

# “To Advance Meaningful Measurements”

Excerpted from Transonic Founder Cornelis Drost’s Presentation  
At the Grand Opening Celebration, July 2012

The seeds for Transonic were planted more than 35 years ago at the NYS Veterinary College at Cornell where Transonic founder Cornelis (Cor) Drost was a senior research associate. Working under the direction of Dr. Alan Dobson, professor of Physiology, Cor figured out how to measure the amount of blood flowing through blood vessels in a manner where one would not have to interfere with the flow inside the vessel itself.

In 1978, the group presented this theoretical breakthrough to the world. The technology used non-invasive ultrasound. Its revolutionary aspect was that it measures the actual amount of blood flowing through the vessel directly and with high accuracy, without having to do things to the vessel that would change the very flow that one would want to measure.

## THE HARD WORK BEGINS

After securing a Cornell patent for their transit time ultrasound technology a lot of hard work began. In order to actually make the measurement, the researchers had to push the frontiers of technology way beyond what was then the standard. This involved the electronics. Gary Thomas who had joined the Cornell group, together with Cor designed and tested various generations of flowmeter electronic schemes.



Cornell Prototype Flowmeter

The group also had to understand the ultrasonic transducers that worked with the flowmeter, and invent ways of realizing their exacting accuracy requirements. Some of this work was also patented at Cornell. Jan Milanowski did all the transducer design and testing in the early days before later on designing many generations of Transonic’s electronic flowmeters, and contributed to two quintessential flow technology features: “self-reciprocity” and “full flow illumination”.

## ADVANCING MEANINGFUL MEASUREMENTS

New technology is no good unless one can actually do something useful with it. So the mission of the Cornell group became: to Advance Meaningful Measurements. This meant that the Transonic group had to make things work in real life, with fully implanted sensors that report flows inside the animal under normal, healthy, physiological conditions. This is where the Cornell connection was essential: many flowmeter and flowsensor designs were tested in animal studies, not found good enough and then improved, before the system, five years later, was finally ready for a larger commercial audience.

Two seminal papers from Dr. Dobson and Dr. Sellers delivered this proof to the rest of the world: Dr. Alvin Seller’s paper proved that blood volume flow could be measured, under controlled conditions, in an animal study. This validation deployed an absolute calibration technique developed by Dr. Dobson, and the key to Transonic’s hallmark high accuracy. Another paper authored by Dr. Dobson during his sabbatical studies at Cambridge University in Great Britain, delivered independent proof that the technology measured volume flow.

## TRANSONIC SYSTEMS INC. LAUNCHED

During the end of the Cornell period, with NIH research funding waning, New York State issued a small grant to commercialize the transit time flowmeter technology. During the last year at Cornell, one more engineer, Jim Olsefski, was hired from money that Cor had earned from Ithaca area land development activities. This propelled the plans to launch Transonic Systems Inc. During this period a first flowmeter prototype was developed, one that could be operated without Gary tweaking the knobs. On July 1, 1983, Cor, Gary and Jan gave up their Cornell appointments. Cor and Gary joined Jim as "Transonic Systems Inc." This "moving out of Cornell" meant that garage walls at the Drost's family home had to be painted and Transonic electronics had to share space with piles of fire wood that heated the company's first facility. Jan took a position in Maine for a couple of years before he returned to join Transonic later to design many generations of Transonic's electronic flowmeters, up through our current "flowmeter on a chip". Besides working on the new Transonic flowmeter, the team also consulted for a gasoline pump company called Tokheim -- Transonic's first OEM contract!

A \$150,000 business loan from the US Small Business Association made it possible to move operations to Langmuir Lab, a Cornell University Incubator/Research park, across from the Ithaca Airport. The Langmuir Labs years were busy and productive. The first commercially available flowmeter was finalized. With upgrades and minor model number changes, this model has been our flagship product for some 20 years.

"Missionary Sales" were the norm during those first years. Nobody believed in the technology, because it did not exist before, and customers needed sure-bet measurement results for their research studies. This hurdle was overcome by the very essence of the mission of **"Advancing Meaningful Measurements."** Every flowmeter was sold with a 100% application success warranty, with full engineering and application support, when necessary. Transonic figured out how to make the product work for the customer, and the product was customized for free if needed.

Notable publications from those early days included a Medical Electronics article published by Prof. Ron Gorewit of Cornell Animal Physiology. This paper gave wider exposure to what was then the unbelievable feature of the flowmeter -- that it could measure volume flow regardless of the diameter of the blood vessel. An early chronic implant paper from Dr. Hartman also demonstrated the superior measurement ability of the Transonic apparatus.

An invaluable early employee was Mrs. Jean Finley, mother of Laurie Stroman, current head of manufacturing. As Manager of Marketing and Sales, she put Transonic on the map with her unrelenting development of applications, pursuit of customers, and mentoring of other key early employees that included Margo Sosa and Susan Eymann. Her commitment to the mission of "Advancing Meaningful Measurements" paved the way for the Transit-time Flowmeter to become the gold-standard.



Gary Thomas at the Workbench  
in the Converted Drost's Garage



First Transonic Commercially  
Available Flowmeter, T101

## BURSTING AT THE SEAMS

In 1988 the fledgling company was 5 years old and bursting out of the seams at Langmuir Labs. There was no reasonable business land available, so with the help of the Town of Lansing Transonic Systems created the Warren Road Business Park from 40 acres of farm land. Groundbreaking for the new Transonic building took place in the summer of 1988. During the years to come, the company continued its steady growth which averaged 6 to 8% per year. In 1993, when Transonic turned 10, a two-story addition to the building tripled the company's size.



**Groundbreaking of the 34 Dutch Mill Rd. Facility in 1988 with (from left to right) Dr. Alan Dobson, Jean Finley, Cor Drost and a Town of Lansing representative.**

## SUCSESSES

During this period, many good things happened. The Cornell flowmeter technology became the worldwide Gold Standard, first for animal studies, then for human surgery. Transonic's product scope expanded with the hiring of a Russian Biomedical Engineer, Dr. Nikolai Krivitski. Nikolai had the "Aha!" insight that existing transit-time ultrasound technology was also a superior measurement approach to do something called "indicator dilution." This ushered in a whole new world of technology and application innovations

Then, when physicians with hemodialysis patients presented us with a real blood flow measurement problem for their patients, Nikolai had his second "Aha!" insight: Transonic's standard transit-time ultrasound hardware combined with the dialysis machine hardware, made it possible to diagnose life threatening blood flow problems in those dialysis patients. This technology innovation took off like a storm with the first patent filed in the fall of 1994. Only 4 years later, this technology was already recognized in the new Guidelines of the American Kidney Foundation as the Gold Standard technology – the technology by which all other measurements should be compared and judged. In a White House breakfast ceremony in 2000, this technological breakthrough received "Tibbets Award" for Research and Innovation from the US Small Business Administration.

## INNOVATION STREAM

The stream of innovations from Nikolai's R&D group has continued and now includes the Endovascular flowmeter for interventional radiology as well as the new COstatus Monitor, a device that makes it possible to measure cardiac output, blood volumes, and the degree of congenital heart defects in newborn babies.

Transonic then began looking for additional novel measurement methods to add to the "advancing meaningful measurements portfolio" and acquired Endosomatic Systems, out of Davis, CA for their innovative telemetry applications and Scisense Systems, out of London, Ontario, Canada, for their innovative pressure volume systems.

The mission "To Advance Meaningful Measurements" has inspired, guided and propelled Transonic's growth from its humble beginnings to the present day where Transonic is recognized as a biomedical measurement company leader.