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Cluster Bombs: the Case for New Controls

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Executive Summary

Cluster Weapons consist of a large number of sub-munitions ("bomblets") which are dispensed from a metal canister in mid-air and then disperse over a distance of several hundred metres. They are inherently indiscriminate since, once dispensed, the bomblets are un-guided and a threat to military and civilians alike. Bomblets are designed to knock out armoured vehicles but can also kill people to a radius of 30-40 metres.

In field conditions ten percent or more of bomblets fail to explode on impact. Of these a high proportion remain "live" and are liable to go off if touched. In this condition they are "victim activated" and have much the same effect as anti-personnel mines (APM). Clearance of unexploded bomblets is among the most hazardous and expensive of ordnance disposal tasks.

At the end of the air campaign in Kosovo, about 29,000 of the cluster bomblets dropped by NATO had failed to explode on impact and remain a permanent hazard. The International Committee of the Red Cross reported that in the year to May 2000, 151 people had been injured by bomblets, 50 of them fatally.

The global humanitarian hazard of unexploded bomblets has, however, been limited relative to that of APMs (with the historic exception of Laos). This is because cluster munitions are weapons of the major powers and do not lend themselves to widespread use by poor countries, by insurgent forces or guerrillas.

It cannot be claimed, as it was for APM, that the use of cluster bombs is of small military value although the record is mixed. In the Gulf War these munitions were seen to be highly effective in destroying tanks, guns, missiles and strategic installations. But in Kosovo the damage that cluster bombs inflicted on Serb forces in the field was minimal.

After Kosovo, the British Ministry of Defence concluded that "cluster bombs are effective weapons against area targets

such as a group of soft-skinned military vehicles. [But...] it would have been useful to have a capability to strike single vehicles more accurately".¹ In future, the UK will deploy precision-guided missiles for this purpose.

The relevant instrument in international law is the 1997 First Additional Protocol to the Geneva Conventions of 1949 applicable to international armed conflict. This protocol sets out to define what is a military objective and what is permissible by way of "collateral damage". This outlaws indiscriminate attacks, including attacks which may be expected to cause death or damage to civilians or their property which would be excessive in relation to the concrete and direct military advantage anticipated. It should, however, be possible, by the scrupulous choice of targets and care taken in delivery, to ensure that this criterion of proportionality is met. One cannot therefore rule cluster weapons illegitimate *a priori* under the current Geneva Convention.

The use of cluster bombs could nevertheless be regulated by bringing these weapons under the terms of the 1996 Amended Protocol II to the 1981 Weaponry Convention, (this covered remotely-delivered APM before the Ottawa Convention and will be reviewed in a conference in autumn 2001). The Belgian Presidency should support this amendment which would, *inter alia*:

- prohibit the use of cluster bombs against military objectives in populated areas;
- establish responsibility for the clearance of all unexploded bomblets with those who have used them;
- require that all cluster bomblets be fitted with mechanisms to ensure their self-destruction if the device fails to explode on impact;
- require that the use of these munitions be recorded and advance warning be given; and
- support the long-term goal of banning all cluster weapons by requiring the consideration of military alternatives.

¹ UK Ministry of Defence, Kosovo: Lessons from the Crisis, Cm 4724, June 2000, available at <http://www.kosovo.mod.uk/lessons/>

1. The nature of cluster bombs

A description of cluster bombs is provided in Annex A. The salient points are:

1. cluster bombs are area weapons and inherently indiscriminate;²
2. in field conditions, not less than 10 per cent of bomblets fail to explode on impact;
3. unexploded bomblets have very much the same effects as Anti Personnel Mines (APM).

To expand this last point, the bomblets are prone to go off when handled or even touched, and are thus "victim activated" (the key distinguisher of APM). The resulting wounds, if not fatal, can be just as disabling and difficult to treat medically as those caused by APM. The bomblets remain a hazard indefinitely, in some cases making economically important tracts of land inaccessible. And clearance of bomblets is even more difficult, hazardous, slow and expensive than the clearance of APM.

