flowintel
Intelligent Measurement Solutions

CLOUD-BASED METERING SOLUTIONS

Unlocking Precision, Confidence & Efficiency in Metering Data Management

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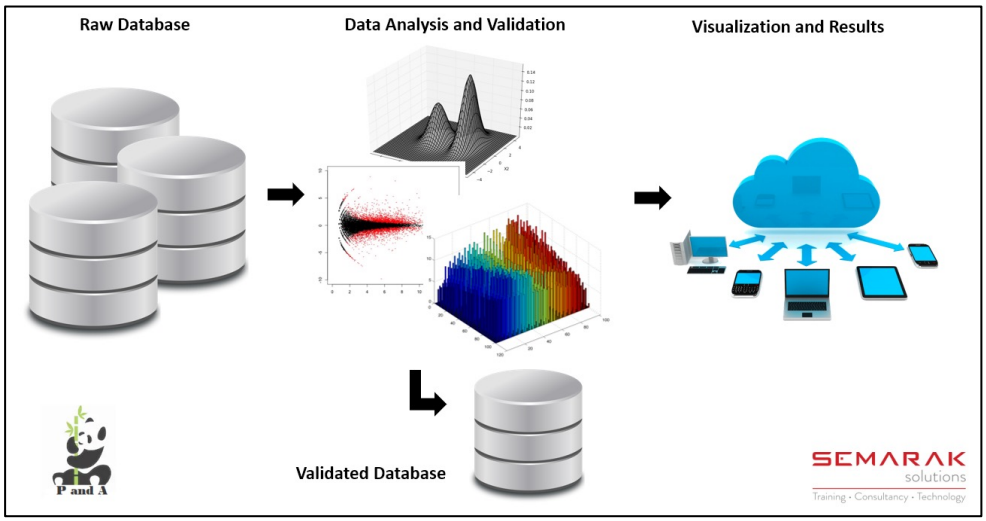
Embark on a new era of metering management with our cutting-edge software as a service (SaaS), born from the partnership between **P and Associates Sdn. Bhd.**, a renowned measurement & allocation technical consultancy expert and **Semarak Solutions Sdn. Bhd.**, a Malaysia's Bumiputera company specialised in business performance solutions.



- **Revolutionizing Metering Management:** Originally conceived to ensure accuracy in metering systems, our software has evolved into a comprehensive solution that centralizes and streamlines metering management processes. Accessible from anywhere via our innovative iCloud platform, it empowers experts, users, and auditors to oversee metering operations effortlessly.

- **Seamless Integration Across Systems:** Our software seamlessly integrates with various measurement systems, providing a unified platform for monitoring and managing metering data. Updates are delivered effortlessly throughout the field's lifetime, ensuring continuous improvement and adherence to the highest standards of accuracy.

- **Unmatched Advantages:** As pioneers in cloud-based metering solutions, we offer unparalleled benefits. Our software drastically reduces deployment costs, whether among partners or within your organization, while guaranteeing the utmost accuracy in metering systems.

- **Built on Expertise:** With a rich history and extensive experience working with global oil and gas operators, both national and international companies, and independent operators, we understand the intricacies of the industry. Our software reflects this deep commitment, offering robust solutions tailored to your specific needs, whether it's optimizing production or facilitating informed decision-making.

- **Committed to Excellence:** Our software and services are built on a foundation of rigorous standards recognized by industry communities worldwide. We prioritize precision, reliability, and efficiency in everything we do, ensuring that our solutions exceed expectations and drive tangible results for our clients.

Contact us for free demonstration: ask@semaraksolutions.com

Embark on a Journey from Data Complexity to Decision Clarity

In the dynamic process of oil and gas metering operations, the quality and reliability of data stands as the cornerstone of informed decision-making. Poor data quality can lead to erroneous decisions, increased costs, and compromise decision making. However, with our meticulous approach to data validation and analysis, we pave the way for precision, reliability, and actionable insights.

