

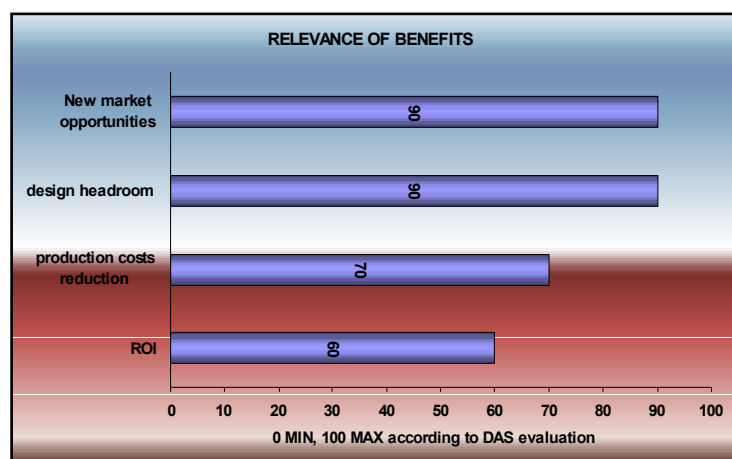
Medical Analyser Control System

The adoption of Open Source Linux based Embedded Operating System and Ethernet TCP/IP connection enabled the company to improve product functionalities reducing time to market and design risks.

Das, designer and manufacturer of electronic and robotic systems, was established in 1977. Since then, many successful products have marked its headway. Its acknowledged growth in advanced technology applications is leading DAS to be one of the most competitive manufacturer of analytical and monitoring automated systems. The main application fields are: environmental pollution, diagnostic analytical processing, detection and acquisition of physical data as well as medical care. Main products of DAS, delivered also through OEM market are: clinical chemistry photometers, micro-plate processors and plate readers for HIV ELISA processing diagnostic, neonatal bilirubin analysers, data loggers and samplers for environmental pollution monitoring

DAS s.r.l.	
Employees	41
Turnover	1700K€(yr2002)
Industrial sector	analytical and monitoring automated systems
Technology introduced	uC Linux, TCP/IP

ECONOMIC BENEFITS



The integration of new capabilities to efficiently provide remote monitoring control enables now the company to gain a wider market share. The market leading technology adopted will deliver reduced time to market and low design risks of new products.

- Expected return on investment of 219% over three years;
- Reduction of production costs (the functionalities of two boards are compressed into only one; thanks to a sophisticated interface the final checking time is reduced);
- Design headroom: reduced time to market of new products using the same control section;
- New market opportunities derived by the possibility to offer the product to customers that need high throughput (two instruments instead of only one, run by the same PC).

PRODUCT IMPROVEMENTS

Main improvements of the enhanced product are:

- Standard Ethernet 10/100 network connection.
- The unit is remotely controlled by means of TCP socket connections and from the local dynamic web server;
- The local web server presents dynamic data and is provided as an additional mean to configure the system and to monitor its proper behavior, without the specific need of dedicated software applications on host;
- The ability to remotely adjust the settings of the installed equipments;
- The ability to effectively manage remote maintenance as well as local configuration and control of local peripherals;
- The capability to connect more than one apparatus to the same PC using the Ethernet connection.



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How to go about it

TECHNICAL CHOICE OPTIONS

The rationale for the technology selection was the following:

Open Source Linux : The use of an open source embedded Linux in the control board ensured a reduced time to market, low risk design, low costs, possibility to customise an analyser in a very short time, possibility to implement a TCP/IP connection in a short time without risks, possibility to design powerful user interfaces.

Ethernet TCP/IP: The Ethernet-TCP/IP connection was adopted to connect more than one control unit with a local server using standard services. The TCP/IP connection has been also used to implement a remote connection for system debug and firmware update.

TECHNICAL IMPLEMENTATION

The improved product development (realised in 12 months with the technical assistance of Consorzio Roma Ricerche) included:

- The development of an embedded controller with Ethernet connection, based on a ARM RISC 32 bit device (Netsilicon NET+50) and an open source embedded OS .

- BSP development including the control of a local FPGA, handling 4 PWM outputs for heater control, 8 monitoring inputs for fluid level control, 8 general-purpose I/O pins, 4 analog-to-digital conversion section for temperature measurement.

- Embedded application SW development.

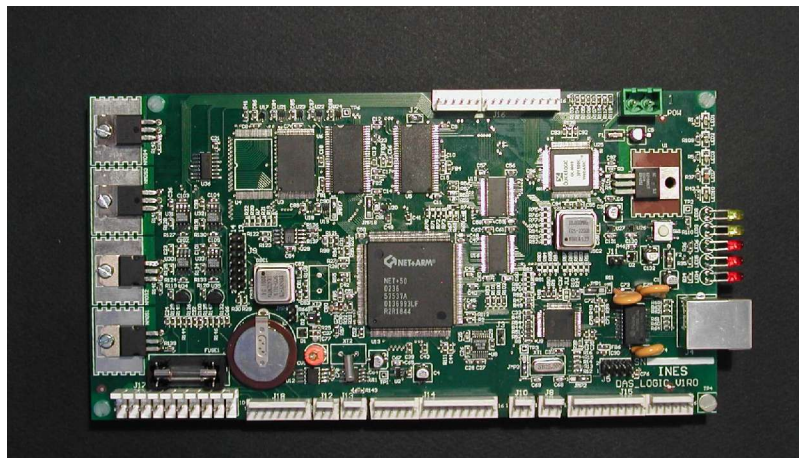
- The implementation of a local HTTP server.

The main open source SW used were:

- Operating System :uC Linux (GPL), 2.4.xx.

- HTTP server: THTTPD (GPL). A famous open source HTTP server to implement a local configuration web page.

- Host side scripting: TCL (BSD-style license - Open Source). TCL/Tk libraries was used to implement a "script" control of the external embedded unit with a "cross platform" general purpose scripting language.



BENEFITING FROM BEST PRACTICE

EC IST Programmes aim to improve the competitiveness of European enterprises by promoting the adoption of under deployed or emerging technologies. This will enable these enterprises to increase their competitiveness and enhance their economic growth. The demonstrator described here is one example of the many Best Practice projects undertaken. Further details of projects covering a wide span of applications, industry sectors and technologies can be found on www.euroines.com

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