However, there are important ways, both in principle and practice, where cluster bomblets differ from APM. First, they become a hazard only when they fail to operate as designed (i.e. fail to explode on impact). Unfortunately, as detailed below, failure rates in the field can be as high as 25 per cent. And although a significant number of those bomblets which fail to detonate may in fact be quite safe to handle, there is no way to tell by visual inspection – thus all must be treated as potentially lethal.

Second, and much more importantly, cluster munitions are weapons of the major powers and with the development of new, more complex and costly versions, they are becoming more exclusive. Hence, they do not lend themselves to widespread use by poor countries, by insurgent forces or guerrillas. So, while the numbers used in particular campaigns is large (one expert survey after the Gulf War of 1991 concluded that between 300,000 and 500,000 unexploded bomblets remained at the end of hostilities) these are small in comparison with the estimates of APM remaining around the world.

No incidence of unexploded bomblets compares with the problems caused by APM, for example, in Angola, Cambodia, Afghanistan or the Congo. A careful analysis of post-conflict casualties in Afghanistan, the Falklands, the Gulf War, and Bosnia-Herzegovina has shown that the great majority of such casualties were caused by mines and booby-traps rather than bomblets.

Only in Laos have bomblets proved the greater hazard. Between 1964 and 1973 the US dropped 6-7 million bombs and an unknown but huge number of bomblets from 17 different types of cluster bomb. Their failure rate was above 25 per cent and it is estimated that to this day some 9 million bomblets remain unexploded. By the end of 1996 well over 10,000 people had become casualties – mostly to bomblets – of which nearly 2,500 became amputees. One third of the casualties were children. The problem in that country shows little sign of improving.

The particular circumstances of the war in Kosovo in 1999 are analysed in Annex B. Paragraph 13 shows that post-war casualties there have owed almost as much to bomblets as to APM.

Thirdly, it is important to note that bomblets can also be dispensed by a number of sophisticated land-based weapon systems: artillery and rockets (see Annex A, paragraph 9). Logically, it follows that any restrictions placed on cluster bombs should apply equally to land-based systems.

² This is not to say that they cannot be used in a discriminate manner – simply that once dispensed the bomblets are unguided and a threat to military and civilians alike.

Finally, in the particular circumstances of the Gulf War these munitions were highly effective. A substantial number of tanks, guns, missiles and strategic installations were destroyed and Iraqi soldiers demoralised by what they described as "steel rain".

2. Defining an inhumane weapon

The St Petersburg International Military Convention of 1868 took the first step towards qualitative arms control when it declared that "the necessities of war ought to yield to the requirements of humanity". It also decreed that states should forgo the types of weapons "which uselessly aggravate the sufferings of disabled men or render their death inevitable". The aim was to seek agreement on technical limits beyond which weapons would be deemed to produce more suffering than was necessary to render personnel *hors de combat*. The Brussels Conference (1874) reinforced this point: "The laws of war do not recognise in belligerents an unlimited power in the adoption of means of injuring the enemy". It also declared as especially forbidden the use of poison or poisoned weapons, as did the Hague Regulations of 1899 and 1907.

This latter point was picked up at the Geneva Conference (1925) and converted into a protocol forbidding the use in war of poison gas and bacteriological methods of warfare. Later, these were dealt with more comprehensively in the 1972 Biological and Toxin Weapons Convention (BTWC) and the 1993 Chemical Weapons Convention (CWC). More than two thirds of UN member states are parties to the BTWC and a similar number have signed the CWC.

In 1995-6 an attempt to obtain a ruling from the International Court of Justice outlawing the use of nuclear weapons led to an inconclusive result. Despite this setback great progress has been made in the past century towards an international consensus that the use of "Weapons of Mass Destruction" is inadmissible.

