SENSOR-FUZED SUBMUNITIONS & CLEAN BATTLEFIELDS

EXAMINING THE FACTS

Presentation by

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At the risk of starting this presentation on a controversial point let me begin with a question: Does a definable *genre* of weapons called sensor-fuzed cluster munitions exist? Some of you will be sure of the answer – but you may between you actually have opposite answers – 'yes' and 'no' respectively – and I think that is an indication that there is need for what we could, in the spirit of the conference, call a wider information footprint. Having started with that somewhat contrived question I realise that some of you, perhaps the majority, may actual be wondering *'if something called sensor-fuzed cluster munitions doesn't exist what have all those powerpoint presentations been about?"* and that is a fair question; let me explain.

Even I, with my jaundiced view of the weapons procurement process, would think it fairly unlikely that my government would expend millions of pounds on a weapon which doesn't exist, but I do not agree that the term 'sensor-fuzed weapons'or SFW refers to a *genre* of weapons which could be said to share sufficient design or impact properties that, for the purpose of the Dublin Treaty, could be considered as a definable and separate group of cluster munitions. I will look briefly at the three in service and production cluster munitions which employ similar sensor technology but then focus on the US-manufactured BLU-108 SFW, designated as the CBU-97/CBU-105 as a container/submunition combination. We are lucky in this regard that the manufacturers of this weapon have been very transparent in their willingness to share information on their weapon with civil society, indeed I must thank them for their assistance during my preparation of this presentation while, in fairness, apologising if they do not concur with my conclusions.

I would first like to revive the questions raised in respect of the German manufactured SMArt 155 artillery-based system in the Austcare/Handicap International paper presented during the Wellington conference and which have not been answered by the champions of that particular weapon. Two of those questions are, in my view, of such relevance that I will put them again now. Those of you who are of a high level of technical expertise please excuse my simplistic terminology, but also understand that you will need to descend to our lesser levels of expertise and grasp of technical vocabulary in order to be convincing;

The SMArt 155 is equipped with three sensors – Passive Infrared and passive and active 94GHz millimetre wave radar – an array designed to acquire targets by analysing a combination of thermal (heat) and shape information. Our questions were:

1. Which of the sensors has primacy in the process of acquiring a target? Or, since that question may be too simplistic, how do the three sensors interact in order to acquire a target?

and

2. The SMArt 155 is designed to acquire a target in a single pass (over the designated target area) – what level of certainty must exist to confirm a target? What level of uncertainty would initiate self-destruct of the submunition or would actively reject a specific target?

These questions could equally apply to the somewhat similar Swedish/French produced BONUS sensor-fuzed submunition, also artillery delivered and incorporating a combination of infrared and laser sensors.

In conversation I have been told that the questions raised in the paper were *'not relevant'* which makes me wonder what would be a *relevant* way of getting the answers to what are clearly important questions. I would argue that the days have gone when these questions could be asked and answered within an exclusive circle of arms industry and military experts and the rest of us simply accept that a weapon is acceptable on the basis of their unquestioned expertise. Those days have gone in respect to cluster munitions because those same *experts* have so consistently got things so completely wrong over a period of more than forty years. How many times would you go back to get your brakes repaired at the garage at the top of the hill which resulted in your crashing into pedestrians at the bottom of the hill? It may seem a tasteless analogy but in respect of cluster munitions It is sadly accurate.

The SMArt155 and the BONUS systems have one other important factor in common – neither have been used in combat. This means we have to take the assurances of manufacturers and those countries who have procured those weapons at face value and on trust and, we assume, following an adequate pre-procurement testing regime. Given the history of cluster munitions and recalling the initial claims made for submunitions such as the BL755, the BLU97B and the M85 we can hardly be blamed for displaying a level of scepticism even when faced with impressive video reconstructions and powerpoint presentations. We have been here before ... and past experience has taught us that the sales talk seems never to prepare us for the battlefield reality.

However, unlike the SMArt155 and the BONUS, the US-manufactured BLU108 sensor-fuzed system was deployed during the invasion of Iraq in 2003 and this places it in a different category.

