

# Engineering focussed cost management

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Applicability within  
high value, low  
volume,  
engineering  
systems

*If done correctly, cost reduction projects typically break even within a 3 month period and deliver an annualised return on investment of 5 or more*



## Summary

**I**n an aerospace design environment, where there are competing challenges on engineers in terms of functionality, performance and time, cost can often be seen as something for procurement to worry about “*after we get it to work*”.

However, in a survey of aerospace and defence second and third tier suppliers, 72% indicated that earlier involvement in the engineering design process would be beneficial both in terms of programme cost and lead time. The challenge in new programmes then is one of taking a collaborative approach to design and commercial arrangements far earlier than is traditionally the case. This is not the reality of many programmes within the aerospace and defence sector where, due to industry cycle many programmes are much further through the product lifecycle.

For existing programmes, where the design is already in production, all is not lost. By taking an engineering focussed look at costs the evidence suggests that significant savings can still be achieved, far in excess of those available through traditional procurement negotiation levers.

Realistically this can only be accomplished where engineering, procurement and suppliers are working together with a common set of design objectives – including target unit costs.

Where there is strong leadership support and a willingness to work in such a collaborative manner, engineering focussed cost reduction projects typically break even within a 3-month period and deliver an annualised return on investment of 5 or more.

## Traditional approaches to third party cost management

The vast majority of the resultant manufacturing costs (including third party spend) are locked in at the early stages of the engineering design.

Most design to manufacturing projects operate within some degree of time constraint.

In this environment tight programme development timescales often mean that designs are closed with haste with the intention of reopening upon reaching steady state production. This often does not happen and when it does financial commitments to non-recurring costs such as tooling in the supply chain can make the business case challenging.

Indeed in an attempt to meet the competing needs of functionality, performance and delivery, cost is often an afterthought or perhaps *“whatever it turns out to be”* in the list of Engineers priorities.

This mindset may well be compounded by a hands-off relationship between engineering and procurement where design is seen as the province of the former and cost the latter.

In order to keep some degree of commercial tension for price negotiations suppliers are often only involved in the design process well after the point at which they could add most value.

### Case Study 1: Space System

A satellite manufacturer was faced with significant cost challenges during the early stages of a 3 year manufacturing programme.

To make the programme commercially viable the company concluded that it needed to make significant savings in third party spend.

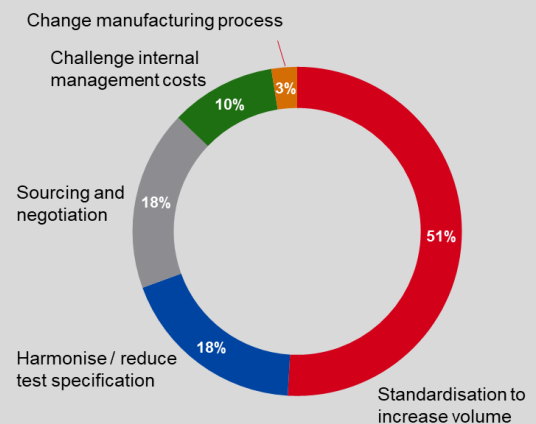
A traditional procurement led activity found only minimal potential savings opportunities available (circa 3-4%).

Deciding to adopt a different approach the company empowered a multidisciplinary team including engineering, testing, manufacturing, procurement and suppliers to consider the same problem.

The team undertook a detailed review of all the main system components which challenged specifications and opportunities for standardisation with other very similar componentry.

The results yielded realised savings of 25.4%.

#### Realised savings breakdown



The net result of these factors is then entirely predictable. Costs are often considerably higher than would otherwise be the case and technically successful projects are less commercially successful than would otherwise be the case.

Subsequent cost reduction efforts often rely on procurement negotiation tools, many of which can lead to minimal short-term gains and longer-term pain as supply chain relationships become damaged.

## Collaborative approach to third party cost

**B**y adopting a collaborative approach to front end engineering design it is possible to engineer lowest cost into the final product solution.

Businesses and projects that have been most successful in doing this are ones in which engineering and commercial functions as well as the supply chain are all aligned and working towards a common set of objectives. Specifically, for Engineers, this means treating unit production cost as another variable in the design parameters in the same way as weight, mechanical and electrical properties and functionality are considered.

Colocation of engineering and commercial staff helps this process and ensures that a wide range of potential suppliers can be engaged at the earliest possible point in the design project – thus making the maximum contribution.

Utilising internal as well as supplier parametric databases it may be possible to eliminate the need for some engineering and test activity altogether as well as keeping production costs to a minimum; Before designing a new component, it should be confirmed that there doesn't already exist something that would satisfy the same requirements and potentially increase purchase volumes.

### Case Study 2: Electronic Components

An aerospace manufacturer was challenged by its customer to reduce costs on one of its main sub-systems.

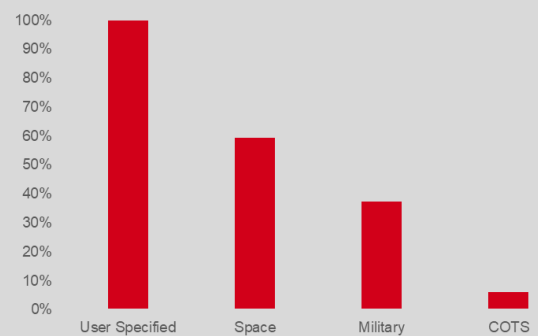
Having conducted a detailed review of the bill of materials it was concluded that several electronic components were costing significantly more than the benchmark for similar devices in other systems.

An engineering led team reviewed the specifications and performed a should-cost exercise to identify potential savings opportunities.

The team found that non-standard electronic components had been designed to such an exacting set of requirements and test conditions that the resulting cost was 40% higher than for space applications and 60% higher than for military.

The team undertook a relatively straightforward redesign exercise to enable the use of standard components applicable for the application and subsequently instigated policy changes throughout the design function to prevent future reoccurrence when not absolutely necessary.

Capacitor cost comparison



Evidence suggests that there is significant hidden cost associated with over-specification of component test requirements (or missed opportunities to conduct screening internally and at a cheaper cost on lower specification components). By including test engineering experts with an understanding of the cost and risk implication when writing procurement specifications unnecessary costs can be avoided.

Many of these simple approaches can be applied retrospectively to existing designs – with surprisingly good results.

## Conclusion

**T**he boundaries between business functions tend to include explicit as well as implicit ownership of outcomes; Engineering is responsible for functionality and performance, Manufacturing is responsible for quality and delivery, Procurement is responsible for cost and lead time. The reality is much more nuanced, all main functions to some degree impact the range of outcomes, cost being the most obvious example.

There are some practical steps that can be taken to ensure that costs are managed effectively throughout the design process and not left to the domain of procurement (who in reality can do very little).

1. Include target unit production cost within the design parameters of all components / subsystems
2. Review existing components before designing new ones and where possible standardise across programmes to increase procurement volumes
3. Engage the supply chain very early in the design process
4. Collocate engineering and procurement staff
5. Rigorously challenge the appropriateness of test specifications

Even at the late stages in the development and early production there are still significant opportunities to reduce costs if there is a willingness to collaborate across functions.



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