— demonstrates the hazards of relying on even the most sophisticated sources for details of Soviet weapons capabilities.

BASIC FACTORS IN THE STRATEGIC FORCE BALANCE

As stated above, no single indicator gives an accurate picture or estimate of the US-Soviet military balance. An effective analysis of the comparative value of strategic nuclear weapons systems involves consideration of a number of variables. Those variables that can be *quantified* include: the number of missiles and warheads deployed by both sides, the yield of the warhead, the accuracy of the warhead, the hardness of the targets, the throw-weight of the missile and the overall reliability of the delivery system.

In addition to these factors, there are a number of other variables which are not easily quantified, but are critical to calculations of the force balance. These include the readiness of operational forces, the survivability of command and control centres, the time between launch and target of a delivery system, the ability of offensive weapons to penetrate defences, and the defensive capabilities of each side. Allowing for these factors generally involves devising complicated scenarios, which are themselves the subject of considerable debate regarding their real-life plausibility. This paper addresses the *quantifiable* variables which, used in combination and in a step-by-step process, can act as useful tools to understanding the superpower competition in nuclear weapons.

MISSILES/WARHEADS

The numbers of missiles and warheads possessed by each side are the basic counting variables. A missile carries the warhead(s) and is the actual vehicle launched. The terms 'missile' and 'launcher' are sometimes used interchangeably and it is therefore important to be aware of which term is being used. Missiles and launchers are not always equivalent and it is possible that a single *launcher* can fire more than one *missile*. For example, recent American INF arms control proposals counted a battery of four ground-launched cruise missiles (GLCMs) as a single launcher. Launcher totals often include missiles *and* strategic bombers which are capable of firing missiles.

Missiles can be launched from the ground, from the sea or from the air. These three elements together make up what is known as the strategic triad. Each leg of the triad is meant to act as an independent deterrent, thus reinforcing the others and deterrence as a whole.

There are basically two types of nuclear missiles: those that must operate within the atmosphere and those that can leave the atmosphere. Strategic *ballistic* missiles are propelled out of the earth's atmosphere by rocket propulsion. At some point in the middle of the trajectory, the re-entry vehicles, which house the warheads and shield them from the effects of re-entering the atmosphere, are released.

This diagram illustrates the ballistic missile (A) which leaves the atmosphere (B). Sometime during the midcourse of its flight-path, the bus (C) releases the individual re-entry vehicles (D) which travel independent trajectories to distinct targets. Other missiles, such as the SRAM (E) and the cruise missile (F), launched from manned bombers, never leave the atmosphere.