

sembly compatible with the means of delivery, as dictated by current military needs. Thus, while the Hiroshima bomb was designed so as to be compatible with the bomb-bays of the B-29 aircraft, the subsequent proliferation of delivery vehicles called for a variety of weapons of reduced dimensions.

Warheads in the present nuclear arsenals bear little resemblance to the bombs that ushered in the nuclear age. In particular, the development of modern strategic bombers and of strategic missiles equipped with multiple, independently targetable re-entry vehicles (MIRVs) placed a premium on small sizes of nuclear warheads and on optimal yield-to-weight ratios, because one bomber or missile had to accommodate several bombs or re-entry vehicles in addition to guidance systems. Thus new warhead designs became necessary to achieve the desired objectives.

A new weapon design currently requires a testing programme amounting, for the USA, to some 6 explosions or more — depending on the degree of complexity — to 4-5 for the UK, and (according to press reports) to as many as 20 for France, and culminating in a proof test to certify the model for stockpile and deployment. Designs not fully tested through explosions are not deemed reliable. The use of simulation with supercomputers can substitute certain development test explosions, but many weapon designers are sceptical as to the possibility of drastically reducing the number of explosive tests. In any event, at least one explosion of a new or significantly re-designed warhead at or near full yield is generally considered to be indispensable.

It should be added that testing is necessary not only to modernize the first two generations of nuclear weapons — the fission and fusion explosive devices — but also to develop so-called “third-generation” weapons. These constitute a refinement of the techniques involved in fission/fusion processes for the purpose of achieving special weapon effects for given military missions. For example, the enhanced-radiation weapon has been developed to achieve radiation levels sufficient to incapacitate enemy military forces while minimizing