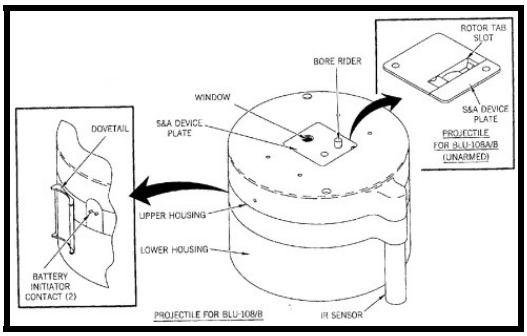
The BLU-108 is configured for deployment from a bomb casing, the SUU-66/B tactical munitions dispenser designated either CBU97 or CBU105 – when equipped with a rather Fred Karno style bolt-on tail-fin kit known as a wind corrected munitions dispenser (WCMD) which makes high-altitude deployment possible. Each bomb contains ten 'posts' each of which incorporates four submunitions – referred to by Textron as *'skeet warheads'*. Thus each carries forty submunitions. After the bomb opens and the posts are deployed they are each brought into the vertical position by a drogue and a main chute and then the submunitions/skeets are extended, two on each side of the post, a rocket motor is then fired and the post begins to spin, imparting spin to the submunitions which are then ejected at the optimum height and each begins a downward search with its sensor array for a target. The submunition consists of an explosively formed projectile (EFP) designed as a top attack weapon against armoured vehicles and a fragmentation ring – chunks of metal; thus providing soft and hard target lethality, to use the rather bland terminology of the arms trade – in less obscure language that means it will stop a main battle tank, destroy ordinary vehicles and kill and maim people. Each submunition contains a side-mounted, dual-mode passive infrared and active laser sensor – a fairly similar mixed sensor array as the SMArt155 and the BONUS.

Each submunition has impressive safety features:

- it cannot arm before it is released from the post.
- the rotation is required to initiate arming.
- If the sensors have not identified a target before the submunition reaches 50 feet (15 metres) above the ground the submunition will self-destruct.
- Regardless of the height initiated self-destruct the submunition will self-destruct 8 seconds after ejection from the post.

- The battery power dissipates 'minutes' after release from the post, neutralising the submunition.

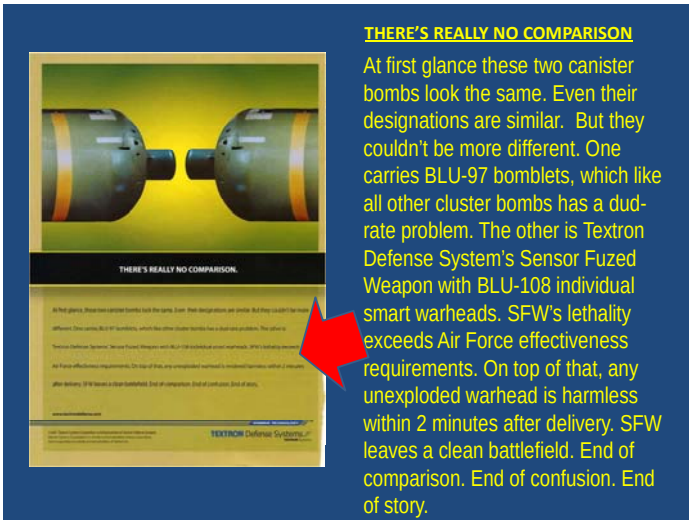
To give you some idea of scale – each submunition/skeet warhead has a diameter of 127mm and is 95mm in height. It weighs a total of 3.4 kilograms of which 945 grams is explosive content. The explosive used is Octol – an insensitive explosive. I understand that each CBU105 has a cost in the region of US$260,000. The search area of each submunition is reported to be 121,000 square metres.



In response to my question put to Textron as to whether they feel there is an identifiable *genre* of weapon which could be grouped under a sensor-fuzed weapon heading, they produced a description of what they would define as a 'sensor-fuzed weapon':

Sensor Fuzed Munitions have unique performance characteristics based on sophisticated subsystems including on-board computers, active and/or passive target detection sensors and software algorithms that detect and engage point targets; while also having self-destruct and self-deactivation features.

