

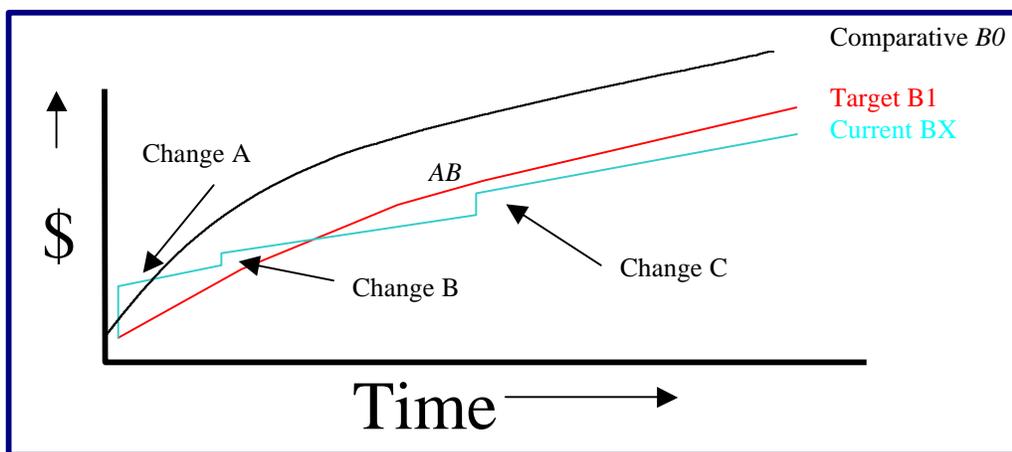
Establish the TOC Comparative Baseline

Any TOC Reduction process must begin with establishment of a TOC Comparative Baseline. This first baseline, referred to as B0, is the point from which an initial TOC Reduction Comparative Baseline is drawn. The B0 may be struck at any point in the Life Cycle timeline but must establish a reference line of cost for the remaining Life Cycle. Usually this TOC Comparative Baseline will be established through the combination and compilation of historical data

The TOC comparative baseline is a tool for comparison; nothing in the TOC comparative baseline should be construed as an approved approach. Requirements and contractual documents define the design criteria; the TOC comparative baseline does not imply endorsement of any approach, equipment, or method.

Other Types of TOC Baselines

Other TOC baselines may be required during design and operation of a weapon system. Typically, a TOC comparative baseline will be developed based on estimated costs for a weapon developed without planned innovation. Another TOC baseline will be developed to track TOC estimates for the proposed/current system and will include CAIV strategy, selected systems, innovations and approaches. Additionally, actual costs should be maintained for the weapon system throughout its life cycle for future use. At each successive Acquisition Program Milestone/defined program milestone (i.e., major overhaul, pre-planned improvement) a Baseline will emerge. For clarity, the baselines referred to in this document are: the reference baseline B0, the comparative/CAIV baseline B1, the current baseline BX, and the actual baseline AB, respectively. The comparative baseline B1, sets the initial estimated TOC with the expected effectiveness of CAIV and other initial reduction strategies. The current baseline BX is a combination of actual/recognized costs and future estimated expenditures. The actual baseline AB is the aggregate value of all recognized costs at a point in time. AB then is the expression of actual cost for concept, design, production and operation at a specific point in the Life Cycle. It is, by our definition, that part of the current baseline that represents the actual/recognized costs.



Defining Baseline Structure

A cost breakdown structure is used to distribute the weapon system costs into phased expenditure categories by fiscal year. This allows allocation of costs to units for comparison of alternative equipment or approaches, and further allows the evaluation of costs over the life cycle of the

system, accounting for the present value of money, as appropriate. The detail required in the baseline structure will depend on the complexity of the system and the level of analysis that will be undertaken during system development. The detail of the baseline will influence the types of tools that will be required for analysis of alternative systems and approaches.

Identifying Source Data

Data sources are used to populate the baseline structure to provide a TOC baseline estimate and, subsequently, to support the analysis and population of the current TOC baseline. Typically, data sources will include historical data for similar weapon systems, vendor data for the subject weapon system or similar weapon systems, and parametric data derived from similar weapon systems. The data obtained from similar weapon systems may require “weighting” to reflect relative differences in the historical weapon system and the subject weapon system. Careful consideration and overall program standardization should be practiced in selecting weighted criteria.

Common Data Sources

VAMOSC

COMET

OARS

HEDRS

Vendor Quotes

Developing TOC Baselines

After defining the TOC baseline structure and identifying appropriate data sources, the TOC baseline can be developed. The process consists of extracting the applicable source data, “weighting” the data if required, and populating the TOC baseline structure. Care must be taken to completely populate the database, and all data sources must be documented.

