Benefits of using V-MAP® G3

- Remote monitoring of all valve operations
- Reduces site exposure for personnel
- Automatic alerts and warnings of deterioration
- Measures compliance with acceptable criteria
- Focuses maintenance activity
- Therefore, maximises plant safety and availability and reduces costs

The third generation of V-MAP® G3 has all the benefits of the previous system but also benefits from being easier to install (in both Brownfield and Greenfield Sites), reduced weight and space requirements and reduced installation costs.

The Score Group has a 30+ year track record of delivering market leading solutions for Intelligent Valve Management™ and 20+ years of experience in delivering valve condition monitoring services / failure mode effects and diagnostic analysis consultancy. This has been coupled with our vision and of course the excellent guidance given to us by our existing customers, to show us the way forward for creating the market's best available technology and systems for assuring the required in-service performance and integrity of critical valves.

Available V-MAP® Case Studies Include :-

- Shell - Ormen Lange
- BP - Valhall
- Lundin Petroleum - Edvard Grieg

Critical Valve Monitoring Comparison Summary of benefits :-

MIDAS® Valve Diagnostics

Measurable Comparison Criteria	Planned Stroke Testing Schedules with Limited Diagnostic Coverage	Operational and Planned Stroke Monitoring with V-MAP® G3
Diagnostic Data from Operational Valve Movements	No	Yes
Unnecessary Valve Testing Operations	Possibly	No
Planned Stroke Minimisation	No	Yes
Valuable Diagnostic Data Missed	Likely	Never
Failure Mode Creation or Stimulation	Potential	No
Asset Life Cycle Effect	Reduction	Extension
Confidence in Valve Operation	Improved	Maximised
Failure Mode Development Detection	Limited	Maximised
Risk of Failure on Demand due to Missed Data	Increased	Minimised

Score *Diagnostics Limited* is a Score *Group plc* Company

Score *Group plc*
Intelligent Valve and Gas Turbine Solutions™
www.score-group.com

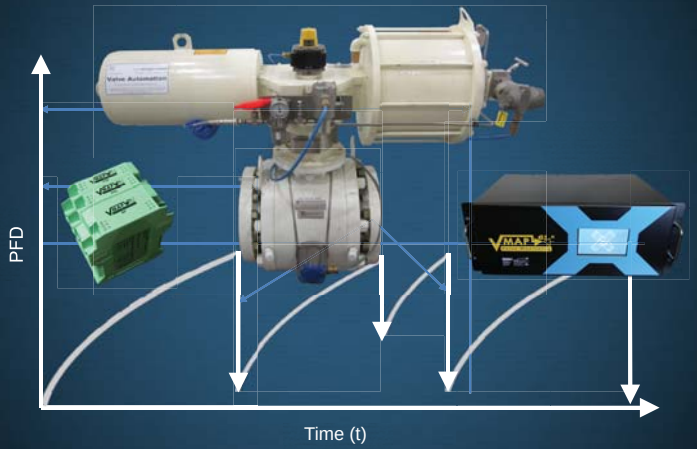
If you're interested in maximising plant safety and availability and reducing costs, contact us at:-
midas.enquiries@score-group.com or go to www.midasvalvediagnostics.com

@MIDASDiagnostic linkedin.com/company/score-group---valve-diagnostics

Revision 01

V-MAP® G3 Valve Monitoring

Best Available Critical Valve Monitoring Solution Delivering Maximum Diagnostic Coverage



Valve Condition and Performance Monitoring Enters a New Era

Score's enhanced V-MAP® G3 system gives process plant owners, integrity and safety assurance engineers, and maintenance personnel enhanced visibility of critical valve condition and performance indicators. This makes developing failure modes in valves and their actuators quickly and easily identifiable. V-MAP® G3 further extends the Score range of diagnostic equipment available for monitoring valves' in-service performance over time.

The affordable, easier to install, complete diagnostic coverage valve condition monitoring equipment and system you have been asking for is now available from Score Diagnostics Limited, part of the Score Group of companies.

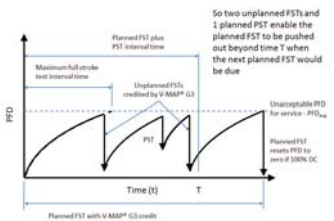
It is no coincidence that this has happened at time when there is an increasing pressure on our customers to comply with operational safety and integrity standards such as IEC 61508/61511, ANSI/ISA-84.00.01, ISO 55,000 and of course to respond to industry concerns over ageing assets - as evidenced by the UK Health & Safety Executive's recent KP4 programme for life extension and inspection.

