

A Systems Approach to Support Engineering

Overview

A one day introduction to Support Systems Engineering for Systems Engineers. This is a short Course designed to introduce the concepts of Support Engineering in a Systems Engineering context. It is targeted primarily at engineers, its aim being to emphasise the nature of Support Engineering in a dynamic and memorable manner.

Target Audience

Practicing engineers, Systems Engineers, Systems integrators and related management personnel.

Objectives and Utility

The Delegate will understand the need for Support Engineering and the nature of Support Engineering, that is, it is an element of Systems Engineering. They will also become aware of the scope of Support Engineering and appreciate the many interactions that occur between the elements of the Total System.

In particular, they will appreciate the impact that the Mission System design decisions, Mission System design processes and the associated design information that is generated, has upon the Support Programme and upon the ultimate Cost Effectiveness of the System. Hence, they will understand the potential impact these factors have upon the effectiveness of the organisation.

The Training Process

The process begins with the identification of the 'Customer's' (the user) need, in both financial and performance terms. The concept of the 'Total System' and the Support aspects of the Total System are derived from an examination of this need. This is done interactively with the Delegates. The inter-relationship between the Mission System design and the Support System requirements is then explored. The concept of 'System Failure Dynamics' is introduced and related to the Failure Modes, Effects and Criticality Analysis (FMECA) and Fault Tree Analysis (FTA) methodologies.

Those aspects of the Total System that have a Support 'dimension' are then identified, for example:

Mission System: Reliability, Maintainability, etc.

Support System: Manpower level, Skill levels, Spare quantities etc.

Concept of Employment: Usage rates, Environment etc.

A sketch of the Total System is created on a white board during this discussion process. The sketch will show the Mission System, the Support Infrastructure (The Support System) and an indication of the Concept of Employment.

Once complete the white board sketch is replaced with Aspire's Dynamic Total System Model (DSM). The DSM is used to illustrate the system interactions in a graphical and memorable manner. A range of issues (pre-scripted) are addressed using the DSM to illustrate the points being made. Issues addressed will include the impact of the Mission System design on Availability and Support costs, the impact of the environment on Reliability and down-time and the impact of Support System design (e.g. turn around times) on Spares requirements and Availability.

The Course will end with a summary that relates the issues covered and the organisations business objectives, to Systems Engineering and to the ISO standard 15288 - Systems Engineering and Systems Life Cycle Process.

Course marketed to design engineers at Thales Glasgow by WWP via Sean Lowe.

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Course Programme

Day 01 - AM

038-P A Systems Approach to Support Engineering

A short introduction to the 'Total System' concept is given which introduces the concept of the 'Mission System', the 'Support System' and the 'Concept of Employment'.

Then the module addresses 'System Dynamics', with, the Presenter, in an interactive session with the Delegates, discussing 'traditional' system dynamics (e.g. the Mission System is designed so that it reacts to some stimuli in a controlled manner). This is the type of consideration a Systems Engineer addresses as routine.

We then move on to consider what occurs when the system fails to react? (e.g. it has failed). The argument is made that other system elements therefore need to be created which react to the failure. These may be Mission System elements (e.g. BITE etc.) or Concept of Employment elements (e.g. Standard Operating Procedures [SOPs]) but predominately they will be Support System elements.

The concept of the Failure Modes Effects and Criticality Analysis (FMECA) is introduced here, and it is explained that an FMECA or a Fault Tree Analysis (FTA) is designed to address 'System Failure Dynamics'. This element of the module essentially introduces FMECA and FTA from a new perspective.

The module relates the issues covered to an organisations business objectives, to Systems Engineering and to the ISO standard 15288 - Systems Engineering and Systems Life Cycle Process. This part of the module forms the "summary" section.