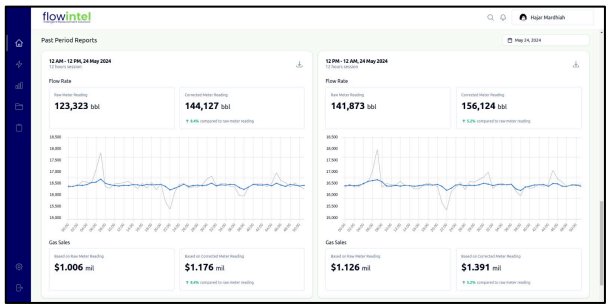
- **Streamlined Validation:** Our automated tools streamline the validation process, ensuring efficiency and accuracy even when dealing with extensive datasets. By minimizing manual errors, we fortify the foundation of your data analysis.
- **Harnessing the Power of Mathematics:** Descriptive Statistics serve as our guiding light in navigating the intricacies of data validation. From pinpointing anomalies to understanding data distribution, central tendencies, and variability, our arsenal of statistical techniques empowers robust decision-making.
- **From Raw Data to Refined Insights:** Our process begins with the collection of raw data, meticulously synchronized to eliminate discrepancies. Through rigorous statistical scrutiny and adherence to sensor physics, we cleanse and refine the dataset, ensuring its reliability.
- **Unlocking Insights, Driving Efficiency:** Armed with validated data, our analyses illuminate pathways to operational and economic efficiency. From brownfields to green fields, and across refinery and field operations, our tailored business applications cut off inefficiencies and losses, empowering you to optimize processes and maximize returns.
- **Visualizing Success:** Where robust statistical techniques and visualization methods spotlight outliers and ensure the integrity of your datasets, through insightful visualizations, we offer clarity amidst complexity, guiding your journey towards success.

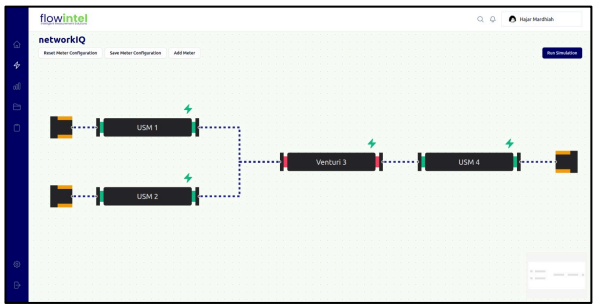
uncertaintyIQ
Ensuring Flow Measurement Precision

Pioneer of cloud-based solution to be certain about uncertainty.

networkIQ
Spotting Inaccuracies, Saving Cost

Real-time flow metering network performance assessment.





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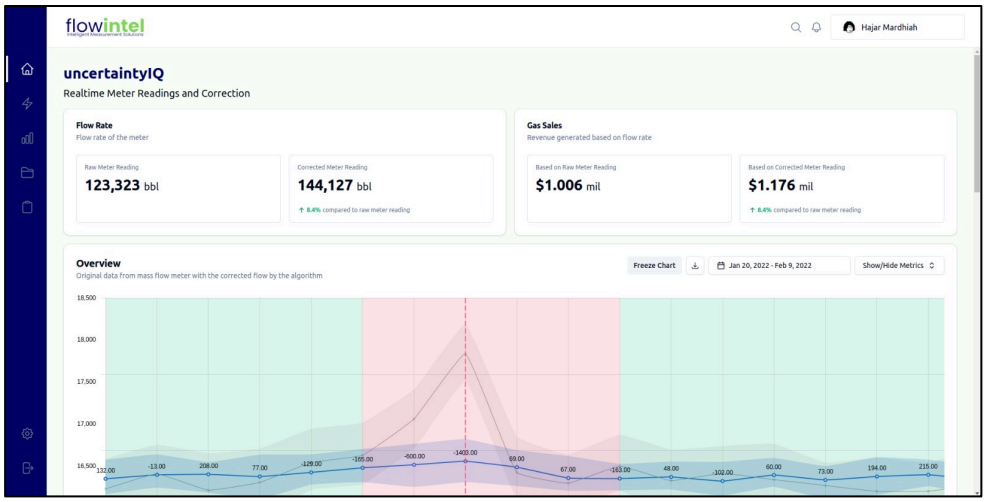
BE CERTAIN ABOUT YOUR UNCERTAINTY:
A key value to monitor for decision-making and reduce financial exposure.

In the intricate landscape of flow metering, accuracy is paramount. Without a clear understanding of flow meter performance and associated accuracy levels, making informed decisions becomes a gamble. Our solution is meant to push against these issues.



Real-Time Financial Insight: Drawing from extensive customer insights, we've developed a cloud-based software solution tailored to your needs. Our innovative platform provides real-time calculations of financial exposure based on specific flow meter usage—be it single-phase Coriolis, Orifice, Turbine, or multiphase flow meters. Beyond mere performance metrics, we assess aging effects and quantify monetary impacts, empowering you with actionable financial intelligence.

Precision Beyond Observation: Our software cloud solution is about going beyond surface-level performance metrics, delivering insights at standard conditions crucial for inter-party trading. Our solution provides unparalleled visibility into critical parameters and transmitter influences, enabling proactive risk mitigation and enhanced measurement accuracy for astute real-time decision-making and future investment strategies.

