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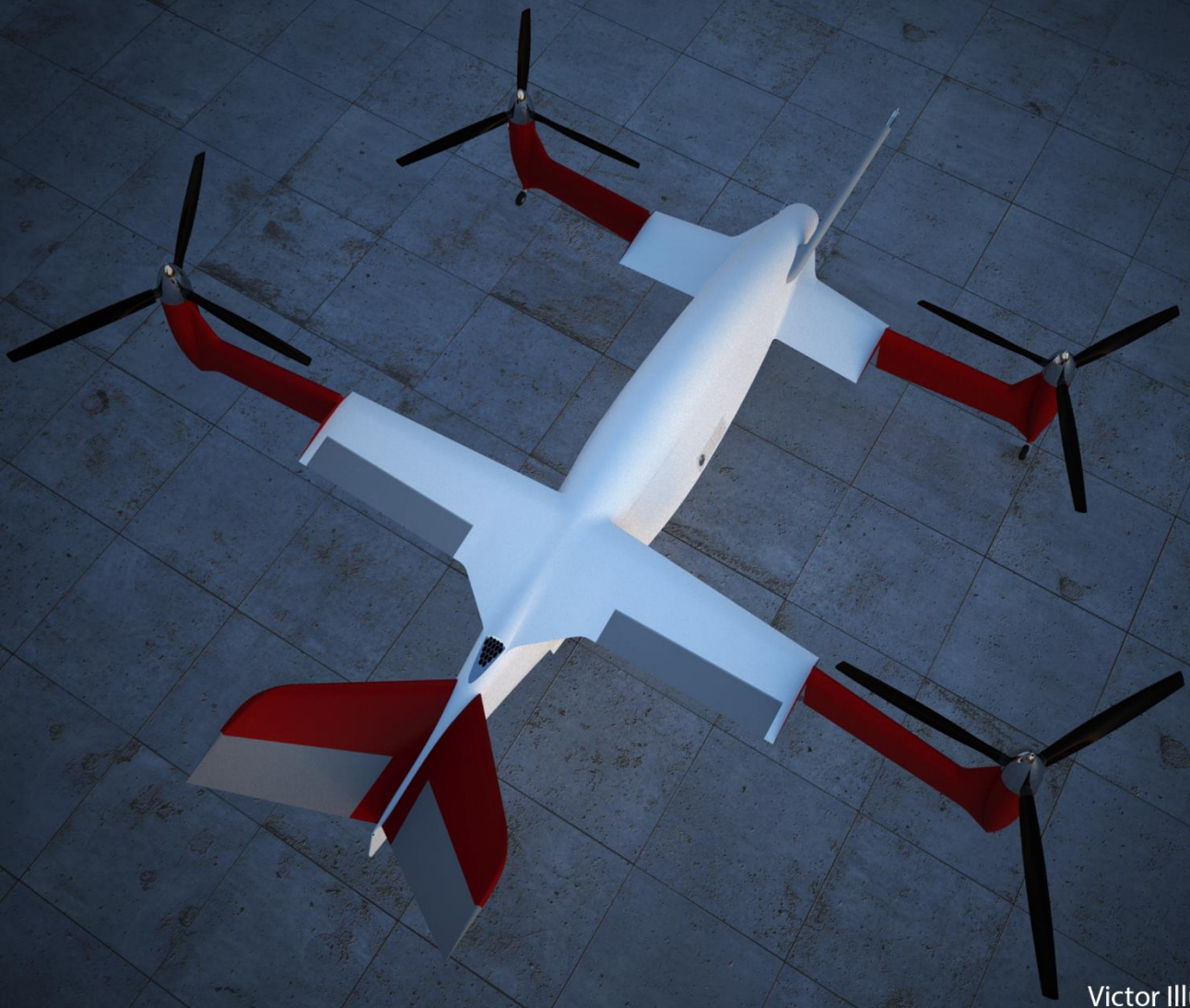
Modern Integrated Technology of Information Systems Design and Development:

From Programming to Project Management



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This monograph is intended for modern engineers as a manual on the up-to-date software development technology used for different applied problem solutions. The fundamentals of structured and object-oriented paradigms as well as useful tools based on the world famous standards are presented and discussed.

Contents

PREFACE

The main purpose of this monograph is to introduce the up-to-date technology of software development for different applied problems solution as one of the most important spheres of modern engineering activity.

It is absolutely obvious today that the role of information technology in everyday engineering activity rises steeply. Moreover, the efficient skills in information technology form the obligatory and essential part of the qualification requirements to modern engineer.

The first, second and third chapters give the general review of software development methodologies and patterns; describe basic data structures and classical algorithms as well as their implementation using the structured paradigm.

Our main goal was to cover the full cycle of software development including analysis of the problem, constructing the static and dynamic models, designing the algorithms and software itself, implementing it and finally testing.

All basic concepts, data structures such as arrays, lists, stacks, queues, sets, maps, files and algorithms of sorting and searching are illustrated with carefully selected examples.

The fourth and fifth chapters present the perspective modern technology of object oriented approach in software development including object oriented analysis (OOA), object oriented design (OOD) and object oriented programming (OOP). The basic concepts of object oriented paradigm are defined and thoroughly explained. They are:

- objects, classes, attributes, methods;
- encapsulation, inheritance, polymorphism;
- iterative process of analysis-design-implementation;
- Fundamental software design patterns.

Examples of physical processes and technical systems are used to illustrate the material.

The sixth, seventh and eighth chapters describe the modern approach to the reliable software development based on the world famous standards such as SADT, IDEF, and RUP. The main stages of the development and project control, the features of input and output information as well as the essence of each stage are presented here.

The ninth chapter describes the method of self-awareness in the development of multi version software using the standard PSP.

The big amount of information in this monograph is natural. It is caused by the need of modern engineer to keep step with the rapid evolution of software development technology and to choose the most appropriate tools and instruments in his or her professional activity.