TFD Europe

Q. Why Use EDCAS?

A. For Equipment Front-End Design Choice, Cost Assessment and Level of Repair Analysis

You should you use ***EDCAS*** when you need to:

- Evaluate the Life-Cycle Cost (LCC) of an equipment design choice.
- Identify the optimum repair policy for an equipment design choice.
- Compare the LCC of alternative designs.
- Test the sensitivity of preferences when data estimates are uncertain.

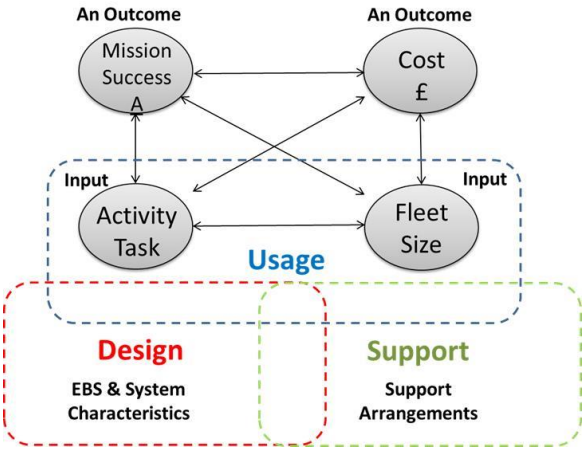
EDCAS - Equipment Designers Cost Analysis System

The International Standard for Front End Cost and Level-of-Repair Analysis

EDCAS is a software-based analysis tool to:

- Select the best design for new equipment based on Life-Cycle Cost
- Understand the impact on supportability and cost of part and configuration design trade-offs
- Define the best repair strategy
- Understand the cost and logistics performance of design alternatives

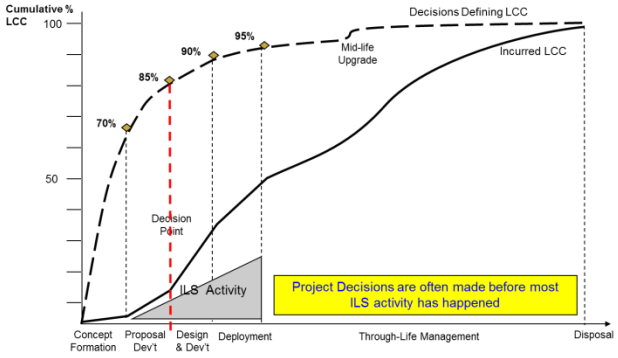
The cost and output of a Capability are defined by the interaction of its Usage Pattern, its Equipment Design (described by the system structure and related attributes such as reliability and maintainability), and the Support System. The critical outcomes of operational performance (such as system availability and cost) are the result of the complex interaction of these three key features.



EDCAS holds data about a system, its operational usage, its constituent components, and the resources (parts, tools and skills) required for its maintenance.

Front-End Analysis

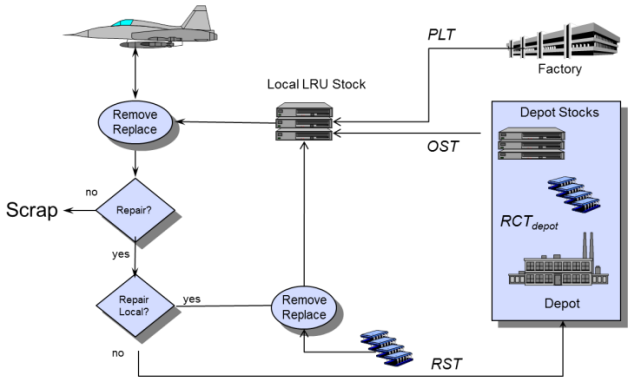
There is a very different phasing between the expenditure of cost in a programme and the point when that costs is committed. Decisions made early in the programme embed LCC that are extremely expensive to affect later. There is an old adage that what costs $1 to change in concept, costs £1000 in design, $1M in manufacture, $10Ms in modifications and $Bns through-life. To avoid this, programmes must spend money early to reduce downstream risk and cost.



