

the American short-range missile (SRAM) and the air-launched cruise missile (ALCM) have a yield of 0.20 Mt. The CEP of the ALCM is 0.016 n.m., and that of the SRAM is 0.10 n.m., a difference of 0.084 nautical miles.

However, this translates into a substantial difference in terms of CMP. The CMP per warhead of the ALCM is 1336 and that of the SRAM is 34<sup>19</sup>. Changes in estimates of Soviet CEPs, such as the recent CIA revision of the SS-19 CEP, also cause large changes in the CMP<sup>20</sup>. This sensitivity to accuracy means that as technology generates qualitative improvements in missile accuracy, CMP will lose its utility as a value.

Despite these emerging limitations, CMP can still be used as a general guide in comparing overall missile system effectiveness. It is probably not useful in aggregate comparisons to determine which side is ahead or superior. To aggregate separate systems would be to assume that the entire missile force is targeted according to a single doctrine of counter-force targeting. Aggregation is also subject to the distortions created by CMP sensitivity to missile accuracy values. For example, the total American CMP is 2,154,924 of which 1,971,936 (92%) is accounted for by the ALCM.

### Overall Reliability

A missile has five stages of operation: launch phase, boost phase, separation, penetration and detonation. The missiles' overall reliability is a composite probability of the different reliabilities of the missile at each individual stage of its flight.<sup>21</sup>

For example, if it is assumed that the reliability of the missile at each

<sup>19</sup> See Table 2A

<sup>20</sup> B. Keller "US Study Finds a Soviet ICBM Less of a Threat to Missile Silos" New York Times July 19, 1985, p. 1

The change in the CEP estimate from 1,000 feet (0.164 n.m.) to 1,300 feet (0.214 n.m.) caused a corresponding decrease in CMP/warhead from 23.42 to 15.20 and a decrease in the total CMP of the SS-19 Mod 3 from 50,592 to 32,879. This change represented a 12% decrease in the total CMP of the entire Soviet Strategic nuclear force

<sup>21</sup> For a useful brief discussion of the stages of missile flight, see Stephen Weiner, "Systems and Technology", especially pp. 50-54, in ed. A.B. Carter and D.N. Schwartz, Ballistic Missile Defense (Brookings Institution, Washington, D.C., 1984)