KB MUSICA : COMMERCIAL OPPORTUNITIES VIA PRACTICAL DEMONSTRATION
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1. INTRODUCTION

The objective of KB MUSICA is to develop an integrated framework for process control and other industrial CIM applications bringing together new generations of fieldbus technology, knowledge-based systems, control techniques and intelligent multi-sensor systems.

The work programme addresses a number of practical measurement and control problems covering a range of variables from standard equipment such as pressure measuring devices to new systems coping, for example, with object recognition of tactile information.

The aim is to develop validated prototype systems based on the specific technical requirements of four demonstrator plants in widely differing industrial sectors (chemical production, metal deburring, glass manufacturing, plastic processing).

A considerable number of hardware and software products are expected from KB MUSICA. Plans for their exploitation are given a high priority by the Project Partners.

2. WHAT IS KB MUSICA?

KB MUSICA is an acronym describing the Project scope:

K = Knowledge
B = Based
MU = Multiple
S = Sensor systems
I = In
C = Computer integrated manufacturing
A = Applications

An alternative title might be 'Low Cost Intelligent Sensing and Control Systems'.

A consortium, made up of five contractors and nine associate contractors from seven countries, has been established to execute the project on a 3-year time scale (Fig 1).

3. TECHNOLOGICAL HORIZONS

The objective of KB MUSICA is to develop and integrate a range of technologies in order to enhance industrial control systems. The total scope includes technological developments in the areas of sensors, fieldbus, knowledge-based systems and multi-variable control schemes.
Sensors

The Project Plan includes the development of enhanced sensors which will possess a capability for self-validation of their operation. These sensors are 'enhanced' by their ability to self-compare actual operating parameters with reference data; when these comparisons indicate that degradation or a malfunction may be occurring, further routines are invoked to confirm that an error condition is present and to determine the cause or type of failure.

Exemplification of the technology is provided by its application to four specific Demonstrators, selected to represent a wide range of potential users. It is intended, for example, to extend existing work on toxic gas monitoring to provide faster and more complete transmission of data coupled with a more informative presentation of results at both the operators' terminal and within a global database. Data leaving the enhanced sensors is to a much higher quality and reliability than previously available from conventional sensors; these data, presented through a Man Machine Interface (MMI) to the operator, will reduce the incidence of spurious plant shutdowns and lead to better economic and safety performance. At a higher level, Multi-sensor Systems (MSS) are being devised for more demanding applications aimed at providing decision support systems for use in the automated supervisory control of robotics and industrial production processes. Sensor data fusion techniques are also being developed, to overcome partial or incomplete information supplied from imperfect sensors.

Fieldbus Technology

It is already clear that, if European Industry is to enjoy a dominant position in the immediate future, there must be an emerging role for the use of Knowledge Based (KB) Intelligent Measurement Systems (IMS). One of the constraints to widespread deployment of such a system has been the high cost of data transfer using conventional cabling systems. This problem can now be solved by utilising a fieldbus system to convey the data between actuators and sensors. The main requirements for a successful fieldbus system are high speed and low cost, the specific goal being to achieve a chip cost of less than 10 ECU with the acquisition period for at least 32 simple variables guaranteed to be less than 10 milliseconds. KB MUSICA will demonstrate that digital bus technology is the best way to perform monitoring and controlled calibration of sensors.

Multi-variable Control

Multi-variable Control (MVC) systems provide maximum interactive control and, consequently achieve a much faster overall response to a complex processing problem than can be achieved by conventional techniques.