

# Electronic Device Description Language (EDDL) for efficiency

*Electronic Device Description Language (EDDL) is relatively unheard of, but for more than 15 years, it has been the key to interoperability for millions of the HART, FOUNDATION fieldbus and PROFIBUS devices used throughout most process plants. EDDL enables maintenance efficiencies through the use of handheld field communicators and device management software as part of an asset management suite. A recent enhancement to this technology boosts maintenance savings further. In a sequel to the article on Bus Technology published in the last Issue of Hydrocarbon Asia, Jonas Berge of Emerson Process Management, takes us through the intrinsic value of EDDL.*

**E**lectronic Device Description Language (EDDL) allows the software to display the setup and diagnostics information from intelligent devices. This makes the technicians' work easier and faster and also reduces the work load and cost of system management. EDDL technology was recently enhanced to produce a graphical display, making device management even simpler and more straightforward reducing the error margin even further.

The following article describes how software based on the IEC 61804-3 EDDL standard makes it easy and low in cost to maintain new devices as they are installed into the plant.

## Benefits of Fieldbus

The primary benefit of installing the fieldbus is to lower the system cost (see Jan/Feb 2008 issue of *Hydrocarbon Asia*). The long-term benefit of fieldbus includes continuous device maintenance savings and performance improvement. To accomplish these savings though, plant technicians must perform monitoring, setup/configuration, and diagnostics of bus devices such as transmitters, valves, and motor drives.

Each device maker provides an EDDL file for each type and version of their product. The file tells the device management software which command to send to the device to retrieve the data, how to interpret the device information, and how to display it in a user-friendly format. This display property is the new enhancement to EDDL.

## Technician's Results

EDDL enables intelligent device management software to reduce the time and costs of maintenance by allowing technicians to perform predictive maintenance and faster corrective maintenance. This makes it easier to keep up with work orders.

## Provides Full Support for Device Functionality

Standard protocols such as HART, FOUNDATION fieldbus, and PROFIBUS have already made it possible to network all types of manufacturers' devices installed around the plant to the same tool – whether it is portable or stationary. The number of device types networked in the main plant and on package units can easily reach a 100 devices when you take into account the



Figure 1. Images, text, bar-graphs, and gauges make device management easy

different manufacturers and models of simple temperature, flow, level, and pressure transmitters as well as various analyzers, advanced valve positioners, and sophisticated motor drives. To perform important tasks, the technician needs access to every function in every device. Advanced setup and sophisticated diagnostics must be presented graphically to be clearly understood.

The original Device Description (DD) technology from 1992 did not use graphics and therefore did not support sophisticated devices or advanced setup and diagnostics. Thanks to the new enhanced graphics, EDDL now makes it possible to monitor, configure/setup, and diagnose simple as well as sophisticated devices using the same software or handheld field communicator.

Using a single application for every device and task, eliminates the need to spend time and money on training for multiple applications. Using a single handheld field communicator eliminates time wastage as there is no need to go back to the workshop to retrieve a different tool for each device to be calibrated or checked. A technician can work more efficiently and accomplish more. Therefore, with instant access to all diagnostics, the a concerned device can be remedied faster. The production loop can be

up and running sooner, and the technician can more quickly move on to other tasks after attending to a failure.

### Consistent Look and Feel

With the plethora of intelligent devices around the plant, setup and diagnostics could be a challenge. Using different software for each of these models, or even a driver program for universal software, would be too difficult because each program works slightly differently.

EDDL makes this unnecessary because it allows the device manufacturer to determine the exact content and structure of how data for the device is displayed. But the look and feel details – such as button style, access to help, printing, audit trail, and export to Excel – are provided by the device management software, ensuring it works consistently for every device regardless of type, make, or protocol.



Figure 2. EDDL methods work like wizards simplifying complex tasks

EDDL thus ensures technicians do not waste time trying to figure out how to use the interface but can instead focus on the task at hand, such as calibrating or troubleshooting. Less time spent diagnosing thus, translates to lower cost.

### Interactive Wizards

For optimum performance, transmitters, valve positioners, and other devices must be setup and calibrated correctly. Considering the vast variety, this could be a challenge.

