

# Improve your Productivity through Collaborative Engineering Management

## “Systems engineering has a significant quantifiable return on investment”

This is one of the conclusions from Eric Honour's seminal PhD thesis [1].

Eric's research was designed to gather empirical research about how systems engineering methods relate to project success. He developed an interview approach and used it to interview project managers and lead systems engineers on 51 completed projects in 16 organisations.

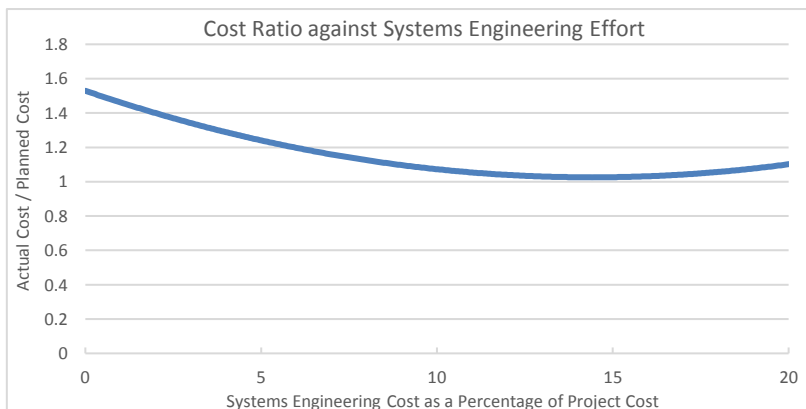
The overall conclusions from the research are that there is a correlation between the application of systems engineering activities and a team's ability to meet planned programme costs, schedules - and satisfy stakeholder needs.

Some of the specific findings are:

- The level of systems engineering effort matters to the success of projects
- Greater systems engineering effort is associated with projects that have significantly less cost overrun.
- There is an optimum amount of systems engineering for best project success.
- Projects typically use less systems engineering effort than is optimum for best success.

The third and fourth of these findings are of particular interest.

Of the projects that Eric investigated, those that operated with little or no systems engineering effort could experience a return on investment as high as 7 to 1 (i.e. a project cost reduction seven times as great as the added systems engineering cost). The return on investment then decreased to zero when the systems engineering effort reached 14.4% of the total programme cost. Levels of systems engineering effort above this had a negative return on investment (see the figure below). Typically, the projects employed systems engineering at about half the optimum level.



### What is a system?

A system is a combination of interacting elements organised to achieve one or more stated purposes.  
*As defined in ISO/IEC/IEEE 15288 [2].*

An element is any identifiable entity.  
*As defined by Kuhn [3].*

### What is systems engineering?

Systems engineering is an interdisciplinary approach governing the total technical and managerial effort required to transform a set of stakeholder needs, expectations, and constraints into a solution and to support that solution.  
*As defined in ISO/IEC/IEEE 15288 [2].*

This research shows that there can be significant productivity gains through appropriate application of systems engineering effort in a project.



## References:

- [1] "Systems engineering return on investment", Eric C Honour, thesis submitted for the degree of Doctor of Philosophy, Defence and Systems Institute, University of South Australia, January 2013. Available at: <http://www.hcode.com/seroi/documents/SE-ROI%20Thesis-distrib.pdf>
- [2] "Systems and Software Engineering – System Life Cycle Processes", ISO/IEC/IEEE 15288, 15 May 2015.
- [3] "The Logic of Social Systems: A Unified Deductive System Based Approach", Alfred Kuhn, 1974.

*Collaborative Engineering Management describes SyntheSys' approach to systems engineering with expert personnel and appropriate tool support. We have helped many organisations increase their productivity through advice on processes, training and the introduction of software tools. Please contact us to find out more.*

## About SyntheSys

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