A parallel process has been under way towards banning conventional weapons regarded as especially inhumane. In brief, explosive bullets were outlawed in 1868, expanding bullets ("dum-dums") in 1899, and weapons dispensing fragments un-detectable by X-rays in 1981. The same (1981) "Weaponry Convention" set strict limits on the use of mines and incendiary weapons in order to protect civilians, and in 1995 laser-blinding weapons were prohibited. The 1997 Ottawa Convention prohibited the use, stockpiling, production or transfer of anti-personnel landmines (APM) in all circumstances. Over one hundred states have already ratified this convention.

3. Time to bring cluster bombs under international jurisdiction?

Since unexploded bomblets from cluster bombs or land-based systems are largely indistinguishable in their effects from APM there is a logical case for bringing them under similar control. Impetus for the convention banning APM derived largely from recognition of the large scale and more or less permanent impact of these weapons against civilians, the huge numbers of mines and areas of land involved, the slow rate of clearance and the horrifying nature of the injuries inflicted. But an important part of the argument was also that APM were currently less militarily effective than had hitherto been supposed.

Since APM (like cluster bombs) had long formed part of military inventories, had been bought in large quantities and had become entrenched in the military doctrine of almost all countries, this was a difficult argument to sustain. While it is probably true to say that no military authorities were completely convinced that APM had lost their military utility, these arguments had sufficient weight with many military men and other sectors of informed opinion to form an important ingredient in the final decision. To what extent does the same argument apply to cluster weapons?

Appendix B analyses the use and usefulness of cluster bombs in the war in Kosovo 1999.

Their principal target was the Serb armed forces in the field and the comparative ineffectiveness of such attacks is well attested. They can in no sense have influenced the outcome of the campaign. Annex C examines the alternatives to cluster bombs available to the British armed forces and notes that procurement decisions have already been taken to ensure that much more effective means of attack become available to the Royal Air Force.

4. The position in International Law

The relevant instrument is the 1977 First Additional Protocol to the Geneva Conventions of 1949 (the "1977 Protocol") applicable to international armed conflict. The Protocol sets out to define what is a military objective and what is permissible by way of "collateral damage". Indiscriminate attacks – i.e. attacks which are not directed at a specific military objective, or which use weapons that cannot be so limited and are consequently of a nature to strike military objectives or civilians or civilian objects without distinction – are prohibited (Article 51.4).

Collateral damage (that is damage to civilians resulting from an attack on military targets) is allowed so long as the attack is not indiscriminate. As a further illustration of an indiscriminate attack the Protocol specifies "an attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated" (Article 51.5).

NATO has repeatedly stressed that each individual bombing action in the Kosovo campaign was subject to scrutiny by Law Officers to ensure its legality. Other independent legal authorities think the Law Officers were too permissive. Thus, Professor Christine Chinkin of the University of Michigan Law School, in a written memorandum to the British Foreign Affairs Select Committee (Spring 2000), thought it "arguable that the form of combat, high aerial bombing and the use of cluster bombs, [was] contrary to the basic principles of humanitarian law". Professor Ian Brownlie and Mark Littman (both eminent counsel) thought that NATO's actions were incompatible with the 1977 Protocol. The British House of Commons Defence Committee reporting in October 2000 (HC 347-1) commented as follows: "At the very least, the reputation (of cluster bombs) as an indiscriminate weapon risks international condemnation, undermining popular support for an action. The UK needs a more discriminatory anti-armour system in order to move to an early end to reliance upon recourse to these weapons in inappropriate circumstances. It is clear that for air-to-ground attack, and even for just an anti-armour capability, a mix of weapons is required which the UK does not currently possess".

The general case has been addressed in an ISIS Briefing Paper³ and will not be discussed further here. The immediate question at issue is whether cluster weapons are such that their effects cannot be limited as the Protocol requires. Once dispensed, bomblets are essentially in free fall; they cannot possibly distinguish between military and civilian objectives. Nor is any discrimination possible once they have landed and failed to explode. It should, however, be possible, by the scrupulous choice of targets and care taken in delivery, to ensure that the criterion of proportionality in Article 51.5 is met. If this is true one cannot rule cluster weapons illegitimate *a priori* under the terms of Article 51.4.

