

**METHOD AND DEVICE FOR USING WARHEADS RELEASED FROM A
LAUNCHING VEHICLE TO COMBAT TARGETS IDENTIFIED ALONG THE
FLIGHT PATH OF THE LAUNCHING VEHICLE**

5 The present invention relates to a method and a
device for using warheads from a launching vehicle flying
over a target area, such as a bomb casing of the cruise
missile type, RPV (remotely piloted vehicle) or
equivalent, with the warheads separating from the
10 launching vehicle and then acting independently, in order
to combat identified hard targets such as armoured
vehicles, artillery, bunker positions etc., and including
those targets which lie extremely close to the flight
path of the launching vehicle and which for this reason
15 have perhaps been identified only at very close quarters,
but also those targets which lie to the side of its
flight path.

 The so-called cruise missiles with their
navigation systems which are independent of external
20 command after initiation, and with their extremely long
ranges, were originally designed for navigating at very
low cruising altitudes along predetermined and programmed
flight paths in order to break through the other side's
missile defences and to carry individual large charges
25 towards particularly important selected targets which it
may be assumed are well defended against air attack.
However, developments have been towards using the same
basic concept for somewhat different purposes, and then
often in a somewhat simpler and less expensive design and
30 with shorter ranges. Aircraft-like weapon carriers of
this simplified cruise missile type have thus been
proposed for defending against attacks of enemy tanks by
spraying antitank mines or independently acting so-called
sub-munitions over an area which could be predetermined
35 before initiation of the launching vehicle in question,
or identified during its flight by a target seeker
arranged in the same and an analysis unit coupled thereto.

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In order to make it as difficult as possible for the other side to combat these weapons carriers which are after all extremely expensive, these have been given, in the same way as the actual original cruise missiles, a very low cruising altitude towards the intended target area. This makes it possible for launching vehicles of this type to approach the target under the protection of the radar shadow which can usually be counted on at cruising altitudes of less than about 50 metres, but this at the same time means that the actual target seeker, if the launching vehicle in question is provided with one, is only able to give very short warning times for offloading of weapons against those identified targets which lie behind concealing terrain formations or extremely close to the actual flight path. In addition, if the targets are ones which lie close to the said flight path but well to the side thereof, weapons offloading is made correspondingly more difficult.

Warhead types which will probably be very useful for spraying from a launching vehicle of the type in question here are those which are provided with their own target seeker and which, as they descend with deceleration towards ground level from a certain height, scan a defined ground area below them along a helical trajectory centred on the line of descent, and where the target seeker fires its ammunition of the shaped charge type or equivalent when it finds that the direction of action of the ammunition covers a combatable target. European Patent 0 252 036, for example, describes a warhead of this type which thus has its own target seeker and an active part directed in parallel thereto, and which during its active phase rotates about its line of descent, with the sighting line of the target seeker and the direction of action inclined relative to the line of descent, and which additionally has the advantage that because it has no parachute, which is the rule in the case of other warheads of similar function, it is not disrupted by wind conditions prevailing within the target area.

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Another type of warhead which could be used in combination with the launching vehicle in question here would be those warheads which are provided with their own target seeker which actively guides the warhead, during the final phase, in towards an identified target and then fires its ammunition at the optimum distance or alternately on direct impact.

One problem which must be solved in connection with the present type of launching vehicle and its basically low cruising altitude is that the warheads, regardless of which of the abovementioned types is chosen, require a higher cruising altitude than that of the launching vehicle in order to be able to act on the target type in question. In WO 94/23266, a method is described for giving warheads of the types indicated above a flight altitude which is sufficiently high in relation to the cruising altitude of the launching vehicle, with the aid of special rocket engines which, when the warheads leave the launching vehicle, give these a movement of separation which is directed obliquely rearwards and upwards in relation to the direction of flight and which, combined with the actual speed of the launching vehicle in the direction of flight, results in the warheads being able to act relatively closely ahead of the point where the target was first observed by the target seeker of the launching vehicle. This system depends for its functioning on expensive and space-consuming ejector rockets which both increase the costs of the system and reduce the explosive load, and at the same time it does not always guarantee being able to offload weapons against those targets which are not identified until the launching vehicle is just about to pass alongside them or over them.

