



## **DeltaV Inspect and How it Reduces Product Variability**

DeltaV Inspect provides you the unprecedented capability to automatically identify under-performing loops.

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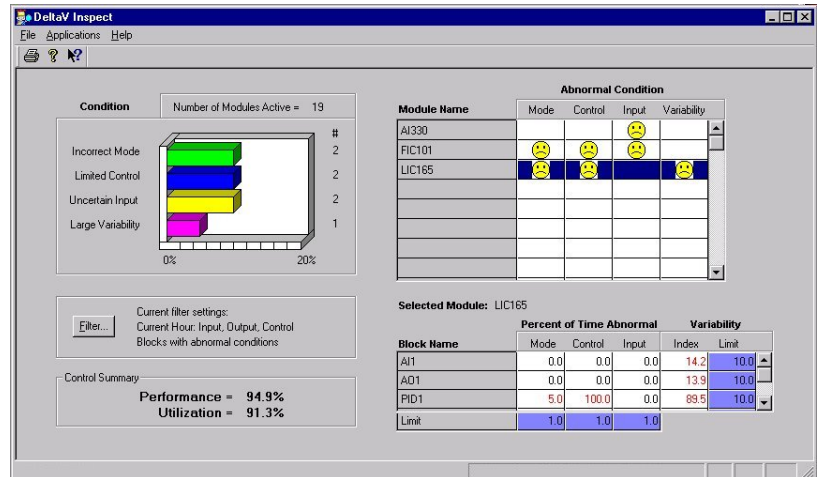


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## Reduced Process Variability

DeltaV Inspect provides the unprecedented capability to automatically identify under-performing loops. DeltaV Inspect continuously monitors loop variability and determine the magnitude of potential control improvements. This patent pending approach to performance monitoring automatically examines input-output and control blocks in the controller for abnormal operating conditions. These abnormal conditions may indicate that operator or maintenance attention is required. Automating the task of monitoring measurements, actuators and control performance virtually eliminates the need for plant audits with portable PC based tools. This frees up plant maintenance resources to focus on resolving problem areas that most impact plant operation.



DeltaV Inspect may be used immediately with no user configuration required. DeltaV Inspect is automatically updated as control modules are added, deleted or modified.. This insures that DeltaV Inspect will always be current with your DeltaV system configuration.

*"The early detection of control system performance decay, of changes in process dynamics and the detection of new sources of variability is absolutely necessary..."*

*One of the key factors is the performance of control loops which is known to decay with time as a result of wearing of control valves, loss of calibration of transmitters, or changes in the operation of the process.*

*With an on-line reference model in place, it will be relatively easy to detect the presence of a new point source of variability, as individual signals will start to exhibit markedly different behavior.*

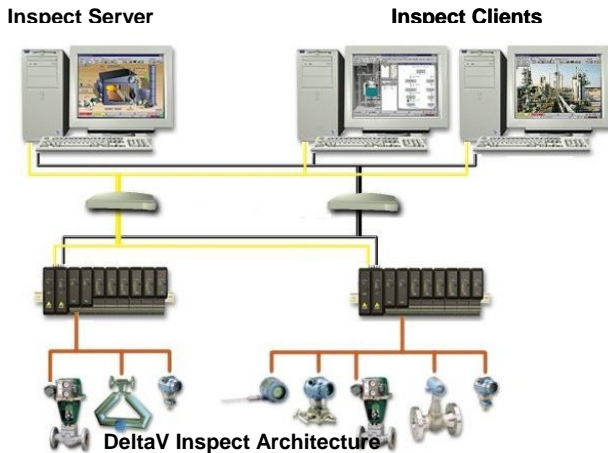
*Bill Bialkowski, Entech*

The benefits from early detection of control system performance decay have been well documented by Bill Bialkowski, Entech, and others. However, scheduled plant audits using handheld or portable PC based tools are extremely manpower intensive. At best such an approach may allow a loop to be analyzed on some infrequent basis e.g. every three months. With DeltaV Inspect, control loops are automatically monitored on a continuous basis and any degradation in loop performance or detection of an abnormal condition in a measurement, actuator, or control block is automatically flagged. This allows DeltaV Inspect to identify problem areas sooner than with audits done with portable PC based tools. By using DeltaV Inspect, the limited resource of plant maintenance may be utilized to resolve measurement, actuator and control problems. As a result, maintenance costs may be reduced or an overall higher level of system performance may be maintained and process variability reduced. Reductions in process variability can directly lead to greater plant throughput, greater operating efficiency and/or improved product quality.

## DeltaV Inspect Architecture

DeltaV Inspect utilizes a client-server architecture and is available at as many as five DeltaV workstations. To allow process variability to be accurately assessed by DeltaV Inspect, total standard deviation ( $S_{tot}$ ) and capability standard deviation ( $S_{cap}$ ) are automatically calculated by each input, output and control function blocks in the controller. The value determined after 100 executions of each block

is communicated from the controller to the DeltaV Inspect server in the DeltaV Professional Plus workstation. This information is automatically used to calculate a variability index for each block. In case of control blocks, the variability index directly indicates how close the loop performance is to minimum variance control. Based on this measurement of variability, individual modules that contain blocks with excessive variability are automatically flagged by DeltaV Inspect. By selecting the module, the variability index calculated for each input, output, or control block in that module may be viewed. To prevent false indication caused by short-term changes in throughput, this detection is based on the average variability over a selected timeframe; hour, shift or day.



Since DeltaV function blocks utilize the architecture and model established for fieldbus, the input and output parameter status and block mode are used by DeltaV Inspect to detect abnormal conditions. In particular, this information is used to automatically determine the percent time that

- A block was not in its design mode of operation
- an input status was limited, Bad or Uncertain
- a downstream condition limited control action.

The modules with one or more blocks having an abnormal status or mode condition are displayed based on the percent time the condition existed. Plant control is

summarized by the Performance and Utilization values shown in DeltaV Inspect. These values may be used to judge overall control performance and whether control is being fully utilized.

*"Manufacturing companies are judged by the quality, cost, and availability of the products they sell. To achieve world class performance in these areas, the manufacturing operation must develop specific manufacturing metrics to assess how well they are performing day to day to guide them towards improvements...."*

*"... in order to improve control, the data must be taken at a high enough frequency that inertial effects are present"*

*"..statistical metrics.. make sense for ...control engineers and quality control professionals"*  
Joseph Shunta, Dupont