

Process Control Systems

INTRODUCTION

Advanced Control provides turnkey solutions for Process control systems utilised for offshore vessels and fixed installations.

Using the latest commercially available automation hardware and software is the best strategy for reducing both costs and risks in the life cycle of an automation system. This is characterised by the use of Open Control Systems.

Being an independent system integrator, Advanced Control AS is not committed to any particular equipment suppliers and uses a variety of hardware and software for our MMI and PLC systems. This also entails continually evaluating new products and transferring experience.

We believe that this strategy is beneficial for companies in the oil and gas business in general.



OBJECTIVES

The prime objective is to reduce lifecycle costs while meeting the design requirements. This applies to the design, development, test and operational phases.

The common sense approach for achieving this is to minimise in-house product development and to maximise the use of commercially available hardware and software products. AC prefers to focus on the operators, the system functionality and ergonomics.

ADVANCED CONTROL'S CAPABILITIES

As well as being an independent system integrator and one of the companies with personnel trained in the use of open systems, AC-personnel has the benefit of an extensive history in offshore production.

For any given system, AC can set its scope and tailor the architecture to suit the client, including the communication network and the redundancy requirements.

AC's solutions are based on open systems such as PCs, MS Windows, TCP-IP, and the Citect display software.

The general design philosophy for the equipment is based on safety of personnel, environment, simplicity, and efficient handling. In addition, the equipment shall give easy access for inspection, maintenance and replacement of parts, if required. This would involve introducing the customer to Innovations and may be done in a study phase prior to the design freeze.

Rather than dictating functional possibilities, AC welcomes close interaction with the customer and operators of the system.

SYSTEM PHILOSOPHY

To minimize operator presence in machine and utility areas, supervision and control of the entire vessel will be performed from a central, continuously manned location, normally the Central Control Room.

The user-friendly AC design provides the following important features:

Increased safety

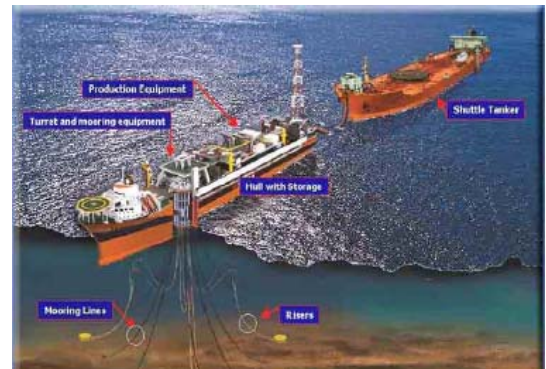
- Redundant ring communication network
- Distributed I/O stations (with the degree of redundancy as required)
- Stand-alone, redundant, multi-functional operator workstations
- Modular standard hardware
- On-line diagnostics
- Supervision of sensor interfaces and machinery operation
- Well proven concept

Cost Effectiveness

- Standard "of the shelf" hardware and software
- Reduction of cabling, due to extensive use of remote I/O
- Less hardwired mimic and console instrumentation
- Self-diagnostic features
- Reduction on spare part requirement
- One supplier, fewer interface problems

Service & Support

- Extensive operator training possibilities
- Trained personnel available on short notice
- 24 hour on-line support (via satellite communication if required)



SYSTEM INTEGRATOR

An AC integrated automation system offers several advantages compared to conventional "stand-alone" systems.

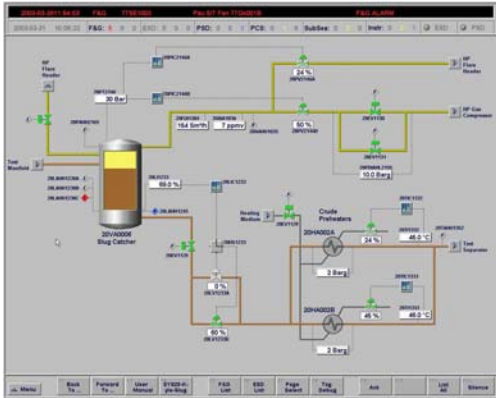
Experience has taught that trying to combine several autonomous sub-systems, supplied by various vendors, into one common operator interface may not give the optimal solution, either technically or commercially. The client is left with the responsibility for defining and coordinating all the interfaces between these sub-suppliers. This consumes a lot of effort and resources, often without the expected results.

By taking advantage of the established knowledge and experience, we will take full responsibility for the complete delivery, including interfaces, integration and the functionality of the whole system.



Process Control Systems

AC easily handles interfaces which are based on open standards and encourages their use. If necessary, the Systems used by AC do have the possibility for developing customized interfaces.



