Institute of Industrial Technologies and Automation of Italian National Research Council shows at BIMEC 2005 the new technologies designed and developed in the field of Open Control Architectures based on PC hardware and in the field of Microtechnologies.

Stand E01G ITIA-CNR – Padiglione 12. BIMEC - Fiera Milano City.

For further information and documentation (also in electronic format) related to ITIA-CNR activities, please contact Lorenzo Molinari Tosatti, e-mail l.molinari@itia.cnr.it or call at +39 02 2369 9962.

**INSTITUTE OF INDUSTRIAL TECHNOLOGIES AND AUTOMATION**
for manufacturing competitiveness and sustainability
Bridging the Gap
from RESEARCH to MARKET

**From the development of:**

- **OPEN CONTROL ARCHITECTURES BASED ON PC HARDWARE FOR ROBOTS**

In Automation Industry, the increasing interest in flexible and custom solutions together with the need of cost reduction drives towards the use of PC-based hardware and open-source real-time operating systems (RTOS). In such a scenario, since some years IRAS research group within the ITIA-CNR has designed, implemented and validated an architecture for rapid prototyping of multi-platform control systems (QNX 4.25, Linux RTAI etc.). The platform, based on modularity, reconfigurability and portability, allows the development of control systems that are easily reconfigurable with reference to robots with different kinematic architecture (serial, hybrid, parallel kinematics). A first implementation, based on RTOS QNX 4.25, was shown during the EMO fair in 2003 and applied to the control of a parallel kinematic robot named Morphem. In BIMEC 2005 fair, as demonstration of the software portability, a new implementation based on the open-source RTOS Linux RTAI is presented concerning the control of the redundant industrial robot PA-10, manufactured by Mitsubishi.

- **MICROTECHNOLOGIES**

The possibility of extend the knowledge on industrial robotics and in particularly on Parallel Kinematic (PK) architecture at micro-level stimulated the foundation of a new research group dedicated to the study of microtechnology. In this context the METIS group was born within ITIA-CNR. Its aims include conception and fabrication of complex micro-devices according to two approaches: the first approach is based on the silicon micro-electronics technology, the second one is based on the employment of a variety of materials which have to be assembled in the second place. Concerning the first approach, deep studies on the dynamic characterization of silicon and on the fabrication of micro-joints have been done. Regarding the second approach, new techniques for assembling micro-components has been studied. Moreover a micro-device with parallel kinematic architecture, with promising applications in optical field, has been conceived and prototyped.
ITIA-CNR's research and activities are aimed at setting up a National Industrial Research System, especially for machine tool mechanics, which will provide the country with the Manufacturing High-Tech needed to ensure the competitiveness and sustainability of Italian products on the world market. ITIA-CNR's industrial research activities cover industrial sectors that play an important role in the Nation's economy (Mechatronics, Design, Home Appliances, Components, New High-Tech Products) and study the whole life cycle of the products and processes in order to contribute to the competitive, credible growth of the manufacturing sector.

The research company Sintesi (main partners: ITIA-CNR, Prima Industrie, SCM Group, Aetna Group, Gamfior, Plastal, Masmec), in partnership with Comau, aims at transferring the knowledge coming out from industrial research activities to the national industrial context.

ITIA-CNR, Institute for Industrial Technologies and Automation of National research Council, plays a major role in the National and International Research system. Through its industrial research activities, the institute works on the development of new machinery and systems and studies new organizational models with the use of emerging technologies. Thanks to its activities, ITIA-CNR is able to promote important programmes for the training of specialists like, for example, the third Master in Industrial Research course which began this year.

ITIA-CNR is a Network Institute comprising sections and labs spread all over the country:

- **Milano Headquarters:** carries out research and development activities concerning manufacturing equipment and the enterprise of the future.
- **Roma Section:** oriented towards the study of supply chain management models and logistics.
- **Bari Section:** dedicated to industrial development activities concerning new manufacturing equipment related, in particular, to assembly and Service Manufacturing.
- **Vigevano Lab:** houses a pilot automated and integrated system for the design and production of footwear.
- **Trento Lab:** dedicated to the development of new methodologies and tools for the design and simulation of mechanical systems and micro-systems.
- **Caserta Lab:** houses a pilot integrated system for the design and production of wooden panels.