Textron have very publicly placed proportionality high on their agenda, or at least that would appear to be so. In discussion with senior representatives of the company in the past few days they expressed the concerns they had when the weapon was classified as CBU97 and went to the extraordinary length of placing an advertisement in the arms trade press pointing out the responsible nature of the BLU108 in comparison with the BLU-97/B which shared the same munitions dispenser. But this was more than simply product protection, Textron made what seemed then, and still seems now, a brave statement *"SFW leaves a clean battlefield"* – after all they would know, because their weapon had been used in battle in April 2003 during Operation Iraq Freedom.



Unfortunately detail to support Textron's brave claim was not too forthcoming. *Defence Industry Daily* has referred to the weapon as 'Cans of Whup Ass' which may mean something to someone somewhere in the United States but is hardly a technical impact evaluation. The somewhat more restrained *Precision Strike Digest* in its September/October issue of 2003 reported the first use of BLU108 as *'a debut with a bang'* and claimed that two weapons (80 submunitions) *' ... decimated, stopped dead, the entire tank column by killing the whole first one-third of it'.* The report went on to quote USAF Lt Col Chris Stockton as saying *"The first thing we heard back from the Marines was, 'Holy (----)'. That is exactly what you want to hear on the radio from the guy you are supporting.".* Stirring stuff certainly, but not munitions effects evaluation quality information. It would be fair to say that the US government has not been effusive in reporting the weapon's battlefield achievements, perhaps for military confidentiality reasons.

The first strike, on April 1st 2003 was close to Baghdad. Later strikes were north of Mosul in the Kurdish area of Iraq. I have found no publicly available records or details of those attacks, although they were probably B52 strikes and definitely in support of US 101st Airborne units. Sometime within the weeks following those attacks a humanitarian demining organisation began to find unexploded BL-108 submunitions in the area. Because they had not encountered the weapon before they requested information from 101st Airborne who 'removed' these submunitions from the area.

One of the technical staff told me, " *When we initially reported the BLU-108 strikes the Screaming Chickens* (sic. Slang for 101 Airborne)*would turn up quickly and remove them from the site. ... After a number of call-outs they became less response ... ".* At that stage the organisation specialists began to deal with the unexploded submunitions themselves. There were approximately thirty distinct strike sites, estimated to be the result of five CBU's (97/105), so a probable total of 200 submunitions.

It can be seen from these photographs that failures have occurred at different times in the deployment cycle.

Picture 1: This is a post, complete with the submunitions visible inside.

Picture 2. This post is visibly damaged, two submunitions remain undeployed.

Picture 3: This picture shows four submunitions adjacent to the post and appear to have been ejected following impact. The chute can be seen at the top of the picture. These could all be a result of the failure of the post rocket to fire.

Picture 4: Shows a post embedded in the ground, submunitions are still in place.

Picture 5: The submunition in this picture, showing clearly the sensor housing, illustrates how easily unexploded BLU108 submunitions could become sub-surface hazards.

Picture 6: Lying on its side the Copper Explosively Formed Projectile can be clearly seen. It should be noted that this would have good scrap value in a post-conflict situation and would be a likely focus for scavenging.

Picture 7: Three submunitions closely grouped. The specialist I interviewed commented: *"The BLU108 warheads were generally grouped together in groups of four and a few sites showed evidence of warhead detonations amongst unexploded warheads. These detonations appear to have occurred on impact rather than target acquisition and fuse detonation above the target"*

Picture 8: A close up of the designation plate on one post.

Picture 9: The Electronics Unit from a BLU108 post.

Picture 10: Shows a complete post after the warheads have been deployed – the four flip-out arms which carry the submunitions can be seen clearly. This example has been cleaned and used for training. It seems likely that the metal content would make this weapon a target for scavenging.