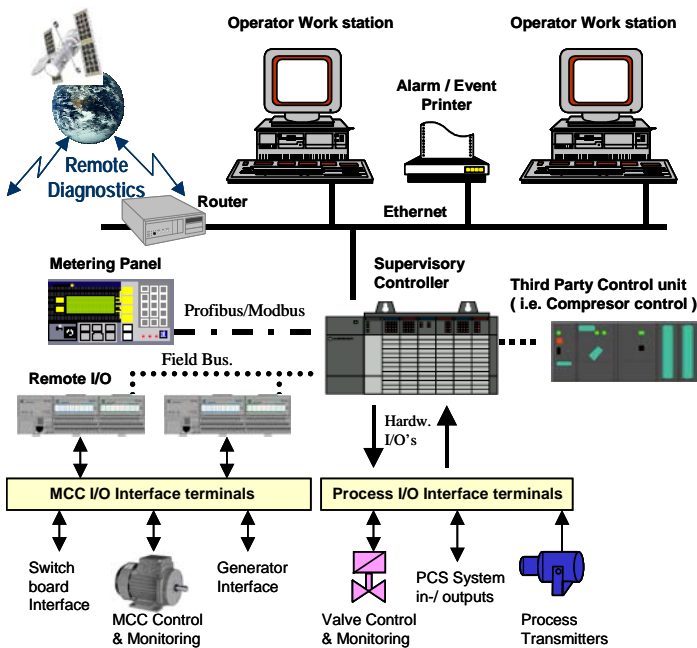
SUPERVISORY CONTROLLER & NETWORK

A programmable logic controller (PLC) is the master controller for the system. Remote I/Os are used to optimise cabling / hook-up and allow for individual Skid / Equipment testing at manufacturer workshop

Remote I/O nodes are connected to the PLC controller via a fiber optic, high-speed network. Field bus is used as the system's backbone for deterministic transfer of monitoring and control signals. Local or remote analog and digital input/output devices connect directly to the PLC for operator station controls and system status monitoring

The software is developed by utilizing PLC programming tool and is designed to make it simple to operate and maintain the system in the field.

The PLC program is stored on removable Flash EPROM media. Software updates and hardware replacements are possible with a simple plug-in module.



OPERATOR ENVIRONMENT (HMI)

Daily operation of the process will be from a set of MS Windows based Workstations (PCs). Operator station architecture will be based on a "server/client" or "multi-master-system", designed as independent network nodes to ensure optimal reliability.

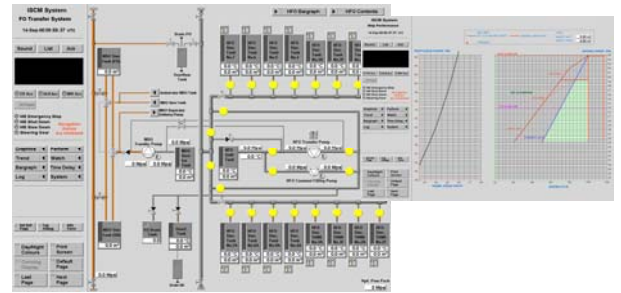
A standard Ethernet network, with redundancy options, shall be used for transfer of large data volumes and co-ordinating tasks between the PCs. This may be tied together with an administrative network for transfer of vital data. Multiple PCs are simply added to the same network as required.

The Operator Screen has the following features:

- Graphics display
- Display of Alarm & Status conditions
- Logging of Alarms and Events
- Display of 3.party Graphics and Data
- Interface to other systems on Ethernet IP

The Human Machine Interface (HMI) is developed by Citec programming tool and is designed to be as self-explanatory and easy to operate as possible for relevant personnel.

All information is presented via graphical screens. The figure below shows an example of the screen layout. Pointing and clicking buttons and objects in the screen can reach all functions of the PCS-system.



REMOTE ACCESS & DATA TRANSFERS

The development system also offers remote access capability where an access link to a remote location can be established. This allows diagnostics, software maintenance and downloads to be carried out without a specialist engineer being required on site. Data transfers to control room on-shore can easily be set up and routed via Ethernet.

CONTROL SYSTEM REFERENCES

AC's personnel have been involved in delivery of several PCS systems using different display software, PLC manufacturers and architectures. Our Automation product range comprises:

- Process Control and Monitoring Systems
- Wellhead and Production Manifold
- Separation and Stabilisation
- Water, Gas and Chemical Injection
- Produced Water Treatment
- Flare and Fuel Gas
- Power Generation and Distribution
- Pumps and Compressors
- Heat Exchange
- Turret Turning