There are two basic approaches for calculating the TOC baseline. The first approach is the Top Down Approach. In this approach, costs are calculated for the system or program based on acquisition cost estimates and Operating and Support projections. The process, in general, consists of:

1. Project Research and Development Costs

- ❖ The Research and Development Costs are those incurred by the government prior to award of the contract, and any R&D costs on Government Furnished Equipment applicable to the program.

2. Project Acquisition Cost

- ❖ The government, during the budgeting process, develops the initial estimate of project acquisition cost. This estimate is based on historical costs and parametric estimates. However, this is the best estimate prior to contract award of the acquisition costs, and is the ideal data to provide the baseline acquisition costs. Upon contract award, a new target cost is established, based on the winning contractor’s proposal. If the winning bid is lower than the initial government estimate, and the contractor produces the product at a cost less than or equal to the proposed cost, then a reduction in acquisition cost is achieved.

3. Project O&S Costs

- ❖ Using VAMOSC data (or other available historical data), extract consumable, maintenance, training and indirect support data.
- ❖ For each of these areas, apply a weighting factor based on the relative applicability of the historical data to the current application. For example, training cost may be weighted by a factor reflecting the relative number of people aboard the current ship compared to the historical data. Also, the weighting factor should compensate for differences in costs by year (i.e., make sure the data is converted to reflect the base year being used).
- ❖ Extract personnel data from the PSMD. Calculate costs by multiplying the number of personnel in each paygrade by the cost per paygrade, and then summing across all paygrades. State the source of the paygrade data (e.g., Cost of a Sailor Study). Again, ensure that the data reflects the cost for the base year. An alternative method would be to extract the data via the COMET Personnel Model from the Naval Center for Cost Analysis (NCCA).

- ❖ Sum calculated costs for personnel, maintenance, consumables, training, and indirect support to arrive at the projected O&S cost.

4. Project Demilitarization and Disposal Costs

- ❖ Using historical data, extract the appropriate costs.

5. Calculate Total Ownership Cost

- ❖ Sum the R&D, Acquisition, O&S, and demilitarization and disposal cost projections to obtain the projected Total Ownership Cost. Include infrastructure costs in the appropriate category or categories.

The second approach for calculating the TOC baseline is the Bottom Up Approach. In this approach, baseline costs for each system are summed over the responsible IPTs, and then summed up to obtain the Total Ownership Cost. The process consists of the following major steps:

1. Obtain historical data or vendor quotes that contain the data necessary to estimate baseline acquisition cost and baseline O&S cost for the system of interest. The data required will depend on the cost estimating tool(s) to be used. If necessary, convert data to the appropriate base year.

2. Using the appropriate cost estimating tool(s), calculate baseline acquisition cost for the system of interest.

3. Using the appropriate cost estimating tool(s), calculate baseline O&S costs for the system of interest.

4. Sum acquisition costs and O&S costs to obtain TOC for the system.

5. Repeat steps 1 to 4 for all systems for which each individual IPT is responsible.

6. Sum system TOC across the weapon system to obtain the Baseline TOC estimate.

By employing both the Top Down and Bottom Up approaches, the utility and accuracy of the TOC estimate is enhanced. The Top Down Approach is expected to provide a higher TOC prediction because the “intangibles” have been included in the collected historical overall ship data. For purposes of establishing a benchmark to measure against, overall TOC should be measured against the Top Down Approach. However, at the system level (after allocation to the IPTs), the Bottom Up Approach should be used in order to avoid inclusion of intangible costs in the tangible (design) world. (The intangibles discussed in this paragraph are the things that will inevitably occur in operation that cannot reasonably be accounted for in the design process. Examples include loss of material due to pilferage, maintenance errors, etc.)

Updating TOC Baselines

Upon initial development, the TOC comparative baseline and the TOC current baseline will be identical. As system design progresses, the TOC current baseline will be re-programmed to reflect system or equipment selection, and process selection or modification that impact TOC. The current and, in some cases, the comparative baseline will be updated to reflect refinement of data or changes in requirements. The Actual Baseline will continue to aggregate recognized costs. All changes must be documented.

Validating TOC Baselines

There are two types of validation for TOC baselines. The first is to validate that the comparative baseline is accurately populated. The second is to validate that the current baseline is accurately populated. Each process requires an independent evaluation of the TOC baseline to ensure that

the baselines are properly populated, and to ensure that data weighting is properly conducted. Periodic validation should be conducted.