

# Advantages and Disadvantages of Virtual and Emulated Simulators

	Virtual	Emulated
<b>Description</b>	<p>Virtual simulators use the actual code from both the control logic and the human machine interface (HMI).</p> <p>The control logic is “wrapped” in a software envelope, allowing it to run on a computer instead of the plant’s hardware controller. This results in precisely the same functionality as the plant’s actual controls. In addition, the simulator HMI screens use the actual DCS graphics, which are set up to run on computers. In both functionality and appearance, the HMI on the simulator is an exact reproduction of the actual graphics in the plant</p>	<p>Fully emulated systems use an emulation of both the control logic and the operator interface. Emulation is achieved by translating the plant control logic and graphics into the simulator environment. This translation is sometimes performed with an automatic translation program and sometimes the simulator provider will manually build the control logic and HMI screens using third-party software.</p>
<b>Advantages/ Disadvantages</b>	<ul style="list-style-type: none"> <li>• The simulator uses the <u>actual</u> DCS control logic and HMI so the simulator training environment is <u>exactly</u> the same as the actual plant.</li> <li>• Control logic and HMI screens may be easily transferred from the plant to the simulator with NO “translation” step required.</li> <li>• Control logic and HMI modifications can be tested on the simulator and easily transferred to the plant.</li> <li>• The simulator uses the same DCS Engineering Workstation as the plant.</li> <li>• Because the control system exactly matches the plant, the simulator may be used to train control technicians on the DCS system.</li> </ul>	<ul style="list-style-type: none"> <li>• Translation requires the use of specific DCS files. The use of these files is generally a violation of the DCS IPR license agreement.</li> <li>• The translated controls and HMI represent the basic DCS functionality, but is not an exact replica of the control system.</li> <li>• A “translation” process is always required when copying control logic and HMI files from the plant to the simulator.</li> <li>• It is difficult to test control logic and HMI modifications on the simulator.</li> <li>• The translated HMI will <u>never</u> have the exact same “look and feel” as the actual DCS HMI.</li> <li>• Translations commonly omit important DCS functions such as alarm management and visible dynamic control logic schematics.</li> </ul>