

Sensing Equipment Specifications

Performance	Pressure transient detection range*: 1.5 Km (4921 ft) on large transmission mains or 1Km ² (0.4 Square Mile) in a dense looped pipe network; Transient localization accuracy*: up to 20m (65ft) <small>*Depended on accurate GIS network representation, pipe material, pipe diameter & node spacing</small>
Sensor specifications	Pressure range:0-300psi (20 bar) for normal applications; < 300psi (20 bar) for specific applications (accuracy ±0.1%) Liquid temperature: -40°C (-40°F) to 105°C (221°F) for normal applications; <105°C (221°F) for special applications Pipe material & diameter: any
Data acquisition and wireless telemetry	Proprietary RTU: ARM Cortex M3 architecture -2GB SD card storage Wireless: 3G/GSM/GPRS module (Telit) Time sync: GPS module (Ublox) Security: SSL v2/v3 and TLS protocols; SFTP; RSA SSH-1 and SSH-2 Encryption
Cloud computing	Amazon Web Services (AWS)
Power	12V SLA battery (33Ah or 18Ah); Optional power: Solar or AC
Enclosure	Powder coated steel enclosure (Waterproof IP68)

KEY FEATURES

PascalView™ is **easy to install and use**. A unique well-tested algorithm prescribes the optimal placement of sensors, and allows for much less equipment required, as compared with other monitoring alternatives. The sensing equipment is installed on existing infrastructure (Hydrants, Air-valves, existing taps) hence requiring minimal capex. Clients can choose between a stand-alone web-based user interface or a link into their existing platform. The system is fully maintained throughout the contract period

PascalView™ provides **clear and quick ROI**. With real-time alerts, localization and prioritization of pressure related issues, it saves clients time and money and helps prevent highly disruptive events. The system allows clients much improved operational efficiency. Effective pressure management prolongs the life of the pipe infrastructure and is a key to good asset management.

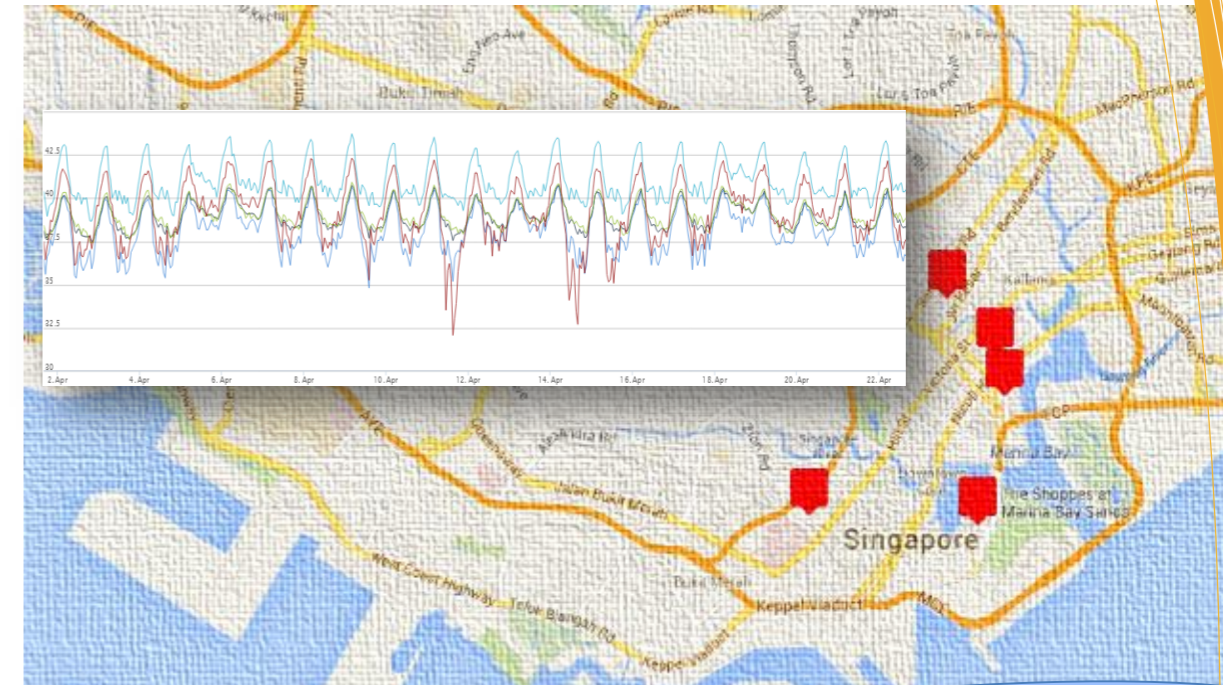
PascalView™ provides clients with **peace of mind**. With 24/7 support from Visenti's Control Center, clients can be assured of an additional alert mechanism for fast response to critical events. Clients can also be assured of effective cost management: Visenti's Cloud-based solution replaces the need for costly data center investment and maintenance.