V-MAP® G3 - A Customer Driven Solution

Whilst our existing customers are aware that our flag-ship valve monitoring system V-MAP® has been available in the marketplace for almost a decade already in both its first and second generation formats, they are also aware of our continuous improvement culture. In light of this, they requested an enhanced valve condition monitoring solution for safety and process critical valves with the following features and benefits :-

- Fully Independent of all Valve and Accessories Manufacturers
- Widest Possible Diagnostic Coverage
- Passive and Non-Invasive Monitoring
- Easier to Install (in both Brownfield and Greenfield Sites)
- Reduced Weight and Space Requirements
- Reduced Installation Costs
- Enhanced Asset Life Cycle Management
- Setting of Performance Standards for all Safety Critical Elements
- Maximised Risk Mitigation with Minimised Probability of Failure on Demand
- Unique and Bespoke System Components, designed and manufactured "from the ground up" to exactly meet asset monitoring needs
- Easy to Interpret Outputs and Alarms
- Evidence to Drive Proactive and Predictive Maintenance Models
- Wireless and Remote Installation Options

PFD Curve with V-MAP® G3 Recording All Strokes



V-MAP® G3 is a passive, non-intrusive on-line system that continuously monitors the condition of Emergency Shutdown Valves (ESDVs) and other critical valves, providing the following features:

- Issues warning of performance deterioration before unacceptable levels are reached.
- Remote monitoring of all valve operations, eliminating the need for personnel at the valve location during testing.
- Provides trending, benchmark comparison, reports, and audit records.
- Provides analysis that will identify maintenance requirements and provide reliability data for confirmation of Safety Integrity Levels (SILs) with the data also contributing to Reliability Centred Maintenance (RCM) studies that will maximise the plant availability.
- All ESV operations are recorded, whether partial or full, planned or unplanned, PSD or ESD. V-MAP® G3 would not be disabled during an ESD in the way some partial stroke devices are.
- Monitors the actuator supply pressure and strain between valve operations to ensure the readings are within their static operational limits and to detect any sensor malfunction.
- Seamlessly integrates with customers' Site Automation Systems (SAS).

The Need

The monitoring of the condition of Emergency Shutdown Valves (ESDVs), on both onshore and offshore Oil & Gas installations, is an essential part of ensuring the safety of personnel, protection of the environment and capital assets. The failure of an ESDV to operate on demand, or fail to provide a shut off, will have a major impact.

To demonstrate that an ESDV's performance meets the installation's safety criteria, it is normally subjected to routines involving inspection, partial closure, full closure, and leakage tests. These routines often require special test equipment and trained personnel, and will involve a planned shutdown, thereby interrupting production.

The Solution

This need to continuously demonstrate valve condition and performance is met by Score's V-MAP® systems development. V-MAP® G3 is an on-line system that continuously monitors ESDV condition and the process duty under which it is operating. Data is acquired remotely, without the need for personnel to be in attendance to monitor specific ESDV tests. V-MAP® G3 will also acquire data for every valve operation, including unplanned ESDV operation events, so building up a history of performance that can be used in-lieu of a planned shutdown test, thereby avoiding the need to interrupt production. The valve and actuator performance trends can then be used to establish a preventative valve maintenance programme based on actual and specific valve and actuator condition.

The Development

V-MAP® G3 has been developed, based on Score's long term experience in valve and actuator design, diagnostics, data acquisition, and system design and construction. The basic monitoring techniques and principles have been well developed in the past. It is the hardware and software developments of recent years that have enabled those techniques and principles to be implemented in a cost effective modular system design: One that can be tailored to the specific monitoring requirements, communications and protocols of the installation's automation system.

MIDAS® Signal Processing Unit (SPU)

Intrinsically Safe Junction Box, with MIDAS® DAU for processing all sensor outputs locally.

The System

V-MAP® G3 dedicated sensors are located on the valve, actuator and on the adjacent piping. The sensor types typically selected are:

- Acoustic Emission leak detection sensors
- Strain gauges to measure the torque or force required by the valve
- Pressure transmitters to monitor the actuator fluid power requirement
- Position transmitter to measure the valve stroke

The V-MAP® G3 sensors are continuously logged by bespoke data acquisition units (MIDAS® DAUs). On detection of a valve operation, the V-MAP® G3 server either directly outputs results in standalone installations, or - in fully integrated installations – it downloads the information from the MIDAS® DAU and typically requests the following input from the installation's automation databases:

- Process pressures and temperatures
- Actuator limit switch and solenoid status and timestamps
- ESDV event timestamps

Once the server has collected the raw data from the various sources, it is processed in the Score bespoke Signal Processing Unit (MIDAS® SPU) and stored. The following functions can then be performed to transform the data in to information:

- Manipulation to obtain derived data
- The derived data is then analysed by use of proprietary V-MAP® software, with algorithms for:
    - o Raising of alerts if performance characteristics exceed pre-set alarm or notification levels
    - o Comparison and trending with previous readings, benchmarks and design calculations
    - o Comparison of sensor outputs to detect sensor drift or malfunction
    - o Provision of summary reports

Score offer an ongoing updates service for all installed V-MAP® G3 Systems with technical support, software maintenance, engineering analysis, data interpretation and valve engineering expertise.