³ Beach, H., and Isbister, R., *Old wine, new bottle: the Just War tradition and humanitarian intervention*, ISIS Briefing on Humanitarian Intervention, No.3, October 2000.

5. Proposals by the International Committee of the Red Cross (ICRC)

The ICRC has recently published two studies on this subject.⁴ Their recommendations regarding cluster weapons included the following, which they would like to see incorporated in a new Protocol to the 1981 Weaponry Convention entitled "Explosive Remnants of War":

1. the use of cluster bombs and other types of sub-munitions against military objectives in populated areas should be prohibited, as is currently the case with incendiary weapons under Protocol III of the [Inhumane Weapons Convention];
2. responsibility for the clearance of all unexploded ordnance should be assigned to those who have used them;
3. all necessary technical information should be made available to the UN and de-mining bodies immediately after the end of hostilities;
4. warning of the threat posed by explosive "remnants of war" should be provided to the civilian population immediately (i.e. after the war);
5. cluster bomblets and other sub-munitions should be fitted with mechanisms which will ensure their self-destruction immediately if the device fails to explode on impact; and
6. use of cluster bomblets etc. should be suspended until an international agreement on their use and clearance has been achieved.

These proposals seem eminently sensible and the following proposes only to supplement and amend them.

6. Further proposals

Rather than seeking a new Protocol to the 1981 Weaponry Convention as suggested above, it might be both more logical and simpler to treat cluster weapons in the same way as remotely-delivered APM (as explained above, unexploded cluster bomblets have similar effects). This would mean bringing them under the terms of Amended Protocol II (of May 1996) to the 1981 Weaponry Convention.

The Amended Protocol II recapitulates the general provisions governing indiscriminate use and collateral damage contained in the 1977 Protocol (see section on International Law above). This would look after point 1 of the ICRC list. It picks up specifically points 2, 3 and 5 of that list. It requires all feasible precautions to be taken to protect civilians from the effects of [these] weapons including consideration of short- and long-term effects and the feasibility of using alternatives. And in Article 6, dealing with remotely deliverable munitions, it makes two stipulations not provided for in the ICRC proposal:

1. Use of the munitions must be recorded. This means recording the location and area where the munitions were used, the total number and type, the date and time of use and the self-destruction time periods; and
2. Effective advance warning shall be given of any delivery or dropping of [sub-munitions] which may affect the civilian population, unless circumstances do not permit.

The first of these points should cause no difficulty if each individual use of cluster weapons is considered beforehand with as much care for legality as the authorities claim. The second – which has a let-out clause – might cause more difficulty if such advance warning were thought to place the lives of pilots at unnecessary risk, although it need not disclose the route or exact timing of any sortie.

⁴ The first, by Colin King, who consults on explosive ordnance disposal for the British MoD, the US Department of Defence (DoD) and the European Joint Research centre (JRC) is entitled 'Explosive Remnants of War: A Study of Submunitions and other Unexploded Ordnance'. The second, by Stuart Maslen, a consultant and former adviser to the ICRC is entitled 'Explosive Remnants of War: Cluster bombs and Landmines in Kosovo'. Both were published by the Mines-Arms unit of the ICRC in August 2000.

This leaves open point 6 of the ICRC list, namely a ban on all use "until an international agreement on their use and clearance has been achieved". The difficulty with this suggestion is that negotiations for an (albeit temporary) ban might be more difficult and time consuming than for the international agreement on use and clearance proposed here. A Review Conference on the 1981 Weaponry Convention is due to take place in the autumn of 2001. Amended Protocol II already applies to mines, booby traps and "other devices". All that is needed under this proposal is to bring cluster weapons (whether delivered by air, artillery round, surface-to-surface rocket or whatever) within the scope of the Protocol. The necessary additional definition should be simple to draft and consequential amendments minimal.