Cloud-Centric Convenience: Central to our approach is the cloud integration, offering rapid deployment within your organization. From metering engineers to asset managers, our platform provides seamless access to data and analysis tailored to individual roles. With robust security measures in place, our cloud-based solution ensures global accessibility, enabling real-time monitoring of asset health and performance from anywhere, anytime.

Empowering Remote Excellence: Embrace the future of flow measurement with confidence. Our solution empowers specialists to remotely monitor multiple assets in real-time, with custom dashboards tailored to specific needs. Whether optimizing operations or responding to evolving challenges, our remote services ensure uninterrupted support whenever and wherever it's needed.

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Our solution yields a multitude of benefits tailored to your specific needs

Density: 138.123 kg/m³ ± 0.407 kg/m³ @ 95 % confidence level

Source of Uncertainty	Value	Unit	Relative Expanded Uncertainty "U"	Absolute Expanded Uncertainty "U"	Unit	Probability Distribution	Coverage Factor "k"	Absolute Standard Uncertainty "u"	Sensitivity Coefficient "c"	Contribution for the given variable "c.u"	Combined Variance "(c.u)²"	Relative Contribution
	[1]	[-]	[%]	[1]	[-]	[-]	[1]	[-]	[1]	[1]	[1]	[%]
Value	138.123	kg/m³	0.100	0.138 1	kg/m³	Normal [99%]	2.575 8	0.053 6	1	0.053 6	0.002 9	6.69%
Repeatability	138.123	kg/m³	0.010	0.013 8	kg/m³	Normal [95%]	1.960 0	0.007 0	1	0.007 0	0.000 0	0.12%
Reproducibility	138.123	kg/m³	0.012	0.016 6	kg/m³	Normal [95%]	1.960 0	0.008 5	1	0.008 5	0.000 1	0.17%
Calibration	138.123	kg/m³	0.004	0.005 9	kg/m³	Uniform	1.732 1	0.003 4	1	0.003 4	0.000 0	0.03%
Curve Fitting	138.123	kg/m³	0.020	0.027 6	kg/m³	Uniform	1.732 1	0.015 9	1	0.015 9	0.000 3	0.59%
Resolution	138.123	kg/m³	0.001	0.001 0	kg/m³	Uniform	1.732 1	0.000 6	1	0.000 6	0.000 0	0.00%
Stability	138.123	kg/m³	0.250	0.345 3	kg/m³	Uniform	1.732 1	0.199 4	1	0.199 4	0.039 7	92.41%
Bias	138.123	kg/m³	0.000	0.000 0	kg/m³	Uniform	1.732 1	0.000 0	1	0.000 0	0.000 0	0.00%
Drift	138.123	kg/m³	0.000	0.000 0	kg/m³	Uniform	1.732 1	0.000 0	1	0.000 0	0.000 0	0.00%
				→			→	→	→	→	↓	
Density	138.123	kg/m³	0.294	0.406 5	kg/m³	Normal [95%]	1.960 0	0.207 4	1	0.207 4	0.043 0	100.00%
				←			←	←	←	←	←	

Figure 1: Showcasing financial exposure on Gas Measurement (% and $)

Universal Compatibility: Our solution is compatible with all types of flow meters available on the market, from single-phase to multiphase/wet gas flow meters. Regardless of your metering setup, our platform seamlessly integrates to provide comprehensive insights and analysis.

Financial Intelligence: Beyond traditional flow rate measurements, our solution translates data into financial units ($) directly relevant to your future decisions regarding investment, maintenance, or operational changes. By quantifying financial implications, you gain clarity and confidence in your decision-making process.

Gas Quality and Energy Uncertainty Management: We address complexities such as gas quality and energy uncertainty through meticulous analysis of all relevant parameters. Our comprehensive approach ensures that no aspect of measurement integrity is overlooked, enabling you to make informed decisions with confidence.

Tailored Solutions: We offer tailored solutions to meet your unique process automation needs. From production and supply chain management to project management services, control systems, and field devices, our offerings are designed to optimize efficiency and drive success across your operations.

