



# IDSS COMMENTARIES (88/2005)

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## **How modern ammunitions can save lives**

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5 December 2005

THE notion of ammunition saving lives is hardly comprehensible especially when bombs are associated with inflicting mass casualties and damages. However, nations are looking into the purchase of smart bombs for pinpoint accuracy under all weather conditions in order to do exactly that. In October 2005, Australia announced the acquisition of Boeing's JDAM (Joint Direct Attack Munition) as the next generation of smart weapons for its airforce. The concept of adopting precision strike in the Revolutions in Military Affairs (RMA) has not only resulted in extensive savings with less dumb bombs being expended but it has also limited collateral damages of neighbouring assets to the accuracy of 10 metres Circular Error Probable (CEP). In fact, smart bombs are not only cost savers, but they also play an important role in urban warfare. With this new option available in offensive capability, air forces could find themselves playing a significant, rather than supporting, role to counter-terrorism.

### **EBO versus DBO**

A concept developed from the dominant role displayed by airpower during World War II, Destruction-Based Operations (DBO) has been the preferred mode of operation in most conventional wars. Victory is achieved via the complete annihilation of the enemy forces and assets, rendering its incapacity for retaliatory strikes.

In recent campaigns, there has been a shift from DBO to Effects-Based Operations (EBO). Finding support in the works of military strategists such as Sun Tzu – who argued that war by attrition was inefficient – and Clausewitz – who argued that a successful war requires strong political support – EBO has shifted air-to-surface warfare from the annihilation of the enemy to the targeting of strategic assets. Contrary to analyses that the advent of precision guided weaponry supported the employment of DBO due to its effectiveness in destroying multiple targets, the smart bomb has been developed as an enabler of the EBO by allowing the airforce to select specific targets for destruction.

Reflecting upon the broader context of war, experiences drawn from Vietnam demonstrated that a victory on the battlefield does not necessarily culminate in victory at the strategic or political level. Social incense germinated from the US intervention in the war then. The use of smart bombs in present military campaigns would ameliorate the misunderstandings between the common public and the political agenda of the decision makers.

Besides the battlefield and political advantages of EBO, EBO also possesses the operational

flexibility to revert back to a DBO framework if required. After all, in an air strike, the perfunctory role of a bomb is to hit a target, regardless of whether it is precision guided.

### **Cost-effectiveness and Improved Accuracy**

The Joint Direct Attack Munition (JDAM) system is a kit that can be attached to the tail end of an existing unguided bomb to aid its accuracy in hitting the target. The integration of the system to an existing bomb proves to be less costly than the acquisition of a new precision guided missile. The cost of an existing unguided bomb, such as the Mark series of general purpose bombs, is negligible when compared to retrofitting it with precision guidance capabilities. The Mk-84, if enhanced with the JDAM kit, would cost 7 times more than its unguided counterparts. This figure is certainly cheaper than the newly acquired Joint Stand-Off Weapon (JSOW), which is estimated at probably 70 times the cost of a dumb Mk-84. Furthermore, operational cost of the military campaign would definitely take a dive when considering the fact that during World War II, it took some 9000 bombs to hit the target the size of an aircraft shelter. The situation had improved in the late 1960's where 300 bombs were probably needed to hit the similar target in Vietnam. In recent campaigns, the airforce would only require a laser-guided bomb to strike the target. The use of precision guided bombs in air campaigns is a viable investment in military technology that has reaped economical benefits.

The JDAMs employ the Global Positioning System (GPS) coupled with the Inertial Navigations System (INS) to strike a target with high accuracy. The system provides autonomous and all weather bombing capability, thus allowing pilots to concentrate on the manoeuvrability of their aircraft. With the aid of the GPS, the CEP of the missile is approximately 10 metres. Under situations whereby the GPS is jammed, the INS mode of operation swings into control and calculates the rate and acceleration with the weapon software to develop a navigation solution. In the INS mode, a larger CEP of 30 metres could be incurred. To improve accuracy on moving targets, an imaging infrared terminal seeker is added to the nose of the weapon. The low-cost and commercially available system is activated when it is a mile to the target. It then compares it with the initial images of the target that had been stored in its processors, and subsequently guides the bomb to the desired aimpoint. For a fixed target, this enhanced capability would reduce the CEP to 3 metres, thereby increasing the reliability of hitting at the precise location.

### **The Value of Smart Bombs in a Traditional War: The US led Campaign against Iraq**

In the field of strategic analysis, it is imperative to differentiate between the war being fought at the strategic level and its military campaign carried out at the operational level. However, military operations and politics are not mutually exclusive and the intricacies binding these two levels cannot be explicitly disassociated, thereby invoking echoes of Clausewitz's renowned connotation of "*War as a continuation of policy by other means*". With regard to Iraq, the central dispute surrounding the legality of entering a war with Iraq still looms large. Decisions made at the strategic level in the US will have ramifications stemming from the American society. With this clear hindsight and based on US targeting with regard to airstrikes, it is perhaps fair to assess the US utilisation of precision ammunition in the battlefield as a justifiable cause for protecting civilians. At the operational level, the campaign was well conducted as smart bombs permitted strategic bombing to cripple enemy military assets and critical infrastructure while avoiding mass casualty rates. Massive firepower is inevitable in adversarial military operations. The critical assessment lies in

where these ammunitions are directed at.

The arrival of the smart bomb serves as a nexus between military campaigns and strategic warfare. Analysts could have argued that the advent of smart bombs may have hastened US decisions into entering a war with Iraq, as a victory in the battlefield can almost be guaranteed with technological superiority. While debates on US decision to start a war in Iraq is speculative, the crucial missing issue is that the US had demonstrated its operations on the battlefield was well in tuned with its message propagated at the strategic level. The use of smart bombs allows political leaders to lay claim that the military campaigns are mission orientated and targets specific.

### **Smart Bombs in a New War: Israeli employment against terrorism**

As exemplified by the rising trend in global terrorist activities and the insurgency in Iraq, the new generation of warfare has shifted from inter-state to intra-state war. Smart bombs may play a key role in these new wars. For example, in Israel, smart bombs have been utilised effectively to strike terrorists hiding not only in a building but also on a particular storey. Minimal collateral damage was done to the surroundings upon the impact of the bomb.

No doubt, the primary and collateral damages incurred could on occasion be substantial as smart bombs are far from perfect bombs but operational opportunity presented by smart bombs cannot be denied. In the past, collateral damage incurred by dumb bombs aggravated by the possibility of missing the target were dissuasive factors to mounting an air-to-surface campaign on terrorism. Now, the arrival of the smart bomb should raise the level of confidence in carrying out such a campaign when the high chance of an accurate hit on a target and the minimised consequential secondary damage is considered.

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