EDDL addresses this problem with “methods” that are written by the device manufacturer and appear as wizards in device management software and on the handheld field communicators. These wizards help the technician make fewer mistakes and guide the user through complex procedures such as eliminating radar-level transmitter false echoes.

EDDL enables the intelligent device management software to reduce time spent on each device, making it easier to keep up with work orders. Better device performance results from correct setup and calibration. This translates into lower process variability, higher quality and throughput, and often lower energy consumption.

### Handheld Field Communicator

A major reason for adopting fieldbus and device management software is the sheer convenience of remote diagnostics and range setting, including the ability to capture device faults as they are reported. However, if a device has failed or drifted, troubleshooting and calibration trim is required in the field. A technician may need to see that a valve is stroking from fully open to fully closed or may need to apply input when correcting a sensor reading for drift.

Because of moving parts, an ordinary laptop is not sufficiently rugged for this kind of field work.

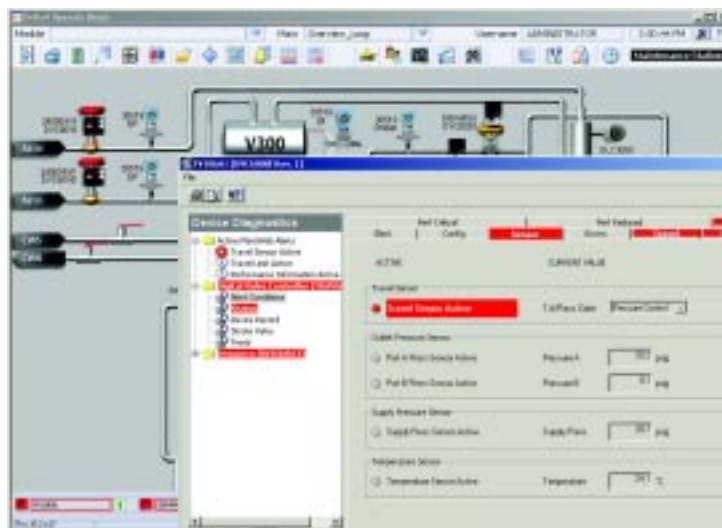


Figure 4. Diagnostics presented using EDDL at a click of a button in operator station

At approximately 4 kg, a hardened laptop is too heavy to hold with one hand and cannot be operated wearing protective gloves. In addition, a laptop is not intrinsically safe and the battery does not last for more than a few hours.

But handheld field communicators, weighing less than 1 kg and with a battery life exceeding 9 hours, are perfect for field work. The new graphical EDDL technology allows this handheld communicator to support simple transmitters and sophisticated positioners from all manufacturers. Because EDDL is not tied to Microsoft Windows, it is the only device integration technology used for handhelds. That is, the same EDDL technology used in the communicator is also used in the device management software.



Figure 3. Handheld communicator necessary for field work

A lot of time and cost can be saved by servicing devices in the field instead of bringing them into the workshop. Similarly, productivity is gained by not having to wait for a “hot-work” permit.

### Single Dashboard

When a device fails or a device problem is suspected, the operator needs to be able to quickly



## Documentation and Context Sensitive Help

Faced with a multitude of device types and many different versions, it is a challenge for technicians to master every device in the plant. With EDDL, the help text provided by each device manufacturer is displayed for each device parameter and wizard at the click of a button. Likewise, device manufacturers can impart their know-how through explanatory text and illustrations displayed right on the device pages.

EDDL cuts the time used to look up answers by reducing the need to browse through hundreds of pages of manual text.

Device management software also enables manuals, drawings, and other documents related to the device or plant location to be quickly accessed. And technicians can enter and share notes about the devices with others.

## System Management Results

Because EDDL enables intelligent device management software to save time and money for the EPC contractor and the project team during the project phase, the system can be started up and handed over to operations personnel sooner. But most importantly, EDDL saves time for those responsible for maintaining the system and keeping it up and running.

## Easy Integration

Every once in a while a completely new kind of device is introduced into a plant to solve some application issue. During several years of operations, this may be done a multiple number of times for continuous improvement. Adding a supporting program or installing driver software while the DCS is running is not permitted by the DCS vendor and could infringe plant policies as there is a risk for the system robustness to be adversely affected by inadvertent application conflicts.