38.5 $/MMBtu

Gas Rate @SC: 89 517.303 Sm³/h ± 2 828.390 Sm³/h @ 95 % confidence level

Source of Uncertainty	Value	Unit	Relative Expanded Uncertainty "U"	Absolute Expanded Uncertainty "U"	Unit	Probability Distribution	Coverage Factor "k"	Absolute Standard Uncertainty "u"	Sensitivity Coefficient "c"	Contribution for the given variable "c.u"	Combined Variance "(c.u)²"	Relative Contribution
	[1]	[-]	[%]	[1]	[-]	[-]	[1]	[-]	[1]	[1]	[1]	[%]
Condensate @LC	1.594	m³/h	73.646 2	1.174 1	m³/h	Normal [95%]	1.960 0	0.599 1	7.519E+01	45.042 9	2.029E+03	0.10%
Gas @LC	550.420	m³/h	3.000 0	16.512 6	m³/h	Normal [95%]	1.960 0	8.424 9	1.624E+02	1368.332 7	1.872E+06	89.91%
Water @LC	0.896	m³/h	100.418 7	0.899 5	m³/h	Normal [95%]	1.960 0	0.458 9	1.480E+00	0.679 3	4.615E-01	0.00%
bo	0.817	Sm³/m³	1.000 0	0.008 2	Sm³/m³	Normal [95%]	1.960 0	0.004 2	1.466E+02	0.611 6	3.741E-01	0.00%
bw	0.995	Sm³/m³	1.000 0	0.009 9	Sm³/m³	Normal [95%]	1.960 0	0.005 1	1.333E+00	0.006 8	4.576E-05	0.00%
bg	162.414	Sm³/m³	1.000 0	1.624 1	Sm³/m³	Normal [95%]	1.960 0	0.828 7	5.504E+02	456.110 9	2.080E+05	9.99%
GOR2	91.981	Sm³/Sm³	5.000 0	4.599 1	Sm³/Sm³	Normal [95%]	1.960 0	2.346 5	1.303E+00	003.058 1	9.352E+00	0.00%
GWR2	1.488	Sm³/Sm³	5.000 0	0.074 4	Sm³/Sm³	Normal [95%]	1.960 0	0.038 0	8.909E-01	0.033 8	1.144E-03	0.00%
				→			→	→	→	→	↓	
Gas Rate @SC	89 517.302	Sm³/h	3.160	2 828.390	Sm³/h	Normal [95%]	1.960 0	1 443.056	1.000 0	1 443.056	2.082E+06	100.00%
				←			←	←	←	←	←	
Energy Daily	79 276.52	MMBtu/d	3.160	**2 504.82**	MMBtu/d			1 277.97				
Financial Exposure	3.052	MM$/d	3.178	**0.097**	MM$/d			49 202	$/d			
Financial Exposure	1 114.796	MM$/y	3.178	**35.430**	MM$/y			17 970 979	$/y			

Financial Exposure Daily: 3.053 MM$/d ± 0.097 MM$/d @ 95 % confidence level
Financial Exposure Yearly: 1 114.797 MM$/y ± 35.430 MM$/y @ 95 % confidence level

Why add an uncertainty software solution when having already, or buying a highly accurate flowmeter?

You want to ensure the robustness over time and control any possible new environmental modifications for example: fluid change, commingled fluid, composition change, line pressure, line temperature, or flow rate range. Our solution lets you interact with the flowmeter and associated transmitters for more efficiency, transparency, and safety, everything is done remotely and we provide adequate output results to your system.