Some people would wish to go further and to negotiate a convention banning cluster weapons in the same way as all use of APM has now been outlawed. While accepting this as a desirable long-term goal the time is not yet ripe. As explained above, with the one exception of Laos, no country has suffered from unexploded bomblets on anything approaching the scale of long-term damage from APM. They are not available to third-world warlords, militias, terrorists or insurrectionary forces in the same way. Consequently they pose a much lesser threat on a global scale and it will be difficult at present to raise the popular emotional head of steam that finally forced the APM issue.

Secondly it cannot be claimed, as it was for APM, that their use in present circumstances is of small military value. As explained above they were of devastating effect in the Gulf War. Their meagre effect in Kosovo does not necessarily mean that they would show equally poor results in any future conflict. Finally, as explained in Annex C, alternative means of attacking armour from the air or by long-range rockets are in the pipeline but not yet ready and proven. When these are available the case for seeking a ban on all cluster weapons may be more compelling.

7. Conclusion

While claims that cluster weapons are the "same" as APM do not bear scrutiny, the similarities, especially regarding their inherently indiscriminate nature and their post-conflict implications, are such that a case can be made for an outright ban. However, given their military utility and the fact that the scale of their use to date has been limited (relative to that of APM), pursuing an immediate ban is inappropriate. The better course, for the moment, is to regulate their use by including cluster weapons in the munitions covered by the 1996 Amended Protocol II to the 1981 Weaponry Convention. The Belgian Presidency should raise this issue at the review conference to the 1981 Weaponry Convention this autumn and help foster European support for the recommendations either of the ICRC or of this paper.

ANNEX A. DEFINITIONS AND TECHNICAL DATA

1. A cluster bomb is a metal canister dropped from an aircraft. At a pre-set altitude or after a specific time delay the canister opens and ejects dozens or hundreds of sub-munitions. These may consist of minelets or bomblets. Minelets, which fall to the ground and are designed to be activated by their victims, are covered by the existing convention outlawing anti-personnel mines so are not considered further. Smart sub-munitions, designed for autonomous homing against particular targets, are mentioned only in the context of alternative weapon systems (Annex C). The term cluster bomb is here confined to air-delivered weapons dispensing dumb bomblets without guidance or propulsion systems.

2. Bomblets, once dispensed, fall towards the ground by gravity. They are stabilised in descent by parachute, air-brake, fins, or ribbon (all deployed after ejection from the canister) or by spin conferred by the shape of the bomblet. The practical effects are identical: to slow the descent and ensure that bomblets hit the ground nose-first. Bomblets (as opposed to minelets) are fused to explode on landing. They are normally designed to attack armoured targets (including tanks) by direct impact using a shaped charge in the nose, and simultaneously to attack non-armoured targets (including troops) by means of thousands of pre-formed fragments scattered over a wide radius. They can also have an incendiary effect.

3. For example the British cluster bomb known as *BL-755* was developed in the 1960s and manufactured by Hunting Engineering. It has been sold to eight NATO countries and nine others. *BL-755* deploys 147 bomblets, each with a fragmenting steel body and a copper-lined conical shaped charge in the nose. The bomblet body consists of a coiled casing that shatters into some 2000 pre-formed fragments, able to kill people over a radius of 30-40 metres.

4. Once deployed the bomblets disperse. The higher the altitude on launch the larger the area affected is likely to be but it is generally several hundred metres long.

5. Not all bomblets detonate on landing. Some are dropped from too low a height and the fuses fail to arm. Some parachutes get caught in trees before the bomblets strike the ground. Soft ground, vegetation or camouflage material can prevent the fuse from detonating since it is designed to function on impact with hard material. And bomblets, particularly high-technology variants, can fail to arm properly after being dispensed due to technical malfunction.

