

Fieldbus 402

Choosing a host system

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Overview

Does it matter which host system I use?

Not all host systems deliver the same level of functionality — especially when it comes to taking full advantage of fieldbus technology.

As you select a host system, you'll therefore want to consider how well it meets your needs in a number of areas, including

- Collecting and easily disseminating FOUNDATION fieldbus information for more efficient operations, precision control, and proactive maintenance
- Integrating field and supervisory control
- Surpassing the capabilities associated with traditional distributed control systems

This course covers these and other considerations that will guide your decision.

Hint: As you go through the topics in this course, watch for answers to these questions:

- *Do fieldbus devices and host systems need separate configuration tools?*
- *How can a host system apply information about the status of the field signal?*
- *How can a host system reduce the effort required for device commissioning?*

Supplier experience

When you buy a host system, you're not just getting a bunch of hardware and software. You're also getting the benefit of the supplier's experience in similar applications.

Ask about their experience and run-time applying the host system in real, mission-critical applications. In particular, look for fieldbus experience in your application. A proven track record will help you avoid being part of the supplier's learning curve.

Also consider the breadth and depth of installations of each system around the globe. This is an indication of the experience a supplier has in delivering host systems and services to make your installation meet your expectations. Again, make a point of asking about the supplier's experience implementing and supporting FOUNDATION fieldbus projects in your area.

Designed for fieldbus

The design of many host systems — especially those based on traditional distributed control system architectures — can affect their ability to take full advantage of FOUNDATION fieldbus and the information it provides.

Function block compatibility. For consistent control with minimum configuration, the same fieldbus function block should be able to run in either the host system or the fieldbus device. If not, extra effort is required to modify control strategies and tuning parameters to get similar performance.

You may also have to map fieldbus block structures into legacy host structures to access fieldbus data. Depending on the host architecture, the mapping can be extensive.

Matching operating modes. The mode of host control strategies should be identical to FOUNDATION fieldbus standard modes, whether the block runs in the host controller or fieldbus device. Mode mismatch between the host and the devices could result in inoperable control with very little indication of the problem.

Single configuration environment. The host system should provide a common control-strategy configuration tool that can assign execution of the function block to the host controller or to the fieldbus device, or split execution between them.

Ideally, you should be able to configure a control strategy before determining whether it will run in the host or the device. This capability optimizes your configuration investment.

Calibration from host. A well-integrated host system lets you calibrate fieldbus devices right from the configuration environment on one of the host workstations. This integration reduces engineering time and effort and avoids the need for separate, non-integrated software.

Another key designed-for-fieldbus capability — network-wide access to validated device data — is covered in the next topic.

Access to validated device data

The FOUNDATION fieldbus standard provides for fieldbus devices to pass not only process data to the host system, but also the status or "goodness" of that data. Having good, validated data from the fieldbus device improves the validity of the control, and your ability to respond correctly to abnormal or failure conditions.

A well-designed host system should incorporate this validated data in many areas:

In control strategies. Control strategies that recognize when data coming from a fieldbus device is no longer good can take corrective actions — potentially avoiding process upsets and dangerous conditions.

Propagating the status of the field signal to supervisory control strategies and to historical storage also ensures that these decision support systems are using a true representation of the plant.

In advanced control applications. To be effective, robust advanced control relies on a solid foundation of accurate information. When applied in host systems that do not give the goodness of the data, these controls are often decommissioned because they no longer work as initially designed.

If a field device is delivering bad data, the host should recognize this and propagate the status information to advanced control strategies such as Model Predictive or Neural Network Control to mark those strategies as using bad or suspect data.

In operator displays/alarms. For conditions not handled by the control strategies, operators can be notified of suspect data coming from a fieldbus device and take the proper actions to avoid process upsets.

Fieldbus redundancy options

Make sure the host system you're considering offers the level of security your application requires. Systems can provide redundancy in fieldbus segment communications scheduling, in power supplied to the fieldbus segment, and in the interface between the segment and the host system.

Segment communications scheduling. In addition to fieldbus devices that can provide backup scheduling (link active scheduling or LAS) of communications, the H1 interface card to the host system should be able to provide this backup scheduling.

Fieldbus segment power. A robust host system offers redundancy options in the power supplied to the fieldbus segment. This redundancy is critical to eliminate single points of failure for the fieldbus segment.

