



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON DC

21 Mar 03

MEMORANDUM FOR AAC/JAQ (Mr. Luthy)

FROM: AF/JA

SUBJECT: Requested Legal Review of the Massive Ordnance Air Blast (MOAB) Weapon

1. References.

a. Department of Defense Instruction 5000.2 (5 Apr 02), *Operation of the Defense Acquisition System*; currently under revision, see Memorandum providing interim guidance signed 30 Oct 02.

b. Air Force Instruction 51-402 (13 May 94), *Weapons Review*

c. Request for weapon review; e-mail from Mr. Paul A. Luthy, AAC/JAQ, dated 10 January 2003

2. Background.

a. The MOAB weapon is a 21,000 lbs total weight GPS-guided munition with fins and inertial gyro for pitch and roll control. It uses 18,000 lbs of H6, an explosive that is a mixture of RDX (Cyclotrimethylene trinitramine), TNT, and aluminum. H6 is used by the military for general purpose bombs. The MOAB weapon produces a very large explosive blast, with lesser fragmentation effects due to a thin-walled aluminum casing. Due to the size of the ordnance, it is expected that the item will be extracted from either an MC-130 Talon II or "Slick" C-130 Hercules by way of a parachute.

b. References (a) and (b) require the Judge Advocate General of the Air Force to ensure all weapons being acquired or modified by the Air Force are reviewed for legality under international law prior to their use in a conflict. AFI 51-402 defines "weapons" as devices designed to kill, injure, or disable people, or to damage or destroy property. Based upon this definition, the MOAB is a weapon and requires a legal review. This review's conclusions are based on the facts contained herein. Any weapon that varies from the technical descriptions included in this review must be the subject of a separate legal review.

3. Weapon Description and Employment.

a. The MOAB weapon is based upon the same principle as the BLU-82 "Daisy Cutter", except that it is larger and has a guidance system. The weapon is expected to produce a

tremendous explosion that would be effective against hard-target entrances, soft-to-medium surface targets, and for anti-personnel purposes. Because of the size of the explosion, it is also effective at LZ clearance and mine and beach obstacle clearance. Injury or death to persons will be primarily caused by blast or fragmentation. It is expected that the weapon will have a substantial psychological effect on those who witness its use.

b. The weapon is intended to have a high altitude release, allowing for greater stand-off range for the delivery vehicle. Following deployment from the aircraft via parachute, the MOAB weapon is guided approximately 3 nautical miles through a GPS system (with inertial gyros for pitch and roll control), JDAM actuators, and is stabilized by series of fixed wings and grid fins. The weapon, which uses the aircraft's GPS prior to launch, takes several seconds to reconnect to the GPS signal after it has been deployed, which is normal for GPS weapons.

4. Analysis.

a. The following issues must be addressed in any weapons review under the law of armed conflict (LOAC): 1) whether the weapon causes unnecessary suffering that is disproportionate to the military advantage reasonably expected to be gained from the use of the weapon; 2) whether the weapon is capable of being controlled so as to be directed against a lawful target, i.e., it is not indiscriminate in its effect; and, 3) whether there is a specific rule of law prohibiting its use under the LOAC.

b. *Unnecessary suffering versus military necessity.* There is no agreed definition of unnecessary suffering. Whether a weapon causes unnecessary suffering turns on whether the injury, including death, to combatants is disproportionate to the military advantage gained by use of the weapon. The effect of a weapon must be weighed in light of levels of injury to enemy combatants by comparable, lawful weapons in use on the modern battlefield. The critical factor is whether the suffering is needless or disproportionate to the military advantage secured by the weapon, not the degree of suffering itself. The MOAB weapon kills by way of blast or fragmentation. Blast and fragmentation are historic and common anti-personnel effects in lawful military weapons. There are no components that would cause unnecessary suffering. The explosive ingredient H6 is a widely-used explosive that is typical for weapons of this type. The components RDX and TNT do have some potential toxic effects from long-term exposure, but these are limited and within US government tolerance levels. The potential psychological effect of the weapon does not constitute suffering. The intent is to demoralize or frighten the enemy by impressing them with the large footprint, resulting cloud, and tremendous noise of the explosion.

c. *Discriminate weapons.*

(1) A fundamental principle of the LOAC is that combatants must be distinguished from noncombatants and civilians. Only combatants, other persons posing a threat to the force, and military objectives can be legitimately targeted. Indiscriminate, or "blind," weapons are prohibited. Indiscriminate weapons are those that are as likely to hit civilians and non-combatants as well as combatants. If noncombatants are in the area or intermingled with combatants, normal LOAC analysis will be followed to ensure that collateral damage and injuries are limited. Although the MOAB weapon leaves a large footprint, it is discriminate and

requires a deliberate launching towards the target. The MOAB weapon does have grid fins that allow for a maximum of a one mile radius of correction control in the event of delivery errors. Grid fins were chosen over solid fins because they require less torque to maneuver the weapon. The grid fins deflect as directed by the guidance algorithms in the weapon to keep it on course to the target coordinates. The guidance system ensures that the weapon will hit (within acceptable variables) the target that it is intended to hit. In the weapon test conducted at Eglin, the guidance system test was successful.

(2) LOAC issues related to lawful targeting should be addressed at the time of employment, as determined by the on scene commander under the facts and circumstances reasonably known at the time, including special collateral damage considerations when attacking chemical or biological targets. Such issues are not determinative of the lawfulness of the weapon for the purpose of this analysis. The commander authorizing the weapon's use must consider its characteristics in order to ensure consistency with mission rules of engagement and law of war proscriptions on directing attacks at civilians not taking an active part in hostilities, or who otherwise do not pose a threat to U.S. forces. Targeting with the MOAB will be done in accordance with these issues to ensure ROE and law of war compliance.

d. *Lawfulness of Use of the MOAB Weapon under the LOAC.* There are no LOAC principles or treaties that prohibit use of the MOAB weapon.

5. Conclusion. The MOAB weapon, as described above, is consistent with the international legal obligations of the United States, including the LOAC. This legal review has been coordinated with the Staff Judge Advocate to the Commandant of the Marine Corps, the Offices of the Judge Advocate Generals of the Army and the Navy, and the Office of the Chairman of the Joint Chiefs of Staff Legal Counsel who concur with its analysis and conclusion. The point of contact for this legal review is Lt Col Nancy Richards, AF/JAI, at (703) 695-9631.

/signed/

THOMAS J. FISCUS
Major General, USAF
The Judge Advocate General