

### Targeting considerations in the C4 to D5 decision

The decision to move from Trident C4 to D5 was primarily based on the importance of commonality with the US, but it also provided a system that could do more. D5 would provide a capability that was greater than had been assumed was necessary from a fleet of 4 submarines armed with C4. The new missile would “give us greater operational capability, and so more insurance margin against advances in Soviet capability (especially ABMs).”<sup>25</sup>

One of the documents supporting the move to D5 includes the table below.<sup>26</sup> This illustrates how many “Missiles At Sea” would be required to meet each of the three remaining options from the 1978 Duff/Mason report.

#### *Missiles At Sea to meet Duff/Mason criteria*

Missile:	C4 (8RVs)		D5 (14 RVs)	
	32	100	32	100
Number of ABM				
Option 1	19	28	7	12
Option 2	10	19	6	11
Option 3a	8	8	6	6

Option 1 was command and control centres both within and outside Moscow. Option 2 was Moscow, Leningrad and two other cities. Option 3a was 10 cities outside ABM cover. There is a note with the table which points out that Option 3 requires 6, rather than 5, D5 missiles because of the distances between some of the cities.

The requirement for 28 C4 missiles for Option-1/100-ABM is close to the 27 C4 missile figure in an earlier document. The requirement for 19 C4 missiles for Option-2/100-ABM is relatively high. Earlier papers have different views on whether or not Option 2 could be achieved with 16 C4 missiles.

The table below is an extrapolation of the number of warheads that would need to be deployed:

#### *Warheads At Sea to meet Duff/Mason criteria*

Missile:	C4 (8RVs)		D5 (14 RVs)	
	32	100	32	100
Number of ABM				
Option 1	152	224	98	168
Option 2	80	152	84	154
Option 3a	64	64	84	84

<sup>25</sup> Michael Quinlan’s draft of a paper for the Defence Secretary to send to the Prime Minister. Air 8-2846 E2, Trident, 15/7/81.

<sup>26</sup> Air 8-2846 E51i

Deducting the total number of ABM missiles in each case, except Option 3a, produces the following figures:<sup>27</sup>

*Warheads delivered to meet Duff/Mason criteria*

Missile:	C4 (8RVs)		D5 (14 RVs)	
	32	100	32	100
Option 1	120	124	66	68
Option 2	48	52	52	54
Option 3a	64	64	84	84

The warheads delivered for Option 2 should be the same for C4 and D5, as the increased accuracy of D5 is irrelevant if the purpose is to destroy cities. The similarity between the four figures for Option 2 suggest that this approach, of deducting the ABM numbers is appropriate. If this is the case then the calculations may be based on the assumption that each ABM has 100% probability of destroying one incoming warhead. The actual numbers would be lower, because of missile reliability.

The number of warheads delivered (C4) for Option 1 is more than twice that for Option 2, which is consistent with an earlier statement.

The number of warheads delivered for C4 would appear to be double the number required for D5. This is not consistent with other papers from the same time. These say that four warheads on C4 would be required to destroy a hardened target, where one on D5 would have the same effect. The 4:1 ratio is consistent with information in the public domain about the relative accuracy of C4 and D5. The assumption that a single Mk4 RV on a D5 missile could destroy a hardened target is incorrect. A single Mk4 warhead, with its original Arming, Fusing and Firing System, is not effective against hard targets.

The number of command-centre targets in Option 1 might be either around 30, or around 60. The map accompanying the Duff/Mason report only shows 8 National Command Centres outside Moscow. However, a US intelligence report from 1983 identifies 6 bunker entrances at one of these sites, Chekhov-2. Each entrance would be a separate aimpoint in the US plan. Chekhov-3 and Kuznetsk-8 are of a similar complexity to Chekhov-2. There are three distinct command centres at Strategic Rocket Force headquarters (Odintsovo-10). It is not clear to what extent AWE took this into account in their estimates, in the late 1970s and early 1980s, of the warhead numbers required for Trident.

The table underlying these calculations assumes that each D5 missile will carry 14 RVs. The figures for Option 3a suggest that this means 14 warheads.<sup>28</sup> This table is contained within a longer document which includes a table on costs which assumes that each D5 missile will carry 10 warheads. Several other papers from this period also assume that there will be only 10 warheads per missile, rather than the maximum of 14.

<sup>27</sup> In Option 2, around 20 warheads would be aimed at Leningrad and two other cities outwith ABM cover.

<sup>28</sup> The footnote suggests that Option 3a could be met with 5 D5 missiles, were it not for separation distances. If there were only 10 warheads per missile this will give a total of only 50 warheads, compared with 64 for C4.

A briefing by the Deputy Chief of Defence Staff (Intelligence) on the new targeting policy includes the following agenda items:<sup>29</sup>

- a. Introduction
  - (1) Terms of Reference
  - (2) Need for Study
- b. Basic Considerations
  - (1) The meaning of unacceptability
  - (2) Geography
  - (3) Nuclear assets
- c. Filtering the target list
  - (1) Categories rejected
  - (2) Target groupings
    - (a) Military
    - (b) Industrial and Economic
    - (c) Administration and Control
- d. The Targeting Process
- e. The Importance of Moscow
- f. A new target pack
- g. Problems thrown up
  - (1) Soviet bunkers
  - (2) ABM defences
  - (3) Further studies required
    - (a) Use of RAF assets
    - (b) Fallout policy
    - (c) Multiple Bursts – Fratricide Cumulation

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<sup>29</sup> AiR8-2846 e48 Outline of presentation on strategic nuclear targeting