioned before, 6-12 kites are used. Half are attached to the main rope of the flying line and the other half is attached to the additional rope of the flying line. If an odd number of kites are used then an “extra” kite is attached to the main rope. The very first kite called the ‘head kite’ is clipped onto the additional rope with a special cord 30-40 m long.

The role of the head kite is to lift the other kites during the launch, show the direction of the wind up high before letting out the kites, and prevent the sideways sway of the kites.

The head kite is the first to be launched. Its flight allows one to check the direction of the wind and see if the other kites are positioned appropriately. If the crew notices that the head kites deviates to the left or to the right, the system must be moved to the left or to the right accordingly. The head kite is held at the junction of the two ropes of the flying line When everything is ready for the launch, an order is given to the people to lift the kites and position them vertically, slightly above the ground. The kites should be held by the middle rods. It is also important to make sure that the bridles do not catch on the ends of the rods. Then the head kite rope is released, and the ascending head kite pulls the other kites one by one as the people holding them let go. The kites then lift the basket with 3-6 ballast bags while the launching team members move from the kites to the ballast box and attend the side guy lines. They pull in the basket to the ground; next an observer will be lifted. Sometimes it happens that the wind up high has a slightly different direction, in which case some of the ballast bags are unloaded and the ballast box is moved to a different spot where it is load with bags again. To carry out the lift, people ease the basket on the side guy lines while the kites are ascending and the basket is thus lifted. To bring down the basket, people pull it in towards the ground with the side guy lines. A trained team can accomplish the launch in just 15 minutes. With the average speed of wind being 6-7 m, 9 kites will lift 2 people. To take the station away, the crew pulls in and detaches the basket, then lowers the rope with a running block (or by hand when the wind is not too strong), then detaches the kites one by one, finishing with the

head kite. They reel the flying line on the winch, watching that it stays clean of stones, sand and such.

The head kite is being pulled in by its rope until the moment when it becomes unstable, at which point the rope is dropped and the kite parachutes onto the ground. Otherwise the kite can dive sideways and if deformed, it will not fly well afterwards. The described kite station fits into two carts: one cart holds the winch, another one holds the kites, the ballast box, the basket and the ropes.

Launches can be carried out in winds of 6-15 m/sec. The stronger the wind the fewer kites are needed. Thus if the wind's speed is 15 m/sec then 4 kites would suffice.

Kite lifts are fairly safe: as was mentioned earlier, rupture of the additional rope of the flying line is harmless; if the rope between the basket and the winch bursts due to being hit by a bullet or a shell, then the pull of the kites is transferred to the side guy lines and the basket will land smoothly. Obviously, people attending to the guy lines should react fast and quickly reel-in the slack. The only dangerous rupture would be on the rope between the basket and the first or the second kite, but this is very unlikely.

Kites are very suitable for observation. In steady moderate winds the basket is almost motionless. The absence of rocking allows the observer to notice such details through binoculars which would not be possible to detect from the rocking basket of an air balloon. The Ulyanin kites with a main flying line of 530 m can lift a person to the height of 200 m. This height is enough to scout the territory as far as 4 to 7 km away.

Kites can be brought much closer to the enemy's positions than an air balloon since it is much harder to destroy them. Bullets can not harm kites and it is very difficult to hit the rope or the observer.

All these positive characteristics of kites together with the fact that they are relatively inexpensive demonstrate convincingly that in some cases kites can be a great asset and that each aerial unit would only benefit from having such a kite station.

Figure 1. The Ulyanin Kite:

а, а – soft boxes
б, б – flexible wings
в, в – wing rod
г – middle rod
д – forks
е – bracing pad
ж – rubbers
з – bridle

Figure 2. The launching of the kites – a graph:

а – main rope of the flying line
б – additional rope of the flying line
в – head kite flying line
г – winch
д – basket with the dynamometer
е – ballast box
ж – side guy lines

Figure 3. The general view of the kite lift

Figure 4. a – the kite assembled for launching
b – disassembled kite