Essentials of project and systems engineering management, by Howard Eisner

A Book Review by Ian Jay

For organisations that develop complex systems for third parties, a structured method reduces risk and improves chances of success. This textbook by Eisner gives a complete overview of what that method looks like.

Eisner's work is a basic text that deals with the task of building complex systems. There are two main sections covering Project Management and Systems Engineering. Smaller sections describe integration and trends, as well as cases on systems architecture. The initial section introduces the book, and describes the roles of the project and systems engineers.

Managing complex system development
The problem with complex technology is deciding how to manage its development. Knowing what to expect from the project manager and what supporting roles should be in place is a concern. In the systems approach there are two main roles, the project manager and the systems engineer. Each has a defined set or responsibilities and how these ought to be performed is set out in various published standards.

The role of the Project Manager
Part II of the book covers the essential aspects of the project manager role. It sets out considerations for planning, schedule and cost management, leadership and team building. There is useful coverage of cost control techniques, sources of risk related to cost and a practical approach to handling these. Written from the viewpoint of a sub contractor the book is a useful guide for third party suppliers. The leadership chapters deal with personality traits and give guidance on self-awareness. The final chapter in this section covers team building and interaction within the team.

Systems Engineering
The Systems Engineering section lists thirty elements of the method. It describes these in some detail. The next three chapters deal with Requirements, Architecture, and Software Engineering. In all these chapters, the methods used are set out as logical frameworks and the relevant standards identified. For a project manager this is a useful place to discover what to expect from the technical specialists.

In the Software Engineering chapter is a measure of complexity. This interesting metric uses the number of paths through the system. The number of paths reflect the effort needed to test a specific module and indicates how well designed it is.

The last chapter in the Systems section provides a tutorial. This deals with statistics then moves to metrics for system and software reliability. These relate to earlier chapters that discuss metrics for the software development process.

The last section of the book discusses trends in three areas, project, systems and software engineering. There follows a discussion on how the various elements integrate the method. In the appendix, there are cases to support the systems architecture chapter.

Standards
The book identifies a complete set of standards that are relevant to the systems development area. Because it covers so much ground, it is more useful as a handbook that identifies what should be in place in this environment. It has a comprehensive set of references at the end of each chapter.

Most of the standards described come from one of three sources, the IEEE, NASA and the US DoD. The kinds of systems spoken about in the text are related to space and military applications.
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