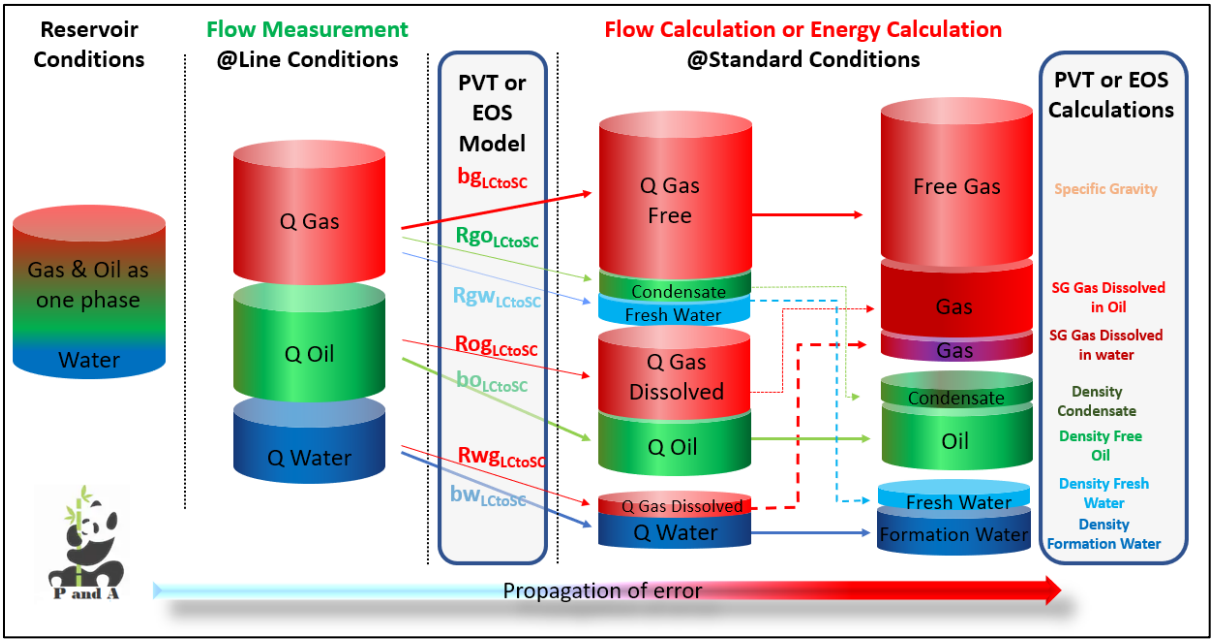

Figure 2: Handling calculations from line to standard conditions.

Calibration and Configuration Made Simple: Easily access calibration information and configuration data with our intuitive user interface, this can also include calibration reminders, and how a late calibration might affect the overall flow uncertainty. Streamline tasks and enhance productivity by efficiently organizing and presenting critical data in a concise and user-friendly manner.

Visualize Performance with Precision: Experience unparalleled clarity with our visualization tools, allowing you to quickly assess flow range, single-phase, or multiphase performance. Real-time trend graphs and associated uncertainty metrics provide invaluable insights for troubleshooting and monitoring flow meter health in current conditions.

Uncertainty Analysis Across Domains: Our solution doesn't just stop at performance metrics—we provide uncertainty analysis in volumetric, mass, or energy domains. Applied across the oil and gas industry, from upstream to downstream businesses, including gas emissions, our uncertainty metrics ensure accuracy and reliability in decision-making processes.

Empowering Sustainable Operations: With our innovative solutions, we empower industries to embrace sustainability without compromising on performance or productivity. From optimizing energy efficiency to reducing environmental impact, our technologies pave the way for a more sustainable future.

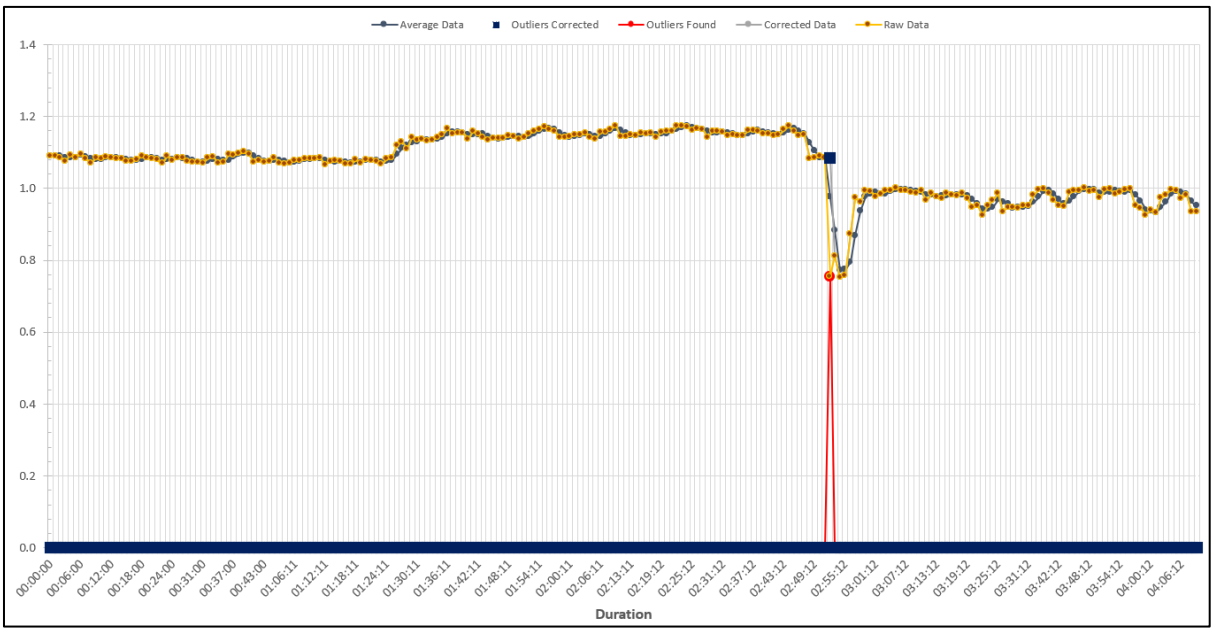

Figure 3:Typical recording with highlight through automatic analysis of outliers and corrections before analysis.