The present invention now relates to a method and a device to give warheads separated from a launching vehicle flying at low altitude over a target area, such as a bomb casing of the cruise missile type, RPV or equivalent, a significantly higher flight altitude without any major and undesired changes in length

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compared to the point where the respective warhead leaves the launching vehicle. The invention is based on an active use of the kinetic energy of the launching vehicle, which energy is taken over to a corresponding extent by the warhead when the latter leaves the launching vehicle, and this kinetic energy is used in turn to give the warhead a looping trajectory or any other programmed trajectory, which means that its original trajectory directed forwards in the direction of flight is changed upwards and backwards towards a point with more or less the same geographical coordinates as those where the warhead left the launching vehicle, but at the considerably higher flight altitude which the warhead requires for its active functioning.

To be able to satisfy the basic concept, the submunition part needs to have, at least initially, an aerodynamic shape adapted to the desired flight trajectory, i.e. in most cases a more or less aircraft-like shape with aerodynamically designed aerofoils which may be surprisingly small if the shape of the body is in other respects suitably adapted. These aerodynamic aerofoils must be adapted to the desired flight trajectory, which means that they should comprise actively adjustable guide surfaces since the basic principles for use of warheads as regards the lateral direction can vary from one instance to another, and at the same time strong winds can make it necessary to make corrections to the actual flight trajectory both in terms of height and lateral direction. This therefore means that the warhead must be able to be controlled in both roll and yaw, and at the same time it must have its own computer coupled to the gyro, accelerometers etc., which gives the rudder the necessary commands on the basis of information obtained from the bomb casing prior to separation from the latter, and its own calculations made during the trajectory.

The combination of main launching vehicle, such as a bomb casing or the like with its own target seeker, and warheads with their own target seekers for detailed scanning of a defined target area, and the basic

principles for the active functioning of the warhead therefore belong to the state of the art, whereas the method for using a controlled looping trajectory or any other programmed flight trajectory to deliver the warhead at a higher flight altitude than that of the launching vehicle, but in proximity to the geographical point where the warhead left the same, constitutes the actual invention. The latter also includes the actual device and also the fact that the trajectory of the warhead can be combined with longitudinal and/or lateral guidance in order to give the warhead the best possible starting point in respect of the target which is to be hit.

The invention entails that an actual target may have been identified by a target seeker which is built into the launching vehicle and which issues orders, via built-in operations logics (operations computer) on separation or ejection of the required number of warheads and gives the respective control logics the necessary control data, or alternatively the necessary data on the target is given to the operations computer of the launching vehicle as program or as remote-control command during its flight towards and over the target area.

The direct separation should be a relatively gentle action in which the warhead is pressed or knocked out of the launching vehicle and upwards or to the side, and the aerodynamic aerofoils of the warhead, if these are stored in the launching vehicle and folded against or into the warhead in order to save space, are deployed so that they catch in the air masses swirling past the launching vehicle. In addition, the separation of the warheads from the launching vehicle should take place in a "nose-up" position, since a raised nose position affords quicker in-swing and actively prevents a stalling of the aircraft-like warhead.

A suitable method for activating the separation of the warhead from the launching vehicle is quite simply to lift it out upwards or to the side by means of a linearly inflatable airbag made of laminated Kevlar, for example, and arranged under the warhead, which airbag is

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inflated with, for example, a small propellant charge and in this way lifts out the warhead. If the fully inflated airbag has been given a wedge shape which closes rearwards in the direction of flight, the abovementioned "nose-up" position is automatically obtained. The basic principles for this method for ejecting ammunition components from a launching vehicle are described in EP 0 424 198.

As has already been mentioned above, it will also be possible for the warheads designed in accordance with the invention to be used against targets which are located to the side of the actual flight trajectory, which means that each warhead included in the launching vehicle, and there can be 10 to 20 in each launching vehicle, must be provided with its own control logics which coordinate the lateral and longitudinal guidance during the looping trajectory on the basis of the control values it has received via the target seeker of the launching vehicle, and possibly also values obtained from its own gyro, accelerometer etc. which continuously provide information on the current position in the x, y and z direction, and any movements in the air stream. Fuse/arming/ignition functions are also included, of course, in addition to the active part and the actual target seeker.

Once the aerodynamically designed and preferably aircraft-like warhead has left the launching vehicle, it commences its flight trajectory with a short in-swing phase and thereafter follows a looping trajectory, or other pre-programmed trajectory, up to at least the top altitude exclusively as a flight phase.