H1 interface card. Beyond just redundant communications scheduling and segment power, redundant H1 interfaces to the host system provide the ability to maintain an operator window into a running segment. The redundant pair of H1 cards should provide automatic and bumpless switchover if a card fails.

Interoperability testing

Important considerations in selecting a host system are its interoperability with other suppliers' fieldbus devices, and the supplier's commitment to testing devices as they become registered with the Fieldbus Foundation to ensure smooth operation.

Available library of device descriptions. To understand the system's level of interoperability with other suppliers' fieldbus devices, ask the supplier if they have a library of device descriptions for devices that have already been tested for interoperability. Such a library allows you to quickly build your control strategies around these devices.

Also ask the system supplier about their policy regarding device descriptions for new devices. Do they provide them? Via the web? E-mail? Or do they expect you to rely on the device manufacturers to provide device descriptions?

Stress testing. Evaluate the host system supplier's commitment to testing and adding new devices. Will they stand behind third-party devices on their host?

Remember that the automation system now extends from the host into the field devices. The system supplier should be able to show evidence of tests with third-party devices and that they will assume responsibility for control regardless of where it occurs.

Ease of commissioning and testing

For each host system you consider, evaluate the engineering effort required to commission a FOUNDATION fieldbus segment and its devices.

Auto sensing of devices. Host systems designed with the fieldbus standard in mind can automatically identify new fieldbus devices as they are connected to a fieldbus segment. Commissioning time is shortened if the host supports connecting an entire segment and auto-recognizing all devices without the need to commission a device fully before connecting additional devices.

Drag and drop commissioning. The effort required from the sensing of the device to using it in control strategies can vary dramatically among host systems. Consider ones that provide intuitive, "drag and drop" commissioning.

Auto-macrocycle generation/optimization. Some hosts make scheduling the underlying fieldbus communications transparent to the user by automatically scheduling and optimizing the communications based on the number and types of fieldbus devices on a segment.

Host systems that have this capability reduce the effort required and avoid the mistakes associated with the complex calculations of bus schedules.

Simulation of field devices. For faster commissioning, look for host systems that can simulate the fieldbus device so control strategies can be pre-tested before startup begins.

Device simulation also lets you perform operator training before startup, which increases the efficiency of the operation earlier. In addition, FAT (Factory Acceptance Test) is accomplished far more readily by simulation than with staging a complete set of field devices.

Rollback of device configuration. Plants continually work to improve operational efficiency. This frequently involves some experimentation to determine the optimum settings to run the plant. Sometimes these experiments are not successful, and it is necessary to return to previous operating parameters. To ensure you can quickly return to more efficient state of operation, look for a host system that can roll back the configuration of a fieldbus device to a known optimally operating state.

Predictive maintenance

Host systems incorporating FOUNDATION fieldbus technology have varying levels of support to deliver predictive maintenance capabilities to your operations.

Device health alerts. Advanced fieldbus devices have the capability to send alerts about their health to the host system. Look for a host system that's designed to receive these messages and has pre-engineered alarms, faceplates, and screens that recommend a course of action to solve the problem.

Process health alerts. Some advanced fieldbus devices have the ability to spot process problems around them, such as plugged sensing lines. Like device health alerts, this information

is immediately communicated to systems and applications that can solve the problem and avoid downtime.

Detailed device diagnostics upon demand. Host systems that integrate asset management as a core part of their architecture can provide detailed device diagnostic information from any view station into the host.

Audit trail and event history. To satisfy regulatory requirements and provide a clear picture of who changed what, when, and why, some host systems incorporate changes in fieldbus devices in the host audit trail. This, combined with the standard host system audit trail data, provides the integration of device and host information needed to speed up troubleshooting and avoid process problems.

See what you're buying

At some point in your evaluation process, take an actual hands-on look each of the host systems you are considering.

Take a test drive. The engineers, operators, and maintenance personnel who will interact day-to-day with the host system should actually engineer, build, commission, and operate examples of each of the host systems under consideration. This will help them understand how each system will perform, and determine each host's strong and weak points.

Talk to users. Users around the world have installed FOUNDATION fieldbus technology and benchmarked the benefits they have received. Talk to people who have used the host systems under consideration. Ask them what they've learned, and how well the system — and the supplier — met their expectations for delivering the benefits of fieldbus.