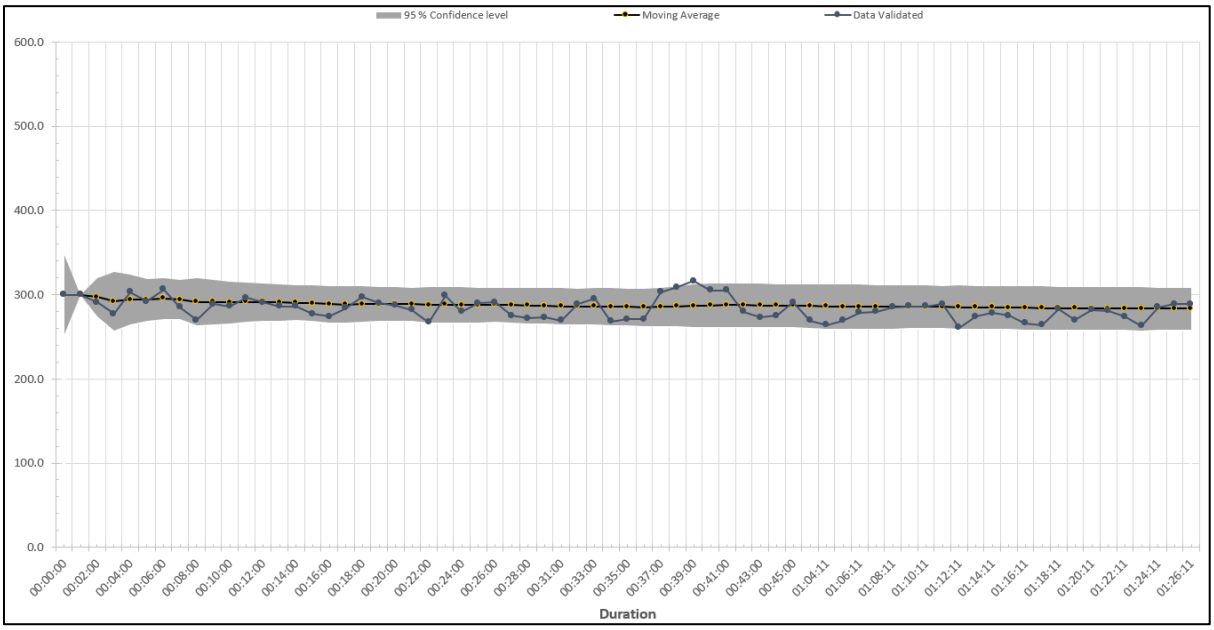

Figure 4: Automatic Display Averaging, Confidence Level, Data Validated and Reviewed

HEALTH CHECK CHALLENGES WITH A NETWORK OF FLOWMETERS:
Your Essential Solution for Flowmeter Performance

Our solution is your key to identifying and rectifying inaccurate or deficient flowmeter performance, safeguarding against unnecessary OPEX expenditures over time.

Figure 5: Leak pipe break, connection leak, gas or liquid, valve issues.

Navigating Measurement Uncertainty: In the complex landscape of fluids transfer, discrepancies stemming from cheap or poorly managed equipment, leakage, or other factors can significantly impact uncertainty calculations. Even a slight error of 0.2% can translate to millions of dollars in financial risk annually, jeopardizing sales agreements and inviting disputes.

Minimizing Financial Risk: The repercussions of inaccurate measurements extend far beyond monetary losses. Accountability issues can arise when multiple partners are involved, leading to disputes, complexities, and legal entanglements. Lengthy legal proceedings only exacerbate the situation, consuming additional resources and prolonging uncertainty.

Efficiency Through Industry Standards: By adhering to approved standards and processes, we streamline operations and mitigate risks associated with uncertainty. Our approach not only minimizes financial exposure but also fosters transparency, trust, and accountability among stakeholders.

Empowering Precision and Efficiency in Flow Measurement: With our solution, flow metering engineers, asset managers, and engineers gain access to a dedicated tool for ensuring the accuracy of hydrocarbon measurements. This assurance extends to associating measurements with relevant pricing in sales agreements, or identifying potential financial exposures and actions required for accuracy improvement.