6. Where technical malfunction is concerned the US Army acceptance tests for new ammunition define a "low" failure rate as meaning that between 1-2.5 per cent of munitions do not function as intended; a failure rate of 2.5-5 per cent is considered "acceptable", while 5-10 per cent is "high". But failure rates in action are often substantially higher. In the field it is not unusual for estimated sub-munition failure rates to exceed 25 per cent.

7. None of the cluster bomblets in current use are known to incorporate self-destruct mechanisms. It follows that unexploded bomblets constitute a hazard of indefinite duration. Some may explode spontaneously if disturbed by natural causes, e.g. parachutes caught by the wind. Intentional tampering is one of the most widespread causes of death and injury from cluster bomblets. This may be done in ignorance, despite the best efforts of mine-awareness programmes in affected areas. Bomblets are often painted in bright colours, have intriguing shapes, and are particularly attractive as playthings to children. Ill-advised attempts to dispose of bomblets by hand are another frequent cause of death and injury to civilians who may be desperate to clear areas vital to their livelihoods.

8. It is widely agreed that the clearance of cluster bomblets is among the most hazardous of explosive ordnance disposal (EOD) tasks. The reasons include: the fusing system is very sensitive, even to changes in the weather; bomblets are too unstable to defuse – they must always be blown up *in situ*; mine-clearing machines cannot be used since the shaped charges in the munitions may destroy them; dogs cannot be used because if their noses touch a bomblet it may detonate and kill them; standard mine detectors are dangerous to use since

their emitted electromagnetic pulse can set off the munition; and bomblets can penetrate into the soil by as much as 50 cm. EOD operatives must then locate each bomblet, excavate alongside without touching and then lay a detonating charge. Hence the task is always dangerous, time consuming and expensive.

9. Finally, it is important to note that bomblets can equally be dispensed by land-based weapon systems: artillery and rockets. A well known example is the American Multiple Launch Rocket System (MLRS) which has been sold to nine European countries of NATO to a total of some 372 systems. MLRS fires 22.7 cm. *M26* ballistic rockets with a range of up to 30 miles. They can be fitted with various forms of warhead including carrier warheads dispensing large numbers of *M77* Dual Purpose Improved Conventional Munitions (DPICM). These bomblets contain 30 g. of explosive and are stabilised by a looped ribbon. An MLRS launcher carries 12 *M26* rockets armed with 644 *M77* DPICM (a total of 7728 bomblets per salvo). They were first used in the Gulf War of 1991. Variants of this design have been manufactured by many countries, including Yugoslavia.

ANNEX B. USE OF CLUSTER BOMBS BY NATO ALLIES IN KOSOVO

Air Operations

1. The air campaign was conducted on two axes: against strategic targets regarded as of high strategic value and against tactical targets in and around Kosovo. As regards the former, NATO claims to have attacked 440 static targets and to have inflicted moderate to severe damage on more than three-quarters of them. These facilities would have been easy to inspect after the war was over so there is no reason to doubt the substantial accuracy of these figures. Since their exact locations were presumably known before they were struck, logically, targets of this kind would be attacked by precision munitions, – in fact bridges are almost impossible to knock out in any other way. And since many such targets were in civilian occupied areas there would be a strong presumption against any use of cluster bombs.

Use of Cluster Bombs

2. NATO is reported to have used almost 1,400 cluster bombs in the campaign, beginning in early April. Of this total over 60 per cent were delivered by the US. It seems likely that cluster bombs were used mainly against mobile targets in Kosovo. Thus in a written answer to a Parliamentary Question on 18 May 1999 the British Ministry of Defence said: “[Cluster bombs are] particularly effective against Serb forces deployed in the field in Kosovo, and targets have included main battle tanks, armoured personnel carriers, other military vehicles, artillery, field headquarters and troop concentrations. [This weapon] is not designed as a runway-cratering weapon, and has not been used to attack runways, nor is it designed to impede damage repair”.