One obvious question was whether any targets were acquired, it seems probable that a number were, I was told: *"There were several destroyed vehicle chassis in the strike area but far fewer than I would have expected. ... it seemed that each vehicle was probably hit more than once .."*

The overall evaluation of the field specialist who dealt with the Mosul strikes was that failures were due to a wide range of reasons, his closing comment was *"Personally I feel that BLU108 was an expensive over-engineered weapon which did not perform to expected standards"*

A report on the disposal of BLU108 submunitions included the following key notes:

A remote projectile attack on the warhead did not separate the warhead electronics unit due to two strong bolts attaching the two components together.
The warhead was struck using 7.62mm projectiles fired from a protected firing position. The warhead was tumbled several times with no detonations or reactions being observed.
Warheads were finally disposed of using explosive donor charges.
Donor charges were placed beside the warhead in close proximity to the darker, forward section (Shaped Charge end) of the warhead. This donor charge was detonated at right angles to the munition, ensuring that the detonating wave struck the warhead at 90°.
Consideration was given to the direction of the shaped charge and an earth mound was positioned infront of the warhead to counter the problem in the unlikely event of an EFP being formed. Deformation of any EFP should be ensured by the position of the donor charge.

Conclusions:

This research into the impact and problems associated with deployment of BLU108 in Iraq is not complete but raises a number of serious questions regarding the reliability of BLU108, especially when measured against claims made for the weapon by manufacturers, specifically as follows:

- **99% reliability:** While it has not been possible to calculate a percentage reliability without full details of the number of weapons actually deployed in the Mosul area, it is clear from the clearance team's overview and generally available figures for use of BLU108 during Operationa Iraqi Freedom that the percentage of submunitions which have failed is higher than 1%. Perhaps substantially so.

- **No Hazardous UXO:** It seems probable that manufacturers and users would claim that the failed submunitions had self-neutralised and were therefore non-hazardous. However, given that many of the submunitions appear to have failed to operate as designed this is not a safe assumption. At best, these unexploded submunitions would deny access to land for civilian communities until cleared.

- **The BLU108 provides *'..a safer, reasonable and responsible alternative to legacy cluster munitions':*** That argument is not supported on the basis of this evidence.

- **Leaves a Clean Battlefield:** The BLU108 quite clearly does not leave a clean battlefield.

This is not to say that the BLU108 is not a safer, more stable weapon than many existing, previous generation cluster munitions, it would seem that is the case. However, the BLU108 has been developed over many years, with enormous budgets, by the world's best-resourced nation with the added advantage of having produced more of the world's unacceptable cluster munitions than any other country. All the necessary skills and experience were available and yet the BLU108 doesn't work. If the United States struggles to produce a reliable cl;uster munition using sensor fuzing, how likely is it that lesser resourced nations could do so?

We can make some judgements regarding the reasons for the failures seen in Iraq, but we don't know the detail or scale of the problems and, it would seem, that Textron are not even aware that their weapon has these problems. On November 13 last Textron announced a contract to supply BLU108 to the United Arab Emirates beginning this year.

These uncertainties point strongly to the dangers of a blanket exemption under the Dublin Treaty for a category of weapons termed 'sensor fuzed weapons' – BLU108, on this evidence, could not be exempted. BONUS and SMArt 155 are untried and unproven. This is why the Cluster Munition Coalition have argued for a comprehensive ban on all cluster munitions which cause unacceptable harm to civilians. Weapons which do not have those effects must be clearly demonstrated to fall outside the treaty definition – I would suggest that this will, for many countries, require a far more rigorous testing and procurement regime than currently exists.

There were no civilian casualties as a result of these unexploded submunitions, but we have no way of knowing whether that would have been the result had an NGO, a civil society response, not been in the area, nor do we know the results and consequences of other *'successful attacks'* in other parts of Iraq. What we do know is that the only sensor fuzed weapon to have been used in battle did not work as designed – I hope that delegates in this conference will draw the correct conclusions from that fact.

Thank you

Rae McGrath acknowledges the invaluable assistance provided by organisations and individuals who provided information and testimonies for this presentation. Thanks are also due to Textron Inc.