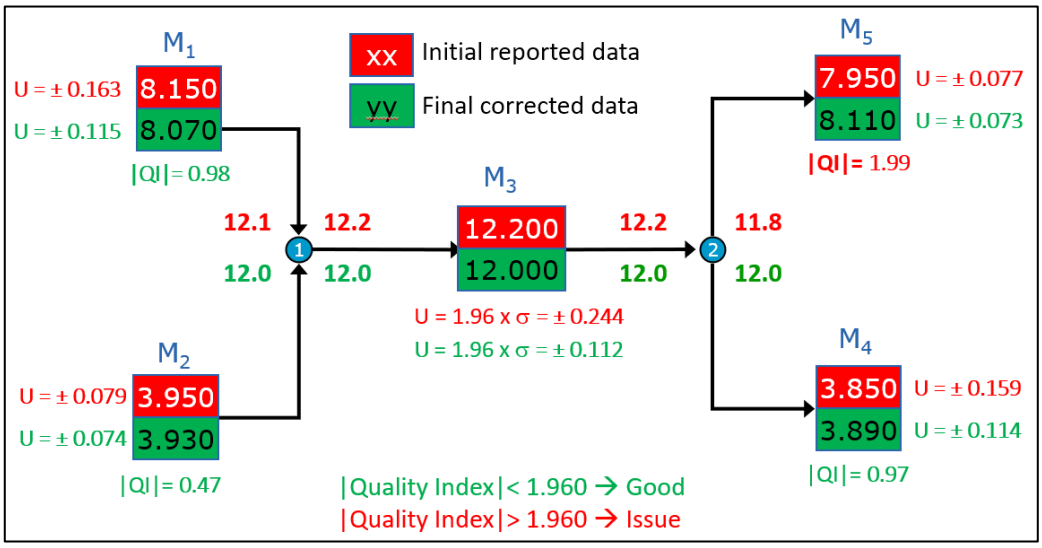

Figure 6: This graph shows network of 5 meters and in red the raw data and the unbalanced situation, then with our analysis, we can provide the correct value with the minimum change and spot the "weak" flowmeter in this case M5.

Independent Assessment for Assurance: Our independent review process provides invaluable assistance to parties involved in assessing the accuracy of flow meter calculations within their network. Whether settling disputes internally or externally, our thoughtful review process ensures swift resolution and facilitates regulatory approval when needed.

Data Validation and Reconciliation: At the core of our solution lies the concept of data validation and reconciliation, leveraging mathematical models to describe system behaviour. These models establish relationships between variables, such as energy, mass, or volumetric flow rates, ensuring balance constraints are met. Through advanced techniques like Lagrange development and associated analysis, we minimize measurement errors while maintaining system integrity.

Cost-Effective Calibration Management: Our network flow metering software offers support in optimizing calibration frequency through a risk-based approach. By strategically reducing the number of calibrations required across the system, significant cost savings can be achieved—potentially up to $100,000 annually in systems with multiple flow meters and components.

Spotting Deviations and Enhancing Accuracy: Our solution employs Quality Index (QI) monitoring to identify failing devices or equipment within the network. By recalibrating against healthy flow meters, we mitigate deviations and optimize accuracy. This sophisticated approach not only identifies discrepancies but also establishes expected uncertainty levels post-reconciliation, ensuring robust and reliable measurements.

