ANNEX V. COST-BENEFIT CONSIDERATIONS

User requirements are expressed in a technology-free manner, and therefore cost-free also. However, decisions on design and implementation of observing systems must take account of cost. The relationship between user requirements, as defined by the RRR process, and decisions on design and implementation of observing systems based on cost-benefit considerations is therefore important. The cost-benefit curve for a single observing system, in the context of a single application, is illustrated schematically in **Figure V.1** below. It is assumed that "benefit" can be estimated quantitatively and also that it can be expressed in financial terms. The cost-benefit curve has the following generic characteristics:

(a) A significant cost must be incurred before any significant benefit is derived. Beyond this point (B), additional cost then results in increasing benefit. However, a point (A) is reached beyond which additional cost does not bring any significant benefit;

(b) The "maximum" and "minimum" requirements of the CBS method map on to points A and B respectively;

(c) The cost-benefit curve will (normally) first cross the line of equal cost-benefit at the "break even" point. It represents the point above which we can make a (business) case for implementing the system;

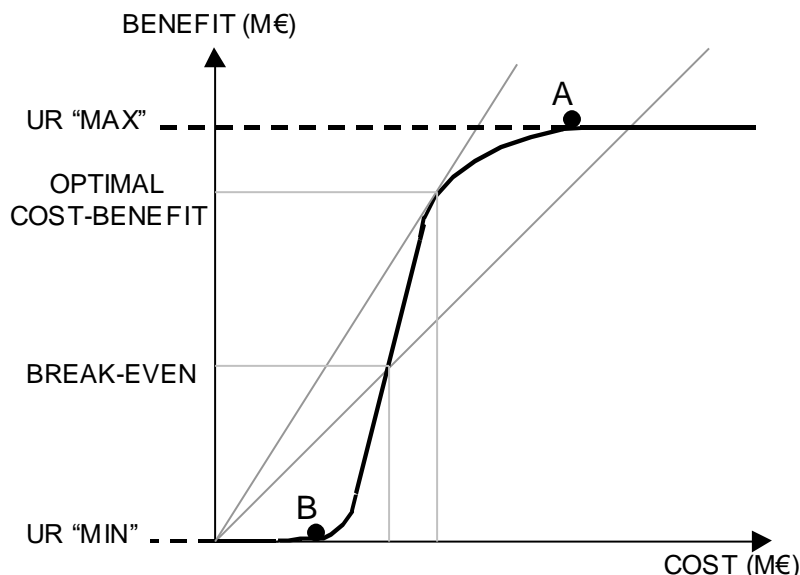(d) The optimal point, representing the highest ratio of benefit to cost, is also shown.

Figure V.1. Generic cost-benefit curve for an observing system.

Note that the point of optimal cost-benefit represents a benefit (and cost) that is, in general, lower than the point of "maximum requirement". This is important; it is often assumed that we should be striving to meet the maximum requirement. Whereas this analysis shows that a system meeting "maximum" requirements is likely to deliver a level of benefit in a region of diminishing returns. Also a system's performance must exceed the "minimum" requirement before it is likely to be cost-effective.