As soon as the warhead has reached the topmost point of the trajectory, its control logics and its target seeker can take over entirely, and its continued function can principally follow two alternatives depending on the function which has been chosen for the active stage of the warhead.

According to a first alternative, the warhead can be of the type which is guided in the final phase and in

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which its own target seeker guides the warhead in directly towards a target identified by the target seeker itself in order to activate the active charge of the warhead at a predetermined distance from the target or on
5 direct impact thereon.

According to a second alternative, the warhead can be of the type which, during its decelerated descent, scans the area around the impact site along a helical trajectory in towards the impact point, and if its target
10 seeker finds a combatable target within the trajectory, then fires the active charge of the warhead. The basic principle for this type of warhead is thus described in the previously cited EP 0 252 036 and a development thereof in SE A1-9101038-9.

15 In order to function in the intended manner, this type of warhead must, during the active phase as it approaches ground level in a decelerated descent, rotate at a predetermined speed of rotation about its main inertia axis, which will in turn form a predetermined
20 angle with the direction of action of the active part and the parallel seeking direction of the actual target seeker. The angular adjustment of the main inertia axis relative to the direction of action of the warhead is achieved, for example, by deploying the target seeker to
25 the side of the active charge, at the same time as the target seeker is activated, while the decelerated descent and the maintenance of the rotation of the warhead are achieved by means of aerodynamically shaped deceleration surfaces which can preferably be deployed from the
30 warhead in conjunction with the activation thereof. These deceleration surfaces can have, for example, the shape which is shown in SE-A-9101037-1.

Even if the aerodynamic deceleration surfaces of the warhead are designed to maintain the desired rotation
35 about the main inertia axis, it must be assumed that the rotation will be initiated in another more active manner, since otherwise a valuable flight altitude would be lost.

Thus, according to the invention, the target seeker is deployed in order to obtain the desired

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inclination of the main inertia axis relative to the direction of action of the warhead, which can also be assumed to correspond to the line of symmetry of the warhead, since the active part is the one of its components which has clearly the greatest mass. The rotation of the warhead about its main axis of inertia can be activated, for example, by means of nozzle engines, rudder servos, or in another way. This therefore takes place as soon as possible after the warhead has passed the top of the flight trajectory, whereupon the warhead is given the desired rotation combined with the angle of incidence necessary for its function, and a downward speed vector.

Once the still more or less aircraft-like warhead containing active part, target seeker, possibly a gyro, control logics, impulse engines etc., has been rotated up to the desired speed of rotation, there are two alternative routes of action.

Thus, it is possible to retain completely the aircraft-like warhead, if appropriate after separation of wings and/or fins, or else it is possible to use warheads whose outer configuration is more or less identical with the types of warheads mentioned in the patents cited above, and where it is therefore first necessary to remove the aircraft-like outer shell which has been responsible for the actual flight trajectory, which may advantageously be a looping trajectory. If the aerodynamically designed and preferably aircraft-like outer shell of the warhead is to be removed after the warhead has been given the necessary rotation, angle of incidence and downward speed vector, then this must be done without seriously disturbing the rotation. This means that the outer shell should preferably be divided along one or more planes which run parallel to what is at that juncture the axis of rotation of the warhead.

Provided that the actual warhead which has thus been released, hereinafter referred to as the submunition, is of the general type which is described in the previously cited references EP 0 252 036 and

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SE-9101038-9, then it will comprise an active charge, a deployable target seeker, fuse/arming/ignition devices combined in one unit, and deployable aerodynamic deceleration members. When the target seeker and the deceleration surfaces are deployed, the main inertia axis of the sub-munition will be displaced away from the original line of symmetry, and a certain time will be required for this stabilization phase before the sub-munition rotates uniformly about the new position of the main inertia axis, i.e. with the inclination which at ground level gives the helical seeking pattern typical of the product.

This alternative thus involves the need for an extra dividing operation and requires that the highest point of the warhead in the looping trajectory lies so high up that the subsequent downward trajectory gives time for both the dividing phase and the stabilizing phase. The advantage is, however, that it is possible to use directly as sub-munition a product which is also included in a number of other weapons carriers.