3. The comparative ineffectiveness of the attacks on Serbian forces in the field is well-attested, although NATO has been reluctant to acknowledge it. On 16 September 1999 General Wesley Clark, Supreme Allied Commander Europe (SACEUR), published figures suggesting that the air campaign had destroyed almost 1,000 pieces of military equipment. A closer examination of his reasoning, however, shows that the true figures may be rather smaller. In the case of tanks (the only category for which a full breakdown was shown) out of 93 claimed strikes only 26 could be substantiated by on-site inspection after the war. If we allow even 50 per cent of these inferred strikes as valid (which seems generous) this reduces the tank total to 60. Applying a similar factor to the other categories of equipment we arrive at the following speculative totals for items put out of action:

Tanks	60
Armoured personnel carriers	100
Other military vehicles	210
Artillery and mortars	360
Total	730

4. There are a number of points to be made in explanation of these figures. First the targets were well dispersed under cover in thick country, camouflaged and therefore very difficult to detect. Secondly, the NATO authorities had decided that sorties should be flown at medium altitude (above 5,000 metres) to minimise the risk of casualties, whereas munitions of this kind are best adapted for delivery at much lower level – a skill to which the RAF has long given special attention. Thirdly the weather was assessed as "unfavourable" on 57 of the 78 days of the campaign, causing many sorties to be aborted. Finally the rules of engagement rightly required every care to be taken to avoid "collateral" civilian casualties.

Human casualties of the war

5. NATO claimed in June 1999 to have inflicted 5,000 to 10,000 military casualties on Serb forces during the war. The Yugoslav authorities countered by claiming that 476 soldiers were killed. The first figure can only have been guesswork. The second is probably

understated, it being part of President Milosevic's strategy at that stage to claim that the Serb military had not been defeated in the field. The exact figure will probably never be known. Nor is it of primary importance to the argument in this paper. A figure of 1,000 killed would be a reasonable inference.

6. The number of civilian casualties caused by the bombing is much more germane and also much better substantiated. The post-conflict casualty reports of the Yugoslav government varied, but all agreed in estimating the death toll of at least some 1,200 and as many as 5,000 civilians. US officials, on the other hand, testified before Congress that there were only twenty to thirty incidents of "collateral damage" during the war.

7. Both these figures are belied by the findings of a painstaking and comprehensive bomb-damage assessment mission carried out by Human Rights Watch in August 1999. They found that there had been 90 separate incidents involving civilian deaths during the campaign and that between 488 and 527 civilians were killed as a result. The team determined the intended target in 62 of the incidents. Military installations accounted for much the greatest number but nine incidents were caused by attacks on civilian targets believed by Human Rights Watch to be illegitimate. A third of incidents occurred as a result of attacks on densely populated areas, although in Belgrade at least only precision-guided weapons were used. Almost half resulted from attacks during daylight hours.

8. Of the 90 incidents, 32 occurred in Kosovo, the majority on mobile targets or military forces in the field. These were more deadly, accounting for more than half the deaths. The team was able to determine the weapon used in only 28 of the incidents. In 21 of these precision-guided munitions had been used. Cluster bombs were positively identified in only seven incidents (another five being possible but unconfirmed) and the team assessed that some 90-150 civilians died from the use of these weapons.

9. By way of a general comparison, although it has no relevance to the argument in this paper, the number of Albanians reported missing during the Serbian expulsion campaign and believed dead was given as 11,334 by the International Criminal Tribunal for former Yugoslavia in November 1999. Other widely different figures have been given – none of course by the Yugoslav authorities. The true figure can never be known.

Post-war casualties

10. NATO itself is reported to have estimated that 10 per cent of bomblets from cluster bombs dropped during the campaign did not go off. So, of some 290,000 bomblets dropped, roughly 29,000 remained as a permanent hazard. In fact, reports from expert mine-clearing parties working in Kosovo suggest a slightly higher figure. Yet by the end of May 2000 only some 4,070 unexploded bomblets had been cleared under UN auspices.

