

# OUR ROOTS

## A discussion with Yves Gamache

The story of an inventor who is passionate about revolutionising gas analysis

### The first digital trace N<sub>2</sub> analyser

In 1992 under the Contrôle Logique operations, the first digital trace N<sub>2</sub> analyser on the market was developed. It was named the K2000. The driver behind this invention was the poor performance of the existing analyser installed in the Air Separation plant I was working. The technology breakthrough was down to a novel low power, low frequency high voltage dielectric barrier discharge plasma detector and the selection of a the 337.1 nm nitrogen emission line for the measurement. Despite its size and weight, 70 pounds, the performance was superior to every commercially available instruments.

### The birth of Contrôle Analytique

Following this success, I was joined by André Fortier in 1995 to form Contrôle Analytique and we quickly revised the technology and product design. The new product was named K2001 and it was the first instrument to be based on an open loop Royer inverter to drive the plasma discharge. Furthermore, we introduced a method to reduce measurement cross interferences from moisture contained in the sample. The clever idea was down to the combination of two key elements: plasma doping with moisture and a moisture trap that did not interfere with N<sub>2</sub> impurity. Following this, a new measurement wavelength was selected to reduce CH interferences. With all those breakthrough, the K2001 was a quantum leap in the domain and became a world standard. Of course, having set the standard, we were copied by others but the level of engineering and performance was never achieved. After more than 30 years, it is still the market reference.

The main application for the K2001 was the air separation plants. Due to its performance, low limit of detection (below 10 ppb) and stability, we generated interests in parallel markets and got requests for lower limit of detections. We pushed the limits and completely redesigned the way analog and digital signal processing was done by working in cooperation with IC chip manufacturers. We were the first one to incorporate a 24 bits high resolution analog to digital converter. This new design lead to the K2002 in 1997. With our reputation and track record, it became an instant success in the semiconductor industry with its stability and 0.25 ppb limit of detection.

Then, other requests came from the air separation industry crude argon analyser to control the pick-up point in the low pressure distillation column. To solve the problem, the K3000 was released in 1998 and again revolutionized the industry. The K3000 was in fact our plasma emission detector integrated in a process GC having all the industrial I/Os for automated operation. It was a single impurity system but soon it became a dual impurities analyser in various backgrounds like H<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>, Ne, Ar, CH<sub>4</sub>, etc. The K3000 was the first reliable crude argon analyser. Many had tried before but system reliability and stability suffered too much to be trusted as a process instrument. The K3000 have found its niche in many semiconductor plants and the K3000 success paved the road to a complete process GC development program in 2000 lead by André Lamontagne, Contrôle Analytique R&D manager, and I. The K4000 was born.

The K4000 was the first plasma emission detector based process chromatograph offering a complete graphic interface and parallel real time chromatography with built in industrial I/Os, built in sampling system and remote Ethernet connectivity. All this in early 2000. The k4000 actually became a best seller and our design concept has been a source of inspiration for some major process GC manufacturer. As the K2001 did, the K4000 became the semiconductor industry standard for the trace measurement of N<sub>2</sub> and Ar in O<sub>2</sub>. This was made possible by the detector sensitivity and also a new chromatographic column for O<sub>2</sub>/Ar separation, known as the ArgonSep. Something we are proud of.

As the technical boundaries were pushed even further by the KA team during the K4000 journey, many challenges were faced, especially with the chromatographic valve which was the main limiting factor impacting performance and long term reliability. In 2005, a new R&D program was started and we developed our own line of chromatographic valves and fittings.

### AFP: Revolutionizing the GC valve market

Soon, these new innovations gave birth to a new company named Analytical Flow Products (AFP) founded by myself and André Fortier. At the same time as the spin off of AFP in 2007, Contrôle Analytique was sold to Servomex. This was not an easy decision but it was strategically wise to do so. Indeed, victim of our success, we were facing the problem to do a major investment in infrastructure in order to follow the demand for our products lines and moreover we foresaw the coming economic crisis. As passionate inventors, this move gave us the opportunity and resources to focus fully on our new venture and provide better products for chromatographers with a high level of technical support.

In 2008, while most of the industries involved in the analytical market cut down their development budget to the economic crisis, we did the opposite in order to complete the AFP product line. Several patents were filed and AFP products became number one on the market in term of performance. AFP is now the leading brand.

Then, the story repeated. AFP was facing a rapidly growing order book and a major investment was required. State of the art CNC machine, qualified manpower and a new building was required. This with the burden of becoming again more of a business manager and number cruncher. In order to continue a long term vision of designing innovative products for chromatographers and secure AFP supply chain, we decided to sell in May 2017 all the valve business technology asset (not the company), to the people who had been manufacturing the valves for many years, APN World.

### ASDevices - Disrupting gas analysis

After the sale of AFP brand, a new division was born, Analytical Sensing Devices (ASDevices) and founded by the original team behind the success and revolution of KA and AFP, Yves Gamache, André Fortier and André Lamontagne.

Again, here, the innovation is on the front line. Based on our experience, market insights, a major investments in R&D and a portfolio of over 12 patents, a complete line of products is offered. Knowing the power and limitations of the plasma technology I introduced more than two decades ago, an enhanced version with new measurement modes will be offered amongst 4 others sensing technologies. Moreover, a full line of accessories comprising purifiers, a modular GC oven, snap in I/O modules and a novel industrial fitting will be offered.

