**MEchatronics
and Systems for
Advanced Production
Innovation Cluster**

AMICO

**Budget: 1,3 MEuro
From 2010 to 2012**

ADVANCED MONITORING AND INTELLIGENT CONTROL

The AMICO Project aims at designing, developing and testing a multi-camera optical sensor able to realize an intelligent and flexible monitoring and control of the operative space of industrial robots, machine tools and production processes. The sensor allows the contact-less measurement of the "pose" (position and attitude) of moving bodies and it will be conceived and developed for achieving the following outstanding characteristics:

- ability to work in an industrial environment by adapting itself to variable environmental conditions;
- high dependability;
- use of low cost cameras;
- "Plug & Play" functionality.

TECHNOLOGIES

Main involved technologies are:

- **CMOS technology, applied for developing the multi-camera optical sensor**
- **Innovative data fusion algorithms**
- **Wi-Fi technology.**

Innovative data fusion algorithms will be applied, able to:

- allow the contact-less measurement "in real-time" of the pose of moving rigid bodies equipped with suitable markers;
- automatically carry out the camera calibration during the system start-up, which will be continuously updated during the normal system working;
- automatically detect the camera pose during the system start-up phase and continuously update it while the instrument is normally operating.

The advanced data fusion algorithms pave the way for using in the industrial field low cost cameras based on CMOS technology, not applicable until now.

A suitable Wi-Fi communication network – expressly set-up for operating in an industrial environment - will be realized for exchanging data among the cameras, the central processing unit and the local networks of interconnected machines and/or processes.

APPLICATIONS

EXPERIMENTAL AND RESEARCH PILOT STATIONS

Two pilot stations, for experimental and research aims, will be realized during the project respectively at the National Institute for Measurement Research (INRIM) for multi-camera sensor measurement certification, and at the laboratory of the DISPEA department of the Politecnico di Torino, for the multi-camera sensor technological testing.

INDUSTRIAL APPLICATION ON FIDIA MACHINE TOOL

A FIDIA milling machine tool will be equipped with the multi-camera sensor with the aim to measure the "pose" of the tool during the process, in order to detect the error of the real tool pose with respect to the required one. A closed control loop, working at higher hierarchical level with respect to the FIDIA control loop, will be able to correct the tool pose error.

INDUSTRIAL EXPLOITATION

The main project goal is to realize a new sensor that, integrated with an innovative methodology on the existing machine tools or processes, improves their precision, efficiency and flexibility. Furthermore, the high scalability that the multi-camera sensor provides (i.e. changing the lens), allows to extent the use and the performance of the same sensor to a wide range of different applications.

The exploitable results appear particularly important for FIDIA that – as end user – could put on the market a new machine tool model that, integrating the new multi-camera sensor, can provide higher performance with respect to their competitors. Together with the industries, absolutely relevant appears also the territorial impact of the project, assured by the dissemination actions carried out by the research institutes involved in the Consortium (DISPEA, INRIM and ISMB), in order to guarantee the success of the innovation.

PARTNERS

EICAS Automazione S.p.A.

iNRiM ISTITUTO NAZIONALE DI RICERCA METROLOGICA

actua Actuation and Control Technologies

FIDIA

POLITECNICO DI TORINO

I S M B Istituto Superiore Mario Boella

SYNERGY FOR SUCCESS

**www.mesapiemonte.it
mesap@ui.torino.it**