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## FOREWORD

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### IEICE/IEEE Joint Special Section on Autonomous Decentralized Systems Technologies and Their Application to Networked Systems

The Autonomous Decentralized Systems (ADS), born in Japan approximately 30 years ago, have technologically evolved in communication networks, information systems, and control systems. It has been applied in many actual systems, and it has progressed in standardization activities. IEICE and IEEE published joint Special Sections on "Autonomous Decentralized Systems" in May 2000, October 2001, December 2005, and September 2008 cooperating with the International Symposium on Autonomous Decentralized Systems (ISADS). However, after that, ADS technology has been making drastic improvement, and innovative new research is being reported successively.

Recently, in ADS, subsystems form community for meeting their purposes and cooperate with each other. In such a heterogeneous community, assurance is required to continue operations for adaptability to change of circumstances. Moreover, scalable structure and timeliness behaviors need. Research meeting on Assurance System has been started in June 2000 under the Technical Group on Dependable Computing. In the United States, IEEE, DARPA, industries and universities established High-Assurance Systems Engineering Symposium (HASE). In July 2002 some members from Technical Group on Information Networks and Technical Group on Dependable Computing founded the International Workshop on Assurance in Distributed Systems and Networks (ADSN). The first ADSN was held in July 2002, and the workshop was anally held. In addition, the 9th ISADS 2009 was held at Athena in Greek in March 2009. It is very challenging to realize Assurance Systems with conventional Fault Tolerance Technology and High Reliability Technology. Hence, ADS is expected to be promising as the core technology for Assurance Systems substituting conventional technologies.

The objective of this Special Section is to discuss new technologies in the field of Autonomous Decentralized System through papers. Due to the fact that ADS have cross-fielding wide applications, this special section has been planned by coordinating the Societies of IEICE Communication (B), and Information and Systems (D) and IEEE.

There were 31 submissions and the editorial committee selected 12 papers. The selected papers are categorized to Community (structure), Assurance (function), and Scalability and Timeliness (value) as mentioned above. These are identified as emerging trends in ADS. The editorial committee hopes that these sophisticated papers will make great contribution to the ADS, related technologies and their applications.

As the Guest Editor in Chief, I would like to express my sincere appreciation to all the authors for their contribution, and to all the Editorial Committee members for their review works.

#### Editorial Committee Members

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Yukikazu Nakamoto, Guest Editor-in-Chief

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**Yukikazu Nakamoto** (*Member*) received M.E. and Ph.D. degrees from Osaka University in 1982 and 2000, respectively. From 1982 to 2004, he worked for NEC Corporation. In 2004, he joined the University of Hyogo and is currently a Professor of Applied Informatics. From 1990 to 1991, he was a Visiting Researcher at Cornell University. From 2003 to 2004, he was a Visiting Professor at The University of Electro-Communications. Since 2006, he has been a Designated Professor of the Center for Embedded Computing Systems, in the Graduate School of Information Science, Nagoya University. His research interests include real-time systems, distributed systems, mobile systems, and software development environments. He is a member of IPSJ, IEEE Computer Society, ACM, and USENIX.

