

History of Autonomous Decentralized System research and development

Hitachi's autonomous decentralized system began development as an epoch-making system concept that came into being using biological organisms as models in 1977 and has thus been applied to the information control systems of general industries, such as those involved in railroads and steel.

In 1993, the first International Symposium on Autonomous Decentralized Systems (ISADS) was held in Japan, where 286 people from 16 countries participated with the mission to engage in discussion concerning the potential of autonomous decentralized systems. Since then, this discussion has continued, and the ISADS was again held in the U.S. (in 1995), Germany (in 1997), and Japan (in 1999), and has been held every two years since then. Autonomous decentralized system was also selected as a subject of priority for scientific research funded by the Japan Ministry of Education, and Hitachi was also requested to participate in the research together with university researchers around Japan, in order to help advance this research. We have also promoted exchange through joint research with the University of California and Arizona State University, along with a production system project with U.S. industries. In order to put autonomous decentralized systems to use in more fields, we have improved our techniques to apply the system and proposed 300 domestic and overseas patents.

Furthermore, we commercialized the open Autonomous Decentralized System (and network) based on the Ethernet in 1994 and released the protocol specification in 1996 to promote FA standardization in Japan. At the MSTC (Manufacturing Science and Technology Center)/JOP (Japan FA Open System Promotion Group), universities, users, and vendors participated in using this release specification to advance standardization and demonstration projects. As the JOP specification—the specification of the Ethernet-based Autonomous Decentralized System Network (ADS-net)—was established, its protocol specification (both in Japanese and English versions) was released free on the MSTC website in 1999. This specification has enabled every person in the world to freely develop, sell, and use ADS-net on a free-of-royalty

basis. As an open communication platform for distributed systems in the truest sense, ADS-net is expected to become more and more widespread in the future.

In addition, as for international standardization, the proposal to standardize the Ethernet-based control network framework including ADS-net was adopted as an NWP (New Work Item Proposal) at the International Organization for Standardization (ISO). After that, ADS-net became an international standard (ISO15745) in 2003. Originating in Japan, ADS-net is expected to lead the world as the international standard network.