11. A document published by the ICRC reports that a total of 492 people had been injured by the "remnants of war" in the year ending May 2000. Of these 176 were caused by APM and 151 by cluster bomblets. Of the latter casualties 50 had been fatal. There are a number of fields, forests and vineyards in Kosovo which as of December 2000 were still unsafe due to contamination by cluster bomblets.

ANNEX C. ALTERNATIVES TO CLUSTER BOMBS: THE BRITISH CASE

1. The *BL-755* has been in service with the RAF since 1972. By 1991 the Ministry of Defence (MoD) acknowledged that the bomb was no longer credible against modern main battle tanks (MBTs). Despite attempts to improve its performance, counter-measures such as explosive reactive armour have reduced its effectiveness by a further factor of four. British Government spokesmen offered a variety of explanations for the usefulness of cluster bombs. Mr. Robin Cook, Secretary of State for Foreign Affairs, speaking to the House of Commons Select Committee on Foreign Affairs in April 1999 said that the UK was not using anti-personnel cluster bombs.

"There is a use of cluster bombs but in this context what the term refers to are anti-tank cluster weapons. Each of the clusters in them are designed to penetrate heavy armour. If your target is a collection of a number of tanks it makes sense to use a weapon that can disable a number of tanks and not just one of them."

2. The Official MoD report "Kosovo: Lessons from the Crisis" (Cm 4742), published in June 2000, presented a rather different slant:

"Cluster bombs are an effective weapon against area targets such as a group of soft-skinned military vehicles. Nevertheless we have learned from the Kosovo campaign that it would be useful to have a capability to strike single vehicles more accurately, hence the trial of the *Maverick* missile."

3. The *Maverick* missile referred to is a precision-guided bomb that has been in service with the US Air Force for many years. It is manufactured by Raytheon who, as of September 2000, had produced 65,000 – 14,000 of which had been launched. On 13 September 2000 the Defence Secretary announced the placing of a £42m order for an unspecified number of *Maverick* AGM-65G2 missiles with their training and support systems. They are due to be operational on the RAF *Harrier* GR7 fleet in February 2001. In making the announcement he said that this would help "to limit the risk of civilian casualties". The reason is that the *Maverick* missile, relying on electro-optical or infra-red guidance systems, requires the pilot to lock on to a particular target before launch. The MoD now envisage *Maverick* filling a capability for attacking solitary armoured targets where there is a high risk of "collateral damage" and therefore restrictive rules of engagement.

4. The planned replacement for *BL-755* is *Brimstone*. This is a stand-off anti-tank guided missile with a range of 8km intended for use by *Eurofighter*. Each missile has its own autonomous target-seeking radar and "programmable intelligence", hence it does not need continuous guidance from its launching aircraft. Its radar guidance system makes the missile considerably more effective than *Maverick* whenever the target is obscured by cloud, fog or heavy rain. The MoD's operational analysis has indicated that *Brimstone* would be 20 times more effective against MBTs equipped with modern countermeasures than *BL-755*.

5. The MoD now expects this missile to enter service in October 2001, ten years later than planned when the programme was launched in 1982. The delay was mainly caused by the MoD itself, including a five-year pause while the implications of the post-Cold War "Options for Change" defence review and the lessons of the 1991 Gulf War were assimilated. In July the MoD reduced its purchase of *Brimstone*, perhaps by as much as 25 per cent. Hopefully, this will be offset by the purchase of more advanced systems including those using Global Positioning Satellite technology, procurement of which is also scheduled to start in 2001.

6. Once *Maverick* and *Brimstone* are in service the MoD sees continuing use for Cluster Bombs for use "against a concentration of lighter armoured vehicles and area targets such as surface-to-air missile sites and logistic storage depots". (Dr. Moonie, Written Answer, 23 January 2001, 'Hansard' Column 538W).

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