

Nevertheless, development decisions regarding bombers to be operational in 1970 have to be made in 1960 — or earlier. Calculations of the kind reflected in Table 22 are worth making as an aid in the decision process provided the uncertainties and biases in the data are recognized. In many realistic complex cases the problem will be more closely analogous to choosing a strategy that leaves no soft spots than it will be to a simple optimizing calculation.²¹ We want something in development to cover the contingency that the Russians will be strikingly successful in developing infra-red, and something else to take advantage of opportunities if they are not. What is a "good" way of providing both, and at the same time of taking care of other "important" contingencies?

The same kind of economic calculus can sometimes be helpful in estimating the utility of developing components, or improved materials, fuels, and so on. One assumes successful development, and then compares weapon systems using the new component or material with weapon systems not using it. What, for example, is the worth of a new higher energy fuel for jet aircraft? As a first approximation, it is the difference between the cost of achieving objectives without the high energy fuel, and the cost of achieving the same objectives with it. If the fuel can be used in existing engines, the calculations involved are, of course, simple — although greater savings may be achievable later in engines specially designed to take advantage of the new fuel. If the new fuel can be used only in specially designed engines, and the engines only in specially designed aircraft, the benefits can only be realized in the more distant future, which means that the calculations may be difficult and the uncertainties large, but no new principle is involved.

If several alternative developments are capable of achieving the same military objective — as lighter-weight structural materials, higher-energy fuels, and boundary layer control can extend the range of bomber aircraft — economic calculations of a similar type can indicate how great an improvement in each case is necessary to save the extra billion dollars that would have to be spent to extend the range by simply building larger, heavier, more expensive bombers. Expert technical opinion might consider some of these improvements much cheaper or easier or more certain of development than others. Despite the unreliability of this kind of expert opinion, hard choices among development alternatives sometimes have to be made, and a rational choice has a better chance of being right than a blind one. The important thing is to avoid the naive assumption that the problem is to choose the *one* best alternative. The simultaneous development of two or more of the possible choices is frequently preferable to developing only one — no matter how superior it appears to the experts.

²¹ See Chapter 10, pp. 198–199.