This fact of life is the reason why Front-End Analysis is essential to take account of costs throughout the life cycle. ***EDCAS*** supports optimisation of Engineering Design, Reliability Engineering, Configuration management and the ILS disciplines of LCC, LORA and spare parts scaling. By determining in detail the resource costs of all viable options, ***EDCAS*** enables the user to make better decisions based on the LCC of the selected option.

Level-of-Repair Analysis (LORA)

A simple logistic system is illustrated below. When a system fails, the faulty part must be removed and replaced with a spare part from local stock.



The first critical question is whether the part should be repaired or scrapped. To determine if repair is the cheaper option, the cost of all the necessary piece parts, skills, test equipment, facilities, transportation times (Outward - OST and Return - RST) and production and repair lead times (PLT & RTRT), and the stock needed to fill the pipeline. This data informs choices about the optimum level or depth of repair and the optimum location, which become the repair policy. ***EDCAS*** supports LORA by evaluating all potential repair policies for the system and its major components by quantifying the LCC of the key cost drivers.

Inside *EDCAS*

EDCAS contains a complex mathematical LORA model to calculate to determine the most cost effective maintenance policy for an item. The choices are: user repair at Organisational, Intermediate or Depot site, Contractor repair, or Discard at Failure. The key elements are:

System Structure - During the early stages of a programme, ***EDCAS*** can be used to describe the system Equipment Breakdown Structure (EBS) or Bill of Materials. The hardware structure can be built progressively using Next Higher Assembly, Parent/Part Structure or Logistic Control Numbers (LCNs). The robust relational database structure of the TFD data Vault that underpins ***EDCAS*** ensures that this data view is logically valid.

Logistic Resources - *EDCAS* also uses data for all the associated logistic resources that drive cost:

- System configuration
- Fit (allowance for redundancy)
- Duty cycle
- Reliability and maintainability data, including frequency of scheduled and unscheduled maintenance events.
- Maintenance resources, skills, tools, test equipment, facilities data such as:
  - Production costs (initial and recurring)
  - Spares (initial and replenishment)
  - Repairs
  - Personnel skills and training
  - Technical Publications and Data
  - Test Equipment (initial and ongoing)
  - Facilities (initial and ongoing)
  - Packaging & Transportation
  - Disposal costs or salvage values

Specific data is preferable when available, but broad estimates can be used subject to sensitivity analysis.

Options Analysis - Analysts can use ***EDCAS*** to evaluate, include or exclude design and support options to focus limited and costly resources. For example, it is useful to know that one option is clearly cheaper than another. But it is also important to discover how and why those costs differ. This is particularly important when some of the design is already fixed and system cost savings must be made in other ways by finding the main cost drivers and evaluating alternatives.

Sensitivity Analysis - *EDCAS* contains powerful sensitivity analysis, which is quick and easy to use to re-calculate model outputs resulting from changes in a single model inputs. Fleet size, utilisation rates, deployment pattern, reliability and the frequency of scheduled or unscheduled events can be automatically adjusted to evaluate sensitivities. Inputs, such as cost, shipping, procurement and repair and lead times can be altered in a single or series of runs, to identify the thresholds at which changes become significant to allow analysts to identify automatically the most important factors.

Configuration Trade-Off Analysis A trade-off compares the outputs resulting from various changes to model inputs. ***EDCAS*** can hold unlimited configuration variants, deployed in unlimited locations, with unlimited different fleet sizes and usage rates within a single TFD database. These variants can be assessed in multiple runs to identify the best possible configuration. Or for a fixed scenario, ***EDCAS*** can support Configuration Trade-Off Analysis within a single run to identify the optimum configuration and LCC for that situation to allow suppliers to optimise designs for LCC.

Using *EDCAS* reduces LCC

EDCAS provides a rapid, intuitive tool to answer many design and supportability questions - to establish the expected system availability, LOR policy, spares analysis and LCC. It can:

- Cost the best design for new equipment
- Define the best level-of-repair strategy for the support solution
- Understand the impact on supportability and cost of part and configuration design trade-off
- Understand the logistics of design alternatives