This is not a problem with EDDL because the files are compressed text,

not software language. Firstly, downloading more than one EDDL file from the Internet is very fast because the files are small. The device manufacturer can even send several EDDL files as an email attachment. Secondly, loading the EDDL files onto the system is a simple matter of copying the EDDL files to their folders. There are even utilities that ensure files are imported into their correct folders. There is no need for time consuming software installation. Thirdly, each version of each device has its own unique EDDL file, which is not shared with any other device. There are no conflicts between device versions or with other devices. This avoids the risk of a new device causing an existing device to fail and subsequently holding up the maintenance effort, which is very time consuming to restore.

The new device and application can be commissioned sooner, without disrupting the running system. The amount of time and cost that EDDL saves by eliminating such conflicts is tremendous.

## Easy Update, No Version Conflicts

Depending on the size, a plant may have anywhere between hundreds, to thousands of devices. With an average Mean Time Between Failure (MTBF) of 200 years, there will be a device

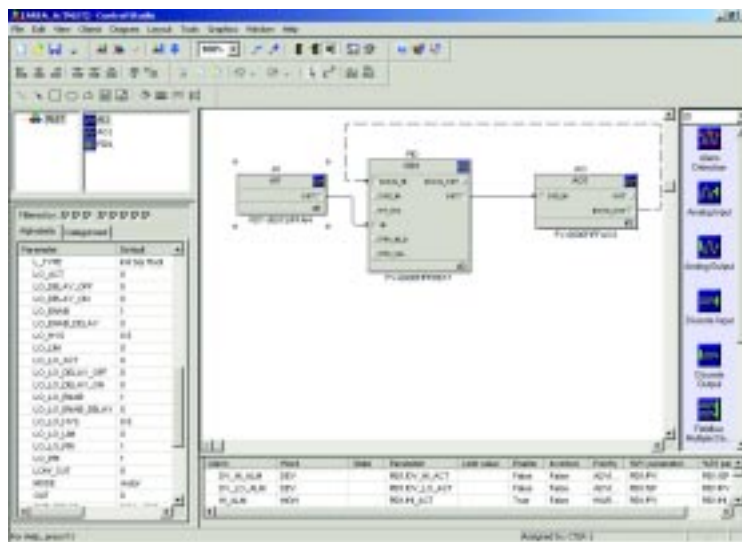


Figure 7. Control system engineering tool needs EDDL for FOUNDATION fieldbus loops

failure each month somewhere in the plant. Yet these devices last for several years, so by the time it fails a new version with more features will replace it. Because of this, maintenance personnel may install a new version of some device each month. The control system has to remain operational for 15 years or more, and must be kept compatible with the new version of devices arriving every month.

Apart from application upgrades and driver installation not being permitted on a running system, software downloads can be long. Plus, installation instructions can be complex. The DCS vendor can't help because they may not be on site at the time and device replacement can't wait. EDDL solves this problem by keeping the system current with versions of new device. It's as easy as

downloading the EDDL file for the new device and copying it onto the system.

Due to the increased efficiency provided by EDDL, the loop or process unit can get back up and running faster after replacement of the faulty device, in turn saving time and money. Moreover, for example the technician who replaces the device at 4 a.m. on Saturday doesn't have to be a software installation specialist owing to the simplistic installation procedure.

Since the EDDL is a compressed text file, when the EDDL standard needs further enhancements in the future, the tool or "tokenizer" that compresses the EDDL text automatically generates files compatible with both new and old software. This is already being done on files with

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and without enhancements made in 2006. This ensures compatibility with old systems, protects plant investments in systems and devices, and at the same time enables new innovation.

Just as EDDL ensures that the control system does not become obsolete with a new version of Microsoft Windows, it also protects the system by ensuring it does not become obsolete with further enhancements to the EDDL technology.

### **Cyber Security**

Device support files are frequently made available to help support the new types and versions of devices added to the system. These files may be downloaded from the Internet, come on a manufacturer's CD, or can be passed from computer to computer on a USB drive.

