The O^{3}neida Publications Series

This book is one of a series of books to be produced within O^{3}neida on various subjects related to distributed automation.

O^{3}neida is a Canadian not-for-profit corporation. O^{3}neida Europe is a not-for-profit association headquartered in Brussels, Belgium. Together they form the hub of the O^{3}neida networks. Their joint mission is to operate as a network of networks fostering the development and deployment of distributed industrial automation technologies based on open standards. These standards include, among others, the Foundation for Intelligent Physical Agents (FIPA), the Device Profile for Web Services (DPWS), Web Crawler (WC), and International Electrotechnical Commission (IEC) 61131 and 61499.

This book contains a collection of papers focused on the simulation, diagnosis, modeling and predictive control of complex industrial systems. These papers have been developed under the aegis of ANIPLA, the national automation association of Italy, which celebrated its 50th anniversary in 2006.

ANIPLA, Associazione Nazionale Italiana Per L'Automazione, the national automation association of Italy, was founded in 1956. It is a scientific non-profit association, whose mission is to promote the discussion, dissemination and education on the technological, industrial, application-oriented and social aspects related to automation. Its main technical services include organization of workshops, courses, congresses, journal papers, and books.

ANIPLA is the meeting point of different competencies and know-how stemming from Industry, Research Institutes and Universities across a wide range of different application areas. ANIPLA's overall objective is to give competitive advantage to the extent possible, to automation-related enterprises in all Italian industrial sectors.

Within this book, there is a strong focus on the real-time monitoring and control of energy production and delivery systems and on the application of innovative approaches ranging from the predictive control of a gasoline engine, through fuzzy inference applied to quality control in the paper industry and up to innovative load shedding and demand management in national electrical grids.

This book will be of interest to practitioners within the automation field, particularly those focused on energy systems. It will also be of interest to academics and students seeking an overview of current thinking in this field or looking for detailed treatment of any of the issues covered by the individual chapters.

More than forty authors from countries around the world have contributed to the production of this unique book and O^{3}neida thanks them, one and all, for their strong collaboration in producing this excellent compendium and for their continuing contribution to the advancement of automation process control.

Future volumes in the O^{3}neida/ISA series on automation will address other equally pressing issues such as Ethernet Safety Devices and also Ontologies. O^{3}neida will also publish materials on automation objects as part of this series.

Finally, this book is the result of a concerted effort by many O^{3}neida members. I thank them all for their dedication and commitment to O^{3}neida as volunteers. I particularly thank Luca Ferrarini from Polimi in Milan, Italy for leading this effort and Allan Martel, O^{3}neida Chief Operating Officer, for coordinating and managing the development of the O^{3}neida series of books on distributed automation.

I also thank ISA for their interest and support in making the publication and distribution of this important book possible.

—Antonio Valentini
    Chief Executive Officer
    O^{3}neida