If the alternative of allowing the warhead in its entirety to execute both the looping trajectory and the seeking phase/active phase is chosen, then the dividing phase is omitted, although this alternative can involve greater or lesser parts of its purely aerodynamic aerofoils, such as wings and/or fins, being separated off. According to this alternative, the whole warhead, once it has passed the top of the flight trajectory, is quite simply converted to a regular dive in oblique spin, and in this case too it is possible to have a deployment of the target seeker to the side of the active charge, which is responsible for the necessary inclination of the main inertia axis of the warhead to the side of what is its axis of symmetry during the flight phase.

Finally, if the alternative is to use a warhead which is guided entirely by the target seeker after the topmost point of the flight trajectory, then the rotation and dividing phases are dispensed with, and instead the warhead will require an extremely advanced target seeker,

control logics and guidance members which are also able to cope with substantial course alterations.

For the user, the present invention, with its various alternatives, involves clear advantages compared with previous systems since it can be used both against those targets which are only identified very close to the flight trajectory of the launching vehicle and also those targets which are identified only when the bomb casing is passing them, and in both these alternatives it is also possible to combat those targets which lie well to the side of the flight trajectory of the launching vehicle.

The invention has been defined in the patent claims which follow and it will now be described in somewhat greater detail with reference to the attached figures, in which:

Figure 1 shows a side view, in partial cross-section, of the bomb casing in conjunction with the invention,

Figure 2 shows a side view, in partial cross-section, of the aerodynamically designed warhead,

Figure 3 shows the warhead according to Figure 2 as seen from above, and with wings spread,

Figure 4 is an oblique projection of the submunition which, in accordance with an alternative of the invention, can be released from the warhead according to Figures 2 and 3, while

Figures 5 to 7 are schematic representations of the operational sequences for the device according to the invention, with its three different alternative embodiments as regards the warheads themselves.

The launching vehicle shown in Figure 1 and Figures 5 to 7 in the form of the bomb casing 1 is intended to be a completely autonomous battle system in the form of a projectile which is driven by a turbojet engine and which has its own integrated navigation system (control logic) which can be pre-programmed, and an internal target seeker which is coupled to the control logic. A number of warheads 2 are stationed in the projectile. As is evident from Figure 1, these are in two

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rows. The direction of ejection is assumed in this case to be upwards, for which reason the top plate of the bomb casing can be thrown off. Under each warhead 2 there is an airbag 3 which is empty in the rest position and which
5 can be inflated by its own propellant gas charges. In the fully inflated state, these airbags have a distinct wedge shape, with the highest part at the front in the direction of flight of the bomb casing.

When the airbag 3 lying under the warhead 2 to be
10 ejected is inflated, the warhead 2 is lifted relatively gently out of its position, with the wedge shape of the airbag ensuring that the warhead 2 leaves the bomb casing 1 with the nose distinctly raised. This, combined with the deflection of the rudder of the bomb casing 1, and
15 combined with the kinetic energy relative to the surrounding air which the warhead takes over from the bomb casing, initiates the looping trajectory of the warhead, which is an important feature of the present invention.

20 The warhead 2 shown in more detail in Figures 2 and 3 has a compact shape, but one which is still well suited to its flight task. These short and thick projectiles 4 are provided on the top side with a wing 5 of broken delta shape, and completed at their rear end
25 with movable side and height rudders 6 and 7, respectively. In its rest position, the wing 5 can be folded in around the projectile. This has been made possible by means of a hinge and by the wing being made of titanium. This means that the wing will move a good
30 deal during the flight, which fact has been taken into consideration when designing said wing. At the front part of the warhead there are also one or more rocket engines 8 which are intended to be used when it comes to rotating the warhead into a spin. Figure 2 also shows the main
35 components accommodated in the interior of the warhead at the start, namely an active part or in this case a complete sub-munition 9 (cf. Figure 4), a gyro 10, one or more accelerometers 11, and the rudder servo 12. The sub-munition 9 includes an active charge 14 and the warhead's

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own target seeker 13. These and other components included in the sub-munition are shown in Figure 4. The active charge 14 is of the shaped charge type (RSV IV). It is the previously mentioned target seeker 13 which, by being
5 deployed to the side of the line of symmetry 16 of the active charge and of the whole sub-munition, provides for the shifting of the main inertia axis 15 of the sub-munition, which gives the desired angle α to the line of symmetry 16. The sub-munition also includes the two
10 deployable aerodynamic aerofoils 17 and 18.

