Preface

These proceedings contain the papers presented at the 1st NASA/ESA Conference on Adaptive Hardware and Systems (AHS 2006), held in Istanbul, Turkey, on June 15–18, 2006. The purpose of the AHS 2006 conference is to bring together leading researchers from the adaptive hardware and systems community to exchange experiences and share new ideas in the field.

Adaptation reflects the capability of a system to maintain or improve its performance in the context of internal or external changes, such as uncertainties and variations during fabrication, faults and degradations, modifications in the operational environment, incidental or intentional interference, different users and preferences, modifications of standards and requirements, trade-offs between performance and resources, etc.

Adaptation at hardware levels increases the system capabilities beyond what is possible with software-only solutions, and a large number of adaptation features employing both analog and digital adjustments are becoming increasingly present in the most elementary system components. Algorithms, techniques, and their implementation in hardware are developed over a diverse variety of applications, such as adaptive communications (adapting to changing environment and interferences), reconfigurable systems on a chip and portable wireless devices (adapting to power limitations) or survivable spacecraft (adapting to extreme environments and mission unknowns).

The papers presented during the conference spanned many issues: fundamentals and theory, state-of-the-art adaptive technology in the area of analog circuits, antennas, optical systems, and signal processing, as well as evolution of digital systems, design and development of reconfigurable devices, architecture, and systems, morphogenetic and cellular adaptive hardware, fault-tolerant and self-repair systems, and applications to sensing, image processing, communications, biometrics, and content based security systems.

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