

Requirements Management: Fundamental to Successful Collaborative Engineering

“Dealing with requirements is an essential part of every engineering endeavour.”

So states *Requirements Engineering* [1], the classic textbook on that subject.

This statement is true regardless of the nature of the collaborative engineering effort, whether the requirements are expressed in the epics and user stories of agile methods or expressed in more traditional ways.

Requirements Management can be defined as *the subset of system engineering concerned with discovering, developing, tracing, analysing, qualifying, communicating, planning, monitoring and controlling requirements that define the system at successive levels of abstraction.*

This definition addresses the main activities involved in Requirements Management, as summarised below:

Discovering begins with “studies to understand potential new organisational capabilities, opportunities, or stakeholder needs” [4].

Developing takes the business, mission, and stakeholder needs identified during *discovering* and refines them into system requirements.

Tracing is the mapping of the relationships between requirements and other artefacts of the collaborative engineering process.

Analysis is concerned with confirming the integrity of requirements and that they adequately reflect stakeholder needs.

Qualifying refers to all testing activity, more usually referred to as verification and validation.

Communicating refers to requirements as the means of communication between stakeholders on what is to be achieved.

Planning, monitoring, and change control activities associated with defined requirements.

Levels of Abstraction refers to the practice of organising requirements into layers of progressing system detail reflecting interests of different categories of stakeholders.

References:

- [1] “Requirements Engineering”, Elizabeth Hull, Ken Jackson, and Jeremy Dick, Springer-Verlag, 2011.
- [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.
- [4] “Systems Engineering Handbook”, International Council On Systems Engineering, John Wiley and Sons Inc., 2015.

About SyntheSys

SyntheSys provides defence systems, training, systems and software engineering and technical management services over a spectrum of different industry sectors. Along with distinct support and consultancy services, our innovative product range makes us first choice provider for both large and small organisations. Established in 1988, the company focus is on fusing technical expertise with intuitive software applications to solve common industry challenges.

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].

What is a stakeholder?

An individual, group of people, organisation or other entity that has a direct or indirect interest (or stake) in a system.

As defined by Hull et al [1]

What is a need?

A need is a thing that is wanted or required. For a system, needs are often capabilities or things that are lacking but wanted or desired by one or more stakeholders.

As defined by the Systems Engineering Handbook [4].

What is a requirement?

A requirement is a formal structured statement that can be verified or validated. There may be more than one requirement defined for each need.

As defined by the Systems Engineering Handbook [4].

We use the phrase Collaborative Engineering Management as a generic term to describe modern structured engineering methodologies (including Product Life cycle Management (PLM), Application Life cycle Management (ALM), Concurrent Engineering, Collaborative Life cycle Management (CLM), and Agile) that have systems engineering activities as part of their basis. It describes the SyntheSys approach to systems engineering with expert personnel and appropriate tool support. We have helped many organisations increase their competitiveness through advice on processes, training and the introduction of software tools. Please contact us to find out more.