Although the warhead shown in Figures 2 and 3 is of the type which is assumed to follow the functional sequence shown in Figure 5, and is therefore assumed to divide once it has been converted to a dive spin and thus
15 release the sub-munition 9 shown in Figure 4, a projectile designed in the same way can in principle also be used for the two other alternative functional sequences in accordance with the invention.

When no dividing takes place, the actual target
20 seeker of the warhead can be deployed through an opening in the projectile. The members necessary for the dividing of the projectile, which is preferably effected in the longitudinal direction, have not been depicted, except for the fact that a longitudinal dividing line 19 has
25 been indicated with a broken line in Figure 2.

The complete functional sequence, shown in Figure 5, for the first alternative of the device according to the invention entails that the incoming bomb casing 1a with its built-in target seeker identifies an enemy
30 target at position F1, whereupon a warhead 2 is given target information and a start command. When the bomb casing has reached position 1b, the associated airbag 3 has been inflated and has lifted the warhead 2 out to the start position. The nose-up position of the warhead 2,
35 the kinetic energy of the latter and the action of the rudders 6, 7 mean that after a swing-in phase 20 it executes its looping trajectory or flight phase 21 in accordance with the invention. During the flight trajectory 21, the control logic of the warhead executes

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possible lateral and longitudinal correction of the trajectory on the basis of, on the one hand, the information on the lateral position of the target F in relation to the flight trajectory of the bomb casing 1, the movements of the target etc., which it obtains from the target seeker of the bomb casing before the start, and on the other hand the movements in the air stream which it observes itself during the flight, and whose effect on the flight trajectory means that corrections to the flight trajectory are required. Once the warhead has passed the top point of the trajectory, the rocket nozzles 8 (there may in fact be several of these) at the front part of the warhead are activated, and it is rotated into a spin with the speed of rotation necessary for the continued function. The warhead is thus converted in principle to a spinning dive during this rotation phase 22. In the present alternative of the invention, the dividing phase 23 is then initiated and executed, with the projectile 4 of the warhead 2 being divided along the line 19 by means of propellant charges, spring locks being released, or in another way. The sub-munition 9 is freed in this way, and it is now given the opportunity to deploy its target seeker 13 and the aerofoils 17 and 18. After a stabilizing phase, the warhead initiates and executes its active seeking and action phase 25 during which, rotating about its greatest inertia axis coinciding with the line of fall and plumbline 15, it scans the ground level below it along a helical trajectory 26, the actual target seeker and the active charge parallel thereto forming an angle according to the invention with respect to the line of fall and plumbline. In the alternative shown in the figure, the target seeker 13 of the sub-munition finds the target at the point F2 to which the said target has been able to travel during this time, whereupon the active charge 14 is activated and the target eliminated.

The alternative shown in Figure 6 follows the same functional sequences as the previous alternative, both at the start and through a large part thereof, but

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with the exception that the diving phase is dispensed with. The target seeker of the bomb casing 1 thus identifies the target at point F1, gives the warhead 2 the start order, and thus executes the looping trajectory 21 in a corresponding manner; a rotation phase 22 is then executed, which also includes a shifting of the maximum inertia axis of the warhead by deployment of the actual target seeker. After a necessary stabilizing phase, which can also be included in this phase, the warhead is thus diving in a spin, rotating about the line of descent which is oblique relative to its own axis of symmetry. This phase 28 is thus the seeking and action phase of the warhead, during which it scans the ground level below it along a corresponding helical trajectory 26 until it finds the target at the point F2 and then activates its active charge. During the active phase 28, it may be necessary to provide the warhead with air brakes, on the one hand in order to keep the movements of the warhead in the spin dive as uniform as possible during the whole seeking and action phase, and on the other hand to give it a sufficient action time. Quite simply, it must not be allowed to descend too quickly.

In the alternative shown in Figure 7, the same functions as in Figures 5 and 6 are executed in principle up to and including the point where the warhead has passed the topmost height of the looping trajectory, after which the active target seeker of the warhead is able to take over and during the downward trajectory 29 guide the warhead, via the control logic of the warhead, directly towards the identified target F which, according to this alternative too, has thus moved from the point F1 to the point F2.

