By Dr Carlo Kopp

MELBOURNE – In recent evidence to the Joint Foreign Affairs, Defence and Trade committee of Federal Parliament, Defence asserted that “throw weight” as a measure of combat strength was irrelevant because of the use of precision munitions. This was a remarkably courageous statement.

The term “throw weight” has a long history as it was used throughout the Cold War as a Measure Of Effectiveness (MOE) for comparing the relative strengths of Soviet vs Western strike forces, comparing the respective triads of long range bombers, submarines and silo launched missile forces; later the model was used to compare road mobile ballistic and cruise missile force strengths. Its ubiquity was a result of its simplicity and robustness as an MOE – once weapon effects are normalised or scaled, “throw weight” provides a direct measure of the “weight of fire” a force can deliver to a given distance. An other way of describing it is as “aggregated normalised weapon pay load to striking distance”.

Calculating throw weights is not complex. The starting point is to determine the combat effect of the respective weapons and derive a relative scaling factor. Where the weapons are identical, such as in the debate over the F-111 vs F/A-18A vs JSF, the scaling factor is unity – the combat effect of identical weapons is the same. Whether a GBU-10/24/31 or SDB smart bomb is dropped by an F-111, F/A-18A or JSF is immaterial – each weapon achieves the same combat effect.

Once we have determined the relative combat effect of the weapons, calculating the resulting throw weight is a simple matter of multiplying the number of each aircraft type by the number of bombs each can carry by the distance they can carry. As an MOE, throw weight thus provides a direct measure of the “weight of fire” a force can deliver to a given distance. It could be done with the number of aircraft available.

Throw weight assessments can be further refined by applying qualitative scaling factors. Aircraft availability or mission completion rates (MCR) can be used, as these account for what fraction of the strike force is airborne vs what is sitting on the ground or diverting due to failures. Aircraft availability/MCR must how ever be used carefully, since peace time rates do not reflect the increased maintenance tempo seen before and during conflicts. Statistics from the 1991 Gulf War are most revealing, as a very large jump in aircraft was ob served compared with peace time availability rates in earlier years. The recent and excellent Red Flag deployment performance of the F-111 is indicative – it did better than the newer series types on site. Un less the aircraft types differ greatly, it will produce little impact on a throw weight estimate as similar figures essentially cancel each other out. The JSF is to be more reliable than either current type, but the additional few percent will produce little impact given the good rates on both of the existing types.

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Qantas smartens landing approach

MAASTRICHT – Boeing, the Air Traffic Alliance, Airservices Australia and Qantas have agreed to flight demonstrations of a concept to improve aircraft arrival efficiency. ATC will send the approaching aircraft electronic arrival clearance – eliminating the need for the usual multiple voice communications.

Electronically linked data then guides the aircraft on a steady descent along the most efficient flight path. The aircraft, on scheduled Qantas flights, will start descent, about 225km from the air port.

Embraer moves into 100 seats

SÃO JOSE DOS CAMPOS – Embraer inaugurated its new mid-sized Embraer 190, a 100-seat plane aimed at a market share now served by bigger planes. Embraer is the world’s fourth-largest civil planemaker. The prototype was doused with champagne by President Luiz Inacio Lula da Silva. The first delivery of the $30 million aircraft will go to JetBlue Airways, which has or dered 100.

F-111: Throw weight vs precision

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An important further qualifier is given by tasking. This is especially important when comparing the F/A-18A and JSF against the F-111. Both of these are to perform air combat roles and strike roles. Because Wedgetails, tankers, airfields and other assets must be protected until all opposing fighters have been killed off, a good fraction of the F/A-18A and JSF fleets would be unavailable for strike operations as they would be or biting in CAPs covering high-value assets. Therefore throw weight estimates which count the whole F/A-18A or JSF fleets over state the capability of the F/A-18A or JSF vs the F-111. The reality is that a large fraction of the F/A-18A or JSF fleet might be committed to air combat tasks, effectively driving down their throw weight contributions.

Conversely, while the RF-111C and F-111G currently can not target laser guided bombs, there is nothing to prevent the RAAF from emulating US Air Force and RAF tactics in previous conflicts – a ‘master bomber’ F-111C would use its Paveway to laser targets for F-111Gs or RF-111Cs and F-111Gs not so equipped.

The value of throw weight centred measures has vastly increased since the recent development of persistent strike techniques against mobile targets – bomb the battle field and plink ground targets with smart bombs within minutes of target detection. This was the key to the success of last year’s Iraq ground campaign. Persistence demands large fuel and smart weapon payloads – the F-111 with about twice the weapon payload and twice the fuel of an F/A-18A or JSF is superior in this role.

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