STATEMENT OF CHRIS COBB-SMITH

Chris-Cobb Smith states:

1. I am currently an independent consultant consulting for a range of news media networks and NGOs working in high risk areas. Part of this remit includes advising on tactics and weapons and munition frequently with regard to investigations.

2. I served in the Royal Artillery for nineteen years, completing my basic training in December 1975 and retiring with the rank of Major in 1995 having commanded an artillery battery. Throughout this time I saw operational service in Northern Ireland, Iraq, Kosovo and Afghanistan and travelled extensively on training exercises many of which involved periods of the live firing of artillery and mortars for which I was responsible. In 1988 I attended the Instructor in Gunnery (IG) course which lasts for one year, at the Royal School of Artillery at Larkhill in Wiltshire, UK. This internationally recognised qualification certifies the successful candidate to instruct in the technical, tactical and strategic use of indirect fire and to run and instruct on equivalent courses. Having qualified on the IG course I was posted to the Combat Training Centre in Gagetown, Canada to instruct at the Artillery School for two years. The above stated experience and expertise are what influences the opinions contained in this statement.

3. Wikipedia provides a very good description of what a mortar is and how it works and I have adopted same for the purpose of this preliminary report.

   "A modern mortar consists of a tube into which the gunner drops a purpose-designed bomb. The tube is generally set at an angle of between 45 and 85 degrees to the ground, with the higher angle giving shorter firing distances. The bomb has a small baseline charge and no cartridge case; for extra range, propellant rings are attached to the bomb's fins. When it reaches the base of the tube, the bomb hits a fixed firing pin, which detonates the baseline charge and fires the projectile. Mortars are portable, and usually used by infantry units. The chief advantage a mortar section has over an artillery battery is the flexibility of small numbers, mobility and the ability to engage targets in cover with plunging fire. Mortars are able to fire from the protection of a trench or other type of cover. In these aspects, the mortar is an excellent infantry weapon, as it can be transported over any terrain and is not burdened by the logistical support needed for artillery. Calibres can vary from the handheld 60mm to the heavier 130mm. Mortar bombs may be high explosive with point detonating or 'proximity' fuzes which initiate in mid-air, smoke or illumination. Mortars are usually deployed collectively – up to six in a 'mortar line'. One tube will usually be used to 'adjust' single rounds on to a target, before all the remaining tubes are employed following verification of the correct data to fire 'in effect' and achieve the military aim ."

4. To a trained and experienced military mind the disadvantages are clear. The mortar is an indirect fire weapon. Therefore it is intrinsically inaccurate, especially in the initial stages of a fire mission. A mortar does not fire with a direct line of sight; it is not aimed at the target in the same way as a rifle, or a tank main armament. To aim a mortar at a target the location of that target is fed into a computation system which

generates a bearing and elevation that is applied to the mortar tube. The aim is for the mortar to then fire that shell in a parabola that will result in that shell impacting on the target. It must be understood that there are a number of variables that will affect the mortar shell from the time that it is fired to the time it reaches the target. These variables can include, air temperate, air density, charge temperature, even the rotation of the earth – all will cause the shell to deviate from its planned trajectory. These variables make any initial rounds inaccurate.

5. Some inaccuracy will also be taken into consideration; this inaccuracy is known as 'Probable Error in Range' (or Circular Error Probable). 'Probable Error in Range' increases with range. This is the indicator of the delivery accuracy of a weapons system used as a factor in determining probable effect to a target. It is the radius of a circle in which half of the projectiles are expected to fall.

6. There are a number of methods in which targets for indirect fire weapons can be recorded or logged for future use but the two most utilised are:

    a) Predicted. This is where the location of the target is plotted on a map and the coordinates fed into the computation system to generate the data for the mortars. Some of the variables mentioned above may be taken into account and this mathematical data added to ensure greater accuracy. However the target is not engaged to confirm the data is correct and no adjustments to that data made from observing the fall of shot are made to ensure subsequent rounds are more accurate. When the mission is eventually fired the rounds may well fall some distance from that 'predicted' target.

    b) Recorded. A target that has been fired on with the predicted data and the observed strikes adjusted onto the exact target location is known as a 'recorded' target. The final data have been confirmed as correct in that it has been proven as accurate is recorded so when the target actually needs to be engaged for tactical reasons a degree of accuracy can be ensured. As the 'variables' change these targets need to be re-confirmed at regular time intervals. The disadvantage of this method is that it takes away the element of surprise.