**PATENT CLAIMS**

1. Method for combating identified targets (F) using warheads (2) from a launching vehicle (1) flying over a target area, by separating from this launching vehicle (1) warheads (2) which act independently after separation, and including those targets which lie close to the flight trajectory of the launching vehicle, characterized in that the warheads (2) use some of the kinetic energy of the launching vehicle which they take over when they are separated from the same in order to give the respective warhead a looping trajectory (21-25) or any other programmed flight trajectory, as a result of which its original forwardly directed trajectory taken over from the launching vehicle is changed upwards and backwards towards a point close to the point where the warhead (2) left the launching vehicle (1), but at a considerably higher flight altitude from which the warhead (2) in accordance with a previously known technique is able to attack the target (F).
2. Method according to Claim 1, characterized in that the flight trajectory of the respective warhead (2) is combined with a longitudinal and lateral correction in accordance with the information concerning an observed target, given by the target seeker of the launching vehicle to control logics included in the warhead for the purpose of giving the warhead as advantageous a starting point as possible for combating the target.
3. Method according to Claim 1 or 2, characterized in that the flight trajectory of the respective warhead is corrected, by control logics integrated in the same, for winds in the lateral and longitudinal directions, and other movements in the air stream in accordance with readings of these movements taken during the trajectory.
4. Method according to Claims 1 to 3, characterized in that the warhead (2), after it has reached the topmost height of the trajectory, is caused to dive towards the



ground and go into a spin about its own main inertia axis (15), which has been given a predetermined inclination relative to the direction of action of the active charge included in the warhead, and the parallel scanning
5 direction of the actual target seeker.

5. Method according to Claim 4, characterized in that the speed of fall of the warhead during its dive with spin is decelerated by means of deployable members (17, 18) adapted for this purpose.

10 6. Method according to Claims 1 to 3, characterized in that the warhead (2), once it has passed the topmost point of its flight trajectory, is rotated about its main inertia axis to a speed of rotation which has been determined in advance, after which the aircraft-like
15 projectile (4) of the warhead which has made the flight trajectory possible is divided and releases a sub-munition (9) which is provided with its own aerodynamic deceleration members, target seeker, fuse/arming/ignition device etc., and which is of a type known per se and is
20 intended, as it descends with deceleration, rotating about its main inertia axis (15) inclined relative to the direction of action (16) of the active charge and the parallel target seeker, to scan the ground area lying below, is released and is converted to its seeking and
25 action phase.

7. Method according to Claims 1 to 3, characterized in that the warhead (2), once it has passed its topmost trajectory height, activates a target seeker included therein, and members connected therewith, for final phase
30 guidance, in accordance with a known technique, of the warhead, or a sub-munition included in the latter and released from the same, which sub-munition is guided by the target seeker in towards the target indicated by the same.

35 8. Device for carrying out the method in accordance with Claims 1 to 7, consisting of a warhead (2) which is released from a launching vehicle (1) and which is intended to be separated from the same over a target area and thereafter, on the basis of the data which it has



received via an operations unit built into the launching vehicle, independently to hit enemy targets (F) starting from a flight height which lies above the flight trajectory of the launching vehicle, characterized in that in addition to the active charge (14) and associated fuse/arming/ignition function, and its own target seeker (13) for activating the active charge, it also includes a projectile (4) which is provided with aerodynamic aerofoils (5) and which is designed to execute, with the aid only of the kinetic energy which it takes from the launching vehicle (1) after it has left the latter, the flight trajectory which is preferably a looping trajectory and which carries it back to a geographical point near to where it left the launching vehicle, but at a considerably greater height.

9. Device according to Claim 8, characterized in that it includes controllable rudders (6, 7) with associated rudder servo (12) controlled by its own control logics, and also members (8) which, at a predetermined point on the trajectory, after its highest point has been passed, rotate the warhead (2) up to a predetermined speed of rotation and converts it to a diving spin, rotating about its maximum inertia axis (15), but with an angle (α) between the same and the sighting direction of the target seeker included therein, and the parallel direction of action (16) of the active charge.

10. Device according to Claim 9, characterized in that the aerodynamically designed projectile (4) necessary for executing a looping trajectory of the warhead (2), or another pre-programmed flight trajectory, is designed such that it can be divided in the longitudinal direction (19) so that, preferably when it has executed the flight trajectory and has been given the desired rotation, it can release a sub-munition (9) of a type known per se containing an active charge (14), fuse/arming/ignition device, its own target seeker (13), and deployable aerodynamic deceleration surfaces (17, 18).