- PascalView™ can be integrated with Visenti's leak detection solution LeakIntel™



Visenti Pte Ltd, a spin-off from MIT, is focused on supporting pipe network operators in monitoring their infrastructure and optimizing their operations. Visenti integrates patent-protected hardware, wireless data transmission and software services. The core technical team of Visenti bring tens of years of experience in pipe network hydraulic analysis, software systems and embedded sensing that is complemented by operations and execution expertise, and an expert advisory board from MIT and Technion.

+65 6515 6582 | consult@visenti.com | www.visenti.com



Real-time Pressure Monitoring and Analytics

- 24/7 pressure data and alerts from critical locations across the pipe network
- Live simulations for valve operations & hydrant flushing with impact assessment

Real-time Pressure Management

ADVANCED MULTI-FREQUENCY PRESSURE SENSING INTEGRATED WITH CLOUD-BASED DATA MANAGEMENT, ANALYTICS AND VISUALIZATION

PascalView™ provides on-line multi-frequency pressure data management, analytics and alerts that are critical for adequate and reliable pressure management in pipe networks.

It integrates Visenti's multi-frequency pressure monitoring sensors (highest sampling rate at 250 samples/sec and lowest at 1 sample/min) with existing pressure monitoring equipment, SCADA and meter data.

The Visenti sensors can be easily deployed at optimal locations across the network on existing taps, air valves or hydrants (permanently or on an ad-hock basis). Pressure data from existing or new sensors is transmitted wirelessly to the PascalView™ Cloud-based data management, visualization and analytics engine. The system operates on both mobile and desktop platforms.

MULTI-FREQUENCY PRESSURE SENSORS GIVE THE ABILITY TO MONITOR PRESSURE REGULATION VALVES AND PUMPS 24/7 IN REAL-TIME FROM ACROSS THE PIPE NETWORK

In high-frequency sampling mode, PascalView™ detects and notifies on damaging transients (caused by operations such as pumping) that can compromise the integrity of pipes in the network. And when the low-frequency mode is used, the sensors ensure that adequate pressure is maintained during Pressure Reducing Valve (PRV) tuning and pressure regulation activities.

REAL-TIME NOTIFICATIONS

PascalView™ is a fully automated system. Real-time data is available on a state-of-the-art web based interface. Once a critical pressure event is identified, PascalView™ automatically notifies the pipe network operators via Email and SMS.

PIPE NETWORK FAILURE DETECTION AND LOCALIZATION

PascalView™ detects and localizes multi-frequency pressure anomalies related to pipe network failures such as leaks, bursts and valve, pump or hydrant flushing operations with negative impact. Once an event has been identified, an automated alert is sent to the network operators in real-time.

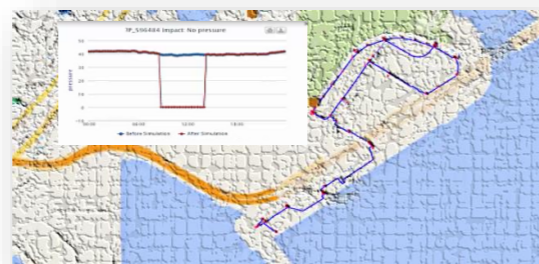
Threshold Violations Rapid Pressure Changes Dynamic Trend Analysis Notifications 24/7

ADVANCED VALVE OPERATION & HYDRANT FLUSHING SIMULATION FOR IMPACT ASSESSMENT

PascalView™ incorporates the network GIS data, pipe network model and live pressure data to automatically simulate network operations. This GIS based user friendly platform allows simulations of multiple valve operations and/or hydrant flushing across the pipe network.