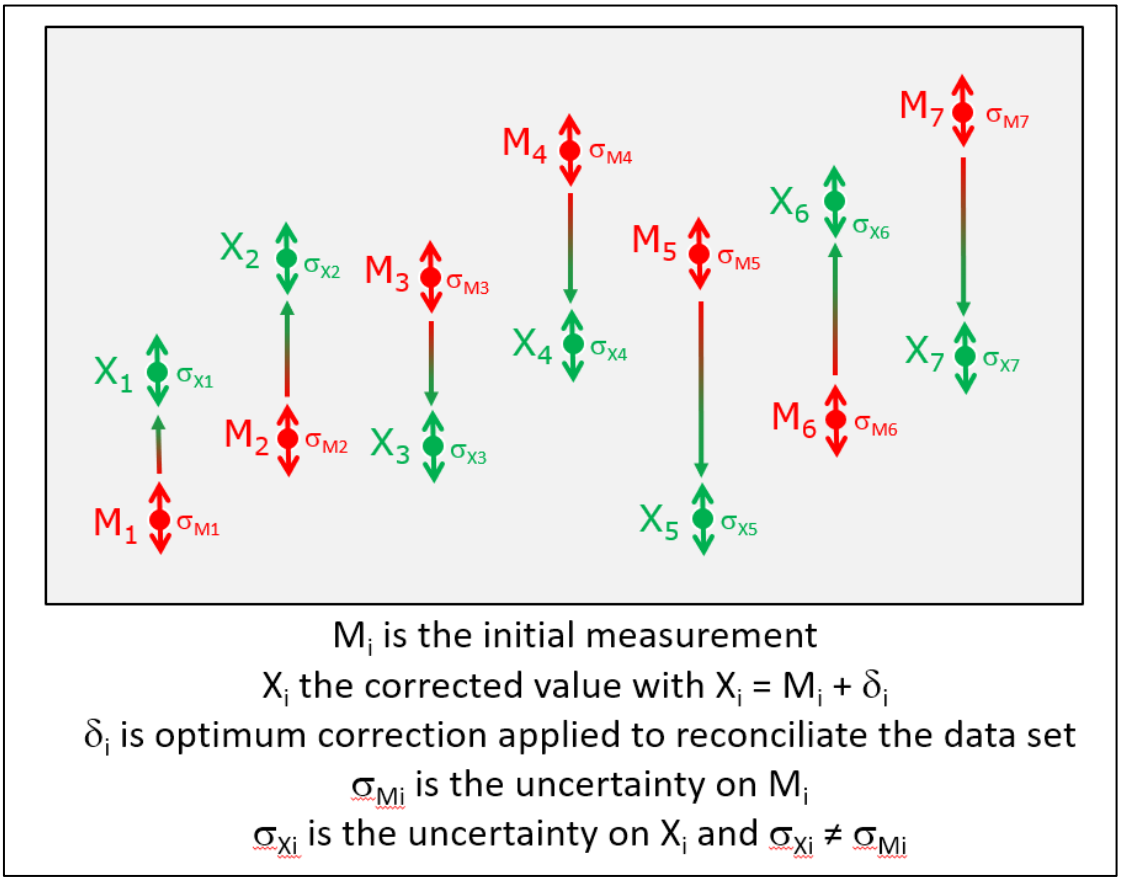

Figure 7: Visualisation of raw and corrected value with respective uncertainty.

Tailored Solutions for Your Data Precision Requirements

Our software is designed to cater to your specific requirements, offering real-time or periodic evaluations of uncertainty measurement and Data Validation and Reconciliation (DVR), complete with Quality Index assessments. By ensuring that flow meters operate within expected accuracy levels, we provide crucial insights that lead to operational expenditure (OPEX) savings and production optimization.

Real-time Precision: Our software enables high-frequency calculations, providing evaluations every 15 minutes, for example. This real-time assessment empowers decision-makers with up-to-date, reliable data, essential for proactive decision-making and action based on facts rather than raw, unvalidated measurements.

Centralized Management: Accessible to experts and partners worldwide, our software offers a unified platform for managing measurement systems. Whether it's for remote support or collaborative efforts, our solution minimizes exposure to mismeasurements and ensures compliance with agreements and regulations. This centralized approach saves time, enhances data quality, and safeguards against financial risks associated with inaccuracies.

Dr. Bruno Pinguet, P and Associates Sdn. Bhd.

Bruno G. Pinguet, Ph.D., Executive M.B.A, is a physicist, inventor and flow measurement expert with an exceptional blend of technical and commercial acumen. With over 30 years of senior leadership experience in the renewable energy and oil & gas sectors, Bruno has established himself as a trusted advisor and thought leader.

Bruno is an author and speaker, having published over 200 papers, 2 books, magazine articles, and international lectures. As a Doctor of Philosophy in multiphase flows, he is also a reviewer for several technical reviews. He holds 8 patents for distinctive products in areas such as Multiphase Sampling, Nuclear, Optical, Fluid Properties, and Multiphase Flow Metering.

His career has spanned the globe, with extensive expertise in countries such as Malaysia, Singapore, Canada, Indonesia, France, Norway, the UK, and Venezuela.

Ts. Faiz Latip, Semarak Solutions Sdn. Bhd.

Faiz Latip, is a Malaysian technologist and entrepreneur who are dedicated to empower operation excellence and business performance in Oil, Gas & Energy industry. He is the Founder & CEO of Semarak Solutions Sdn. Bhd., a PETRONAS licensed company specialised in providing training, consultancy and technology.

Presently, the company is offering over 180 professional courses with global network of 30 subject matter experts and 5 cutting-edge software solutions. It had served clients from 8 countries since 2020.

In 2024, he was elected as an Executive Committee (EXCO) Member of The Malaysian Oil, Gas & Energy Services Council (MOGSC), the largest industry association representing the interests of the industry in Malaysia.

Faiz acquired technical experience while working with Halliburton as a Completions Tools Trainee Engineer and Baker Hughes as a Wireline Services Field Engineer in Malaysia and U.A.E.

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