Summary

The Triconex Safety Video Display Unit (SVDU) is an operator workstation that provides Human Machine Interface (HMI) functionality for nuclear safety applications. The SVDU consists of a server and a flat-panel monitor (available in either a rack-mount or panel-mount form factor).

Business Value

The Triconex Safety Video Display Unit (SVDU) enables better information presentation and decision-making support in nuclear safety applications. It provides seamless integration with the Triconex Tricon Safety Instrumented System and innovative, flexible installation options.

Triconex Safety Video Display Unit

MAXIMUM VISIBILITY OF CRITICAL SAFETY INFORMATION

Digital control and protection systems offer improved accuracy, reliability, and flexibility when compared to their analog counterparts. A digital display unit is a natural human machine interface in these types of systems.

A digital display unit provides the ability to display validated signals from multiple, independent channels in context with other information and enables more effective decision-making. The flexibility of graphics design resolves identified difficulties of providing the correct information set in context with the control features. Specific graphics can be configured to support individual decisions or actions for normal, abnormal, or emergency operations.

The Triconex® Safety Video Display Unit (SVDU) is an operator workstation that provides Human Machine Interface (HMI) functionality for nuclear safety-related applications. The SVDU consists of a server and a flat panel monitor and multiple SVDU systems can be configured to interface with a network of multiple safety systems. The server runs the QNX™ operating system and the Advanced Control Center Information System (ACCIS™) software (preloaded) that supports the communication, display and entry of safety-related process data between the SVDU and the safety system.

CAPABILITIES

- Supports effective decision-making through the availability of safety information in one single HMI
- Presents plant-wide safety information within context, in a user-friendly graphical interface
- Minimizes human factors and information interpretation errors
- Enables streamlined system construction and design by saving footprint, money and time
- Seamless integration with Triconex Tricon Safety Instrumented System
- Flexible hardware allows for rack-mount or panel-mount installation
To use the SVDU with your safety system, you will need to:
• Add an interface to the application on the safety system so that it can communicate with the SVDU
• Develop the SVDU user application (the application that will run on the SVDU to communicate with the safety system)
• Use the Display Builder software to build the SVDU user screens, which are part of the SVDU application

FEATURES
• The SVDU server is a ruggedized box that interfaces with the safety system and executes the SVDU application
• The 19-inch flat panel monitor has touch-screen capability and is available in both a rack-mount version (Model 5910N) and a panel-mount version (Model 5920N).
• The SVDU features a single-board computer with two Dual-Core Intel® Xeon® LV 5138 processors operating at 2.13 GHz with parity checking on the Front Side Bus (FSB)
• The SVDU’s single-board has 4 GB ECC DDR2 RAM installed and the SVDU server contains two 32 GB SSD SATA SLC hard drives
• The SVDU supports AC power supply inputs with dual power supplies (110 V or 220 V) and the SVDU server provides 12 VDC power to the monitor
• The SVDU supports redundant fiber-optic 100 Mbps Ethernet connectivity
• The SVDU LCD monitor is capable of 1280 x 1024 (XGA) resolution and a touch panel and a touch controller (that interfaces with the SDVU server via a USB connection) provide the touch screen capabilities
• Using the on-screen programming capability, the SVDU can be programmed to display process variables, process alarms, data trends and more
• The SVDU server has a Power On indicator (green) and a Hard-Drive Activity indicator (yellow)
HOW IT WORKS

The SVDU provides a Human Machine Interface (HMI) to nuclear safety systems in a nuclear power plant. Possible configurations include:

- Multiple SVDUs connected to one safety system
- Multiple SVDUs connected to multiple safety systems
- One SVDU connected to one safety systems
- One SVDU connected to multiple safety systems

In a typical configuration, where one or more safety systems are connected to multiple SVDUs, one SVDU is assigned as the primary unit and another SVDU is assigned as the backup unit. The remaining SVDUs are assigned as Human System Interfaces (HSI).

The primary SVDU communicates with the safety systems for reading and writing of process data. It shares that data with the other SVDUs on the network. The HSI SVDUs send write commands to the primary SVDU, which in turn sends them to the safety systems. The HSI SVDUs do not directly send the read or write commands to the safety systems. Any operator write command (for example, the Acknowledge Alarm or Change Set Point Values command) issued from the HSI to the safety system is handled by the primary SVDU. If communication between the primary SVDU and the safety systems fails, the backup SVDU will take over. If communication with the backup SVDU fails, the primary SVDU will resume communication with the safety systems. If both the primary and backup SVDUs fail, there will be a loss of communication with the HSI and the safety system.

The SVDU communicates with the safety systems using the Safety Application Layer Protocol (SAP) over TCP/IP or Modbus TCP. The following figure illustrates the communication between multiple SVDUs and multiple safety systems.
ABOUT THE SVDU SOFTWARE
The SVDU runs the QNX operating system and the Advanced Control Center Information System (ACCIS) software (preloaded) that supports the communication, display and entry of safety-related process data between the SVDU and the safety system.

ACCIS is a monitor and data acquisition system which provides process monitoring, annunciation and supervisory control capabilities. ACCIS is a product of Atomic Energy of Canada Limited (AECL). Implementing a system based on ACCIS requires minimal software development in the traditional sense. You will create a User Data directory (SVDU application) that includes various configuration files, points and alarms, data files, display screens (XML files) and so on. The Display Builder tool (purchased separately) is used to build display screens that are incorporated in the User Data directory.

INTERFACING WITH YOUR SAFETY SYSTEM
To use the SVDU with your safety system, you will need to:
• Add an interface to the application running on the safety system, so that it can communicate with the SVDU. This interface consists of programs and tagnames for generating SAP messages to the SVDU and for receiving and processing SAP messages from the SVDU.
• Develop the SVDU user application (the application that will run on the SVDU to communicate with the safety system). The SVDU user application runs on the SVDU server. It communicates with the safety system controller, and sends, receives, and processes SAP messages. After adding the SVDU communication interface to the safety system application, you will use the tagnames and network port configuration information to create files to be incorporated into the SVDU user application.
• Use the Display Builder software to build the SVDU user screens, which are part of the SVDU application.

TRICON CONTROLLER COMPATIBILITY
The SVDU is compatible with the following Tricon™ hardware:
• Tricon v10.5.1 and later systems that have been qualified for use in nuclear safety systems
• Model 4352AN and/or 4352BN Tricon Communication Module (TCM)

In order for the SVDU to be able to communicate with a Tricon controller (send/receive messages), the SVDU/Tricon communication interface must be added to the TriStation™ 1131 application running on the controller. The SVDU/Tricon interface consists of programs and tagnames that generate SAP messages. The SAP messages are sent to/from the SVDU and the Tricon controller.

For information on adding the SVDU/Tricon interface to an application using TriStation 1131, see the TriStation 1131 SVDU/Tricon Interface Developer’s Guide and the SAP Library Reference.