7. The mortar is an indirect fire weapon and is not designed for pin point accuracy. Indirect fire weapons such as mortars and artillery are used as much to deny or neutralise ground as to kill or destroy enemy assets. Once targets are adjusted and recorded mortars are seldom fired singly. Much of the weapons systems effectiveness depends on the spread of the rounds from a number of mortars and the lethality of those rounds when they land. Clearly the most effect rounds are those that produce fragments with the largest spread from the point of burst. It is this effect that makes

the mortar an unreasonable choice of weapon for use in an urban environment which may still be populated by civilians and non-combatants.

8. When organising field firing exercises or planning operations where friendly troops or even civilians may be located in the area there are, or should be regulations which dictate the distances that need to be applied to ensure the safety of those individuals. These distances are defined in the authoritative doctrine adopted by the nation state.

9. In the United Kingdom the authoritative document is the "Capability Directorate Combat, Dismounted Close Combat, Training - Volume V, Heavy Weapons 81 mm Mortar, Fire Control Procedures & Associated Equipment, Army Code No. 71792 dated 2015" (See Doctrinal Notes attached for the full draft).

Rule 1 - The Adjustment Safety Distance:

"Mortars are not to adjust directly on to a target if friendly forces are within the *adjustment safety distance* to that target. The adjustment safety distance is defined as that distance which gives adequate safety to friendly forces whilst a target is being adjusted.

a) A number of factors are considered in arriving at the adjustment safety distance, such as human error; mainly poor map reading, the length and width of the beaten zone, the danger area of the round, the layout of the fire unit and meteorological conditions. The outcome of all these factors is a distance of **700 metres.**

b) The adjustment safety distance always applies during bedding in (when the mortars are first fired), until the spread of the rounds on the ground are deemed acceptable by an observer, and usually for the first adjusting rounds

Rule 2 — The Predicted Safety Distance.

a) Mortars are not to fire directly on to a predicted target if friendly forces are within the predicted safety distance to that target. This rule refers to the *predicted safety distance*; this is defined as that distance which gives adequate safety to friendly forces when a predicted target is first fired on.

b) The predicted safety distance is based on the same factors as the adjustment safety distance, except for the elimination of these factors which have been overcome by the method employed to produce firing data. The distance allowed is always **400 metres**. This means that most of the errors would have been eliminated by the physical observation of rounds on the ground so the accuracy can be established.

29 Nov 15

10. One element that should also be taken into consideration when planning mortar fire missions if the Time of Flight (ToF). The mortar fires at a high trajectory so the ToF can be considerable so there is a danger of the situation in and around the target area changing between the time the mortar round is fired and the moment it impacts in the target area.

11. The exact figures which are used in the computation of elevation for range, charge selection, ToF, etc. can be found in a manual known as 'Firing Tables' of which there are copies for every indirect fire weapon system.

12. Mortar targets are plotted by grid references on map, usually of a scale of 1:50,000. These grid references are passed to the mortar line which mathematically transposes the grid references into bearings and elevations for the mortar tubes. However the number of variables (wind, etc.) associated with the flight path of a mortar shell makes first round accuracy very difficult. This is not normally an issue as mortars, like artillery, are an area weapon and not designed for pin point accuracy. A certain degree of accuracy is possible but only by firing an initial round and adjusting it onto the target.

13. Before I can offer any further opinion on the use of mortars in this operation and the propriety of same, I would need to hear the evidence of the actual mortar firer who would be in a position to answer questions concerning the circumstances under which they fired mortars and the measures that were employed by him during this time. A more fulsome opinion can be proffered at that time.

14. I would recommend however that a large scale map be annotated with the three areas. To better assess how well the fire was controlled the map should also be marked with the locations of the observer(s), if there were any, to confirm they could definitively see the impacts or 'fall of shot'. The route of the observer (s) should be plotted for the duration of the mission to determine his location at the time the rounds were being fired.

15. I would also recommend verification of the planning process prior to the use of mortars prior to this operation. This should include explanation of the calculations made by the mortar officer to ensure the safety of civilians and non-combatants during the operation.

29th November 2015