This is a potential cyber security risk because malicious code could potentially attach itself to executable files associated with the software. No device vendor would spy on their customers or damage their data, but as files are transferred from one engineer's computer to the next, viruses and worms may infect the programs. Additionally, installing a software driver program for a new device version or type requires an administrator-level password, which is, the highest level password permission has to be given to all persons that may need to commission a new device in case of failure. This again compromises security. Someone with this access could install software programs that could harm the system.

EDDL files are compressed text, not software. This reduces the security risk and simplifies the protection measures needed. Technicians have password authorization to copy EDDL files, but are prevented from installing software. Knowledge of high - level passwords is limited to very few system administrators. Avoiding these cyber security risks is a significant benefit of EDDL.

### **System Configuration**

To configure a control loop involving FOUNDATION fieldbus devices, the engineering

tool must know what blocks, parameters, and links are supported in the device. Grappling with two technologies to support both control system configuration and device management increases the effort needed to manage the system because there are two sets of files that must be obtained and managed. But because EDDL is a file the engineering tool can read, this which isn't a problem.

EDDL is a single technology that can be used for control system configuration, device management, the handheld field communicator, and the laptop. So not only are training costs reduced, but less effort is needed than to obtain, manage and install two kinds of files on every workstation.

### **Not Affected by Windows Upgrades**

Control systems remain operational for 15 years or more. Computer operating systems are not supported that long. Operating system service packs and patches will have to be installed on a system over its lifetime. At some point the operating system will have to be upgraded and most likely the hardware changed as well.

Software drivers and programs have another problem; they only work on the version of Microsoft Windows they were developed for. Sometimes they may work for the version before or after, but many don't. So, when Windows is upgraded, or even when a service pack is installed, some of the software drivers may become incompatible. To get the system up and running again, the system manager may have to scramble to find drivers for the new operating system version from many different device manufacturers. Considering that drivers are required for each workstation, this can be time consuming, and there is a risk that no driver could be found for an old device.

With EDDL, the files for the devices are unaffected by Windows versions. Files for millions of devices generated by device manufacturers from as far as 15 years back still functioning today. An operating system upgrade at most means, upgrade

of the device management software itself – a single application and not all the files from the device manufacturers. Therefore there is no need to get new EDDL files from the device vendors. When the operating system is patched or upgraded, EDDL reduces cost and time because new integration files aren't needed for devices.

### **Protects Investment**

The control system must also work with the device integration files for devices released, for an extended period to support those devices used in replacements and expansions. In addition, when a new version or type of device comes into the plant after a few years of operation, its driver program may only be compatible with the latest version of Microsoft Windows. The system manager must upgrade the operating system, and therefore also the device management software, and subsequently scramble to get new driver programs for all the other devices. This is lots of work involving multiple workstations. All of this is avoided with EDDL, because its files are operating system independent. There is no need to upgrade the operating system, device management software, and device integration files to support new device versions.

### **Requires No License Keys**

A hundred different device models may be found around the plant. Integrating all these kinds of devices should be made as easy as possible. Licensing of driver software requires a plant to manage a large library of license keys. This can make it very time consuming and costly. It can even be a cause for delay in commissioning of a replacement device. With EDDL this hurdle will not arise as it is not licensed; it is a compressed text file and not a program, so there is no need to pay for and spend time to manage license keys.

### **Interoperability Testing**

All plants have a mix of devices made by different manufacturers. Having a Main Automation Contractor for the project reduces the mix, but package units and replacements will over time contribute to diversity. Despite this variety, it is

necessary to handle complete monitoring, setup, and diagnostics from the control system and device management software for all these devices.

EDDL technology is the key to interoperability between devices and software. It must be an integral part of device and control system interoperability testing. For example, the Fieldbus Foundation tests the EDDL file together with any device that is interoperability tested. Similarly, its new host registration program tests systems to see that they fully support EDDL.

### **Complete Plant Life Cycle Solution**

EDDL with enhancements solves all plant problems related to device integration, and is a better solution than early DD, which had to be complemented with other technologies. EDDL reduces maintenance cost and time by using a single technology for all phases of the plant life cycle. Plants don't have to change DCS to use EDDL. Leasing control system manufacturers already have an EDDL upgrade for their systems and all have announced such plans. Many plants are already upgrading DD software to EDDL as this paves the way for efficiency and effectiveness in the future.

### **References**

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