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Cluster munitions

PROPOSALS RELATING TO TECHNICAL ASPECTS OF CLUSTER WEAPONS

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I. INTRODUCTION

1. Because weapons of war are generally lethal in nature, their use can pose risks to civilians. The extent of such risks depends on a number of factors, in particular their conditions of use and the intrinsic technical characteristics of the weapons in question.
2. In the case of cluster weapons, there is no doubt that some such weapons raise serious humanitarian problems. Such problems are of different kinds and have various causes. **During a conflict**, the danger comes from fire that may hit civilians. **After a conflict**, the fact that unstable explosive remnants of war (ERW) remain dangerous in very large numbers leads to humanitarian tragedy.
3. It is the responsibility of States to identify preventive techniques to reduce the hazard for civilians. Such solutions involve improving discrimination and accuracy while increasing the weapon system's reliability and reducing the sensitivity of the submunitions.
4. Such solutions, which depend on technological progress, constitute a response to the problem of humanitarian risk. But they cannot be the sole response. They must be incorporated in an overall preventive approach, along with other solutions involving the implementation of international humanitarian law and the drafting of doctrines for the responsible use of such weaponry.

II. TECHNICAL ASPECTS DURING A CONFLICT

5. During a conflict, the problem basically stems from the fact that submunitions can be dropped in very large numbers over extensive areas, which may include areas where civilians live or are otherwise to be found. At this stage, the weapon's firing accuracy and discrimination

are decisive. The more accurate the fire on the military target, the less likely civilians will be affected. The greater the capacity to discriminate between civilian objects and military targets, the better civilians will be protected. Numerous factors have an influence on discrimination and accuracy.

Discrimination

6. In the first place, it is clear that technical devices can significantly enhance the ability to discriminate and greatly reduce the risk of collateral damage to civilians. France is therefore staunchly committed to improving such technology.

7. However, it is unrealistic to hope for weapons which are capable of systematically discriminating between military targets and civilian objects, even though, as technology advances, the use of certain technical devices may make it possible to significantly enhance the level of discrimination.

8. In the final analysis, the ability to discriminate will remain a human responsibility, which cannot be entirely dependent on technology.

9. The result produced by firing a weapon depends on the choice of target. It is for those who select the target to apply humanitarian law and the rules of engagement. They must be able to determine whether the choice of target is in keeping with the principle of discrimination, and whether the use of a given weapon is in conformity with the principle of proportionality and the principle of humanity.

Accuracy

10. Once the target has been selected, accuracy becomes the main issue. It is then crucial to locate the target, and thus in practical terms to determine its geographical coordinates while avoiding the numerous difficulties related to target fixing. Here too, the technological advances of recent years offer affordable technical solutions that can greatly reduce fixing errors.

11. The next step is to activate weapons systems which are composed of complex arrays of equipment and munitions. At this stage, a number of elements that directly influence the accuracy of the impact must be taken into consideration:

- (i) The collection and measurement of physical parameters is critical for the munition's trajectory to be calculated accurately and the point of impact to be determined as precisely as possible. This requires a good knowledge of the launcher's kinematics and of the various environmental conditions (humidity, wind speed and direction, temperature, etc.) as they vary in the four dimensions (altitude, latitude, longitude and time);
- (ii) The launch parameters must then be precisely calculated on the basis of the above elements, using reliable mathematical models incorporated into the software and processors;

- (iii) The technical characteristics of the munition itself, in particular its quality, must also be taken into consideration. This includes:
- The quality of manufacture
 - The age of the munition
 - The munition's sensitivity to transport and storage conditions

As these parameters vary widely from one munition to another, it is very difficult to establish benchmarks.

12. Lastly, on approach to the target, the accuracy of terminal guidance is an important factor. It may be dependent on the carrier projectile or on the submunition, and may rely on a wide variety of passive sensors (infrared, laser, satellite-based positioning, inertial guidance, optical or radar reconnaissance, etc.) or active sensors (radar) which may be linked with trajectory guidance mechanisms.

13. Accuracy also makes it possible to know with certainty the areas of coverage, and thus to improve the efficiency and effectiveness of post-conflict ERW clean-up operations.

14. Technological progress in the past 15 years has produced appropriate, reliable and affordable solutions which can drastically reduce identification and accuracy errors, and thus significantly lessen the risk of collateral damage associated with the use of weapons in general, and cluster weapons in particular.

III. POST-CONFLICT TECHNICAL ASPECTS

15. Averting hazards faced by civilians in post-conflict situations is the other aspect of the preventive approach to humanitarian problems raised by certain cluster weapons. At the technical level, the improvements are aimed at increasing the reliability of cluster weapons and making unexploded submunitions safer to handle.

Reliability

16. During a conflict, reliability has to do with the military effectiveness of a munition. But once a conflict is over, the reliability of cluster weapons is directly related to the emergence of ERW which may affect civilians.

17. Reliability depends on the firing system and the presence or absence of self-destruction, self-neutralization or self-deactivation mechanisms. In predetermined conditions reliability may be quantifiable, but such conditions will never correspond wholly to those prevailing in actual use. Here too, the human factor is decisive. Any munition or cluster weapon that is poorly prepared prior to firing, or used outside its intended scope of action, has little chance of being reliable.

18. Nonetheless, there is no disputing that the addition of self-destruction mechanisms to submunitions has made it possible to significantly reduce the generation of ERW and the resulting humanitarian impact.

19. In technical terms, reliability can be further improved by using electronic instead of mechanical firing devices. All electronic devices can be factory-tested, and what is more, a self-deactivation device can be incorporated in the munition.

20. Such factors have resulted in undeniable progress.

Sensitivity

21. The post-conflict humanitarian impact is also dependent on the **sensitivity** of the submunitions that become ERW. The threshold required to explode an ERW when a person is present, nearby or in contact with it is a very important characteristic. It is directly related to reliability, as it depends on the firing and self-destruction mechanisms. This too is a possible way forward that is worth exploring in order to minimize the risk of explosion during accidental handling.

Attractiveness

22. Though it is true that this problem is not unique per se to cluster weapons, the fact that some submunitions have a particularly intriguing aspect because of their small size and light weight makes them additionally hazardous to civilians, in particular children.

IV. CONCLUSIONS

23. In conclusion, the humanitarian risks posed by the use of certain cluster weapons can be significantly reduced through technology, both when cluster weapons are used and in the post-conflict phase.

24. As emphasized above, such solutions are not in themselves sufficient. The human factor will always be crucial in this problem, and the full implementation of international humanitarian law is vital.

25. However, all else being equal, technology offers approaches that make it possible to prevent senseless civilian tragedies. Such approaches must not be ignored, especially as technical solutions already exist. They make it possible to improve discrimination and accuracy when cluster weapons are used, and also enhance the reliability of the submunitions and reduce their sensitivity, thus curtailing the generation of ERW and the risk of accidental explosion.

26. Even if from this point of view certain technical solutions are not unique to cluster weapons, their application to the particular case of such weapons, especially the most dangerous among them, is all the more imperative because of the specific risks that they involve.
