(Translated from the French)

Technical improvements to submunitions

Transmitted by France

The statistical analyses presented to date to the States Parties to the Convention of 1980 on Certain Conventional Weapons appear to show that cluster weapons (weapons incorporating submunitions) are a major issue in the overall problem of the explosive remnants of war (ERW). It should however be noted that from an operational point of view, they are particularly suited to the neutralisation of ground targets (vehicles, artillery batteries, temporary battlefield supply points, and so on) and are peerless in their efficiency. A state equipped with wide-dispersal cluster weapons which decided to do without them today would be agreeing to a major reduction in the operational capabilities of its armed forces. Dispersed by terrestrial or airborne means, in some cases in large numbers over wide areas, cluster submunitions can however present a significant initial failure rate and are therefore likely to constitute a significant humanitarian risk for civilian populations.

The present paper sets out to explore feasible solutions for technical improvements in submunitions.

I. The technical characteristics of submunitions and humanitarian risk.

Not all categories of submunition present the same level of humanitarian risk. The precise degree of danger is dependent on several factors, which need to be taken into account:

- **the size of the submunitions** : as a general rule, the smaller they are, the more numerous they will be in given cluster projectile volume, the more difficult to detect and identify, the more difficult their reliability will be to ensure, and, as a consequence, the greater the humanitarian risk.

- **the accuracy of the submunitions** : a weapon’s accuracy permits, in principle, a reduction to be made in the total quantity of munitions required to achieve a given level of effectiveness. Accuracy also reduces dispersal by ensuring more precise location and tighter definition of contaminated zones with a view to marking and clearing danger areas.

- **the purpose of the submunitions** : a distinction should be made between precision weapons (bombs incorporating submunitions dropped by aircraft and fitted with an effective guidance system, of which the purpose is the destruction of ground infrastructures such as airport runways) and area weapons. These are intended to cut swathes through enemy troop concentrations by using a large number of submunitions (the term "saturation attack" is also used). These last are the source of the main humanitarian threat.

It will be observed that while submunition size and accuracy are measurable technical parameters, purpose can be determined only on the basis of a set of criteria relating to the design of the weapon

and is more difficult to quantify numerically.

II. Possible ways forward for technical improvements to submunitions.

For a proper understanding of the paragraphs which follow, "reliability rate" is the ratio of the number of munitions which explode, after being armed and fired, to the total number of munitions delivered. Conversely, "initial failure rate" is the ratio of the number of unexploded munitions, after arming and firing, to the total number of munitions delivered.

It is the responsibility of government experts to define and detail the relevant numerical data, taking into account both the technical and operational limitations of the weapons systems and the humanitarian goals pursued.

At the present stage, the following approaches on improvements can be envisioned:

1/ Taking into account the "risk level criteria" set out above, it is therefore recommended that the search for improvement should focus on area-effect submunitions with the following characteristics:

- area (or saturation) weapons carrying a large number of small submunitions. The higher the number of submunitions, the higher, for a given reliability rate, the number of initial failures;

- low-accuracy cluster munitions. The specific characteristics of the launcher, fuze precision and operational constraints should make it possible to define an acceptable level of accuracy for the cluster vector used.

2/ For such submunitions, it would be desirable for the following technical improvements to be achieved:

- attainment of a high reliability rate. This rate, which must be defined for standard use conditions (in terms of terrain, weather conditions, and so on), is intrinsic to each munition type for which a life profile has been determined. Moreover, such a criterion is also dependent on the conditions under which the assembly, production and storage of the munitions have been conducted and monitored. Fo r this reason, it is not easy to verify;

- imposition of the inclusion of self-destruct or self-neutralisation mechanisms. High-accuracy submunitions used on defined targets would be an exception to this principle on operational grounds. This is so because an effective self-destruct system is, in the current state of the art, easier to add to submunitions of large size than to those that are very small. In addition, at first sight, self-destruction may appear more advantageous than self-neutralisation insofar as it definitively eliminates the munition, which ceases to contaminate the area. It does however cause an explosion the collateral effects of which one cannot always be sure, whereas a self-neutralised munition is, in theory, no longer dangerous;

- Use of identification marking (a distinctive colour or emblem for example) for the most dangerous submunitions, in order to make them easily recognisable.

3/ It would be appropriate to introduce a standard for the indication of the presence of submunitions. The most notable goal in this context would be the protection of civilians. For this reason, such indications should not be restricted to certain types of submunition, on the pretext that they present a greater danger. Protocol II of the Convention of 1980 on Certain Conventional Weapons, as amended, offers a working basis which would seem to be suitable for use as an instrument applicable to submunitions (notably, Article 3 – para. 10 and Article 9 – para. 2 – first sub-paragraph).

4/ Conversely, detectability does not offer any substantial improvement as regards the ERW issue. The experience of clearance teams shows that the large quantities of metal debris covering any battlefield distort the indications of detection equipment. Furthermore, in most cases, the submunitions are simply lying on the ground. They do not therefore, in principle, require specific search and detection procedures. The location of submunitions is facilitated by indications of their presence and, where applicable, special markings. Certain submunitions are however designed to penetrate deep into the soil. These are usually large projectiles dropped by aircraft, in a cluster bomb equipped with an effective guidance system, and are intended to destroy infrastructures such as airport runways. They leave visible signs of impact on the ground and are not usually physically accessible to civilians. It would therefore appear that detectability is not a relevant criterion in the context of the search for technical improvements to submunitions.

5/ Lastly, while standards should be defined for the future, it would be appropriate to look at flexible provisions applicable to munitions already in existence, including, in particular, suitably staged dates for withdrawal from service.