The system provides feedback on the impact of these operations focusing mainly on pressure drops below acceptable ranges or interruption of supply to key customers. This feedback helps in preventing unintended consequences of the operation.

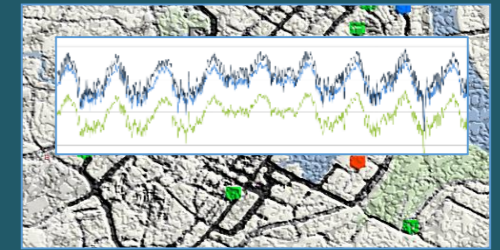
PascalView™ is available on mobile devices too; all the simulations can easily be done while in the field, during the operation. This saves time, money and minimizes damage to the environment from trial and error.



Valve Closure Impact Assessment

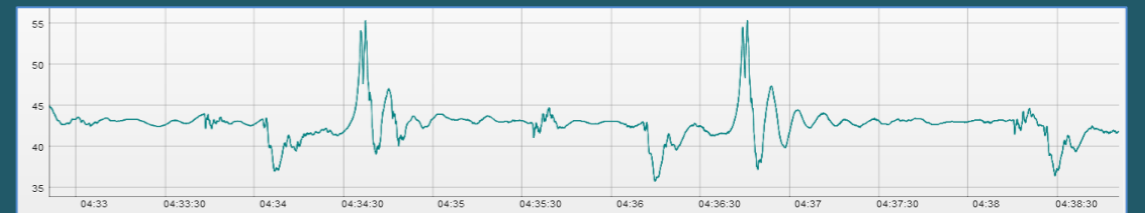
CASE STUDY: SINGAPORE'S WATER NETWORK

Singapore's national water supply agency, PUB, has implemented Visenti's pressure monitoring tools in several complex pipe networks that comprises almost 500km of pipelines.

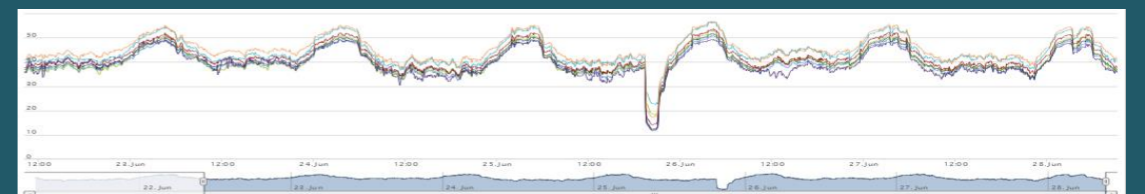


On-line normal pressure trend from multiple locations across the pipe network (integrated with SCADA and meter data)

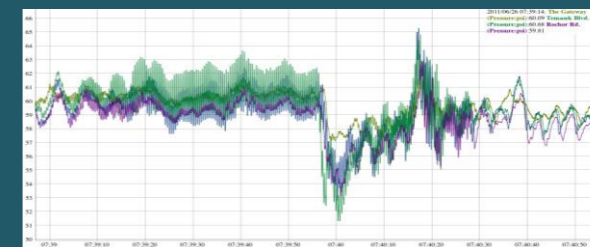
Data from a total of 55 pressure-monitoring devices, deployed at optimized locations within the networks, is integrated with existing SCADA and meter data. This enables the system, which manages multiple data streams, to perform real-time analytics and to send automated notifications in real-time to the most relevant personnel so that they can identify quickly the impact of different operations such as pumping or pressure regulation on the pipe network.



Detection of pumping operation causing significant and potentially damaging pressure variations



Major pipe burst detected based on low pressure threshold violation in multiple sensing locations



Transients generated by Valve operations



Typical sensing installation alternatives on existing hydrants, pipe taps or air valves

Access PascalView™ securely
anywhere, any time.

DETECTION SOLUTIONS

SUB-SURFACE DETECTION TECHNOLOGIES

Australia
A15 / 276 New Line Road, Dural
PO Box 3222, Dural, NSW 2158
Phone: 1300-885 383
website www.detectionsolutions.com.au
New Zealand
Unit J, 150 Harris Rd, East Tamaki, Auckland
PO Box 38 061, Howick, Auckland
Phone: (+64 9) 576 8000 Fax: (+64 9) 576 4641