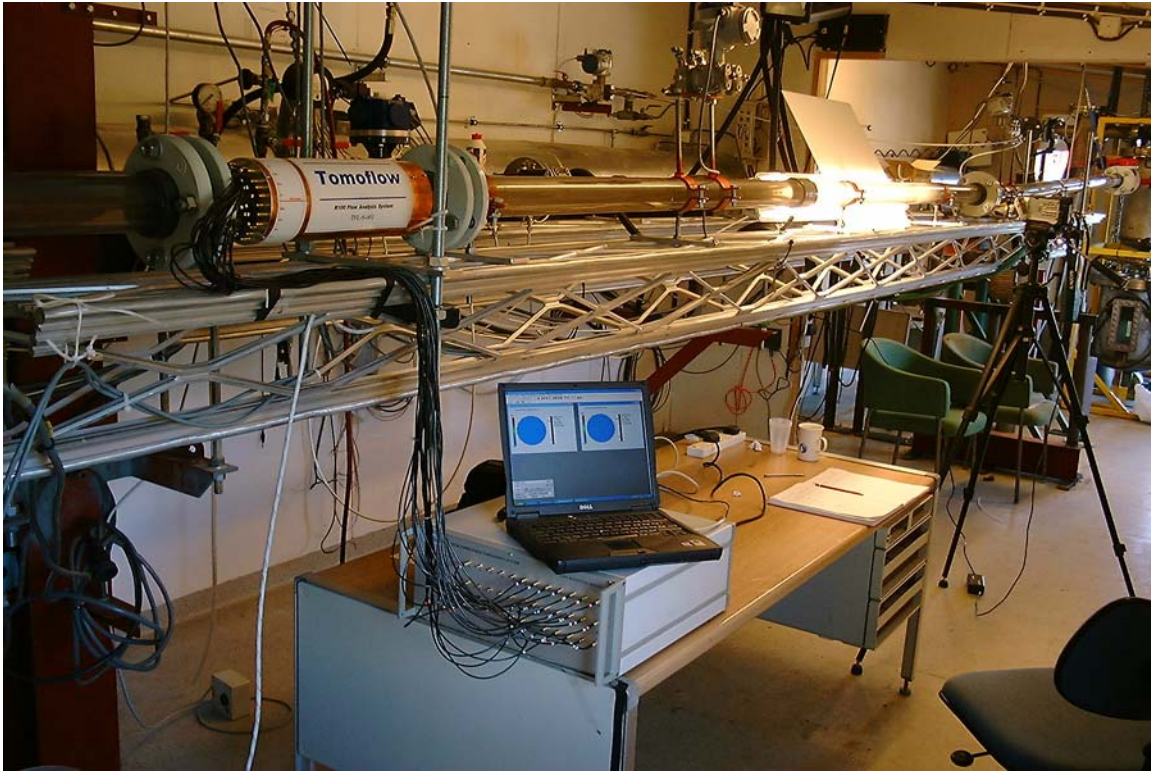


Tomoflow Ltd

A Novel Tomographic Method of Measuring Flowrates of Mixtures in Pipes



Tomoflow Ltd has been established to develop flowmeters for mixtures of materials (known as multiphase flowmeters), and plans to expand over the next five years to become a significant manufacturer and systems supplier.

The output of a flowmeter tells the user how much material has passed through the meter in a certain time, either as a volume flowrate (for example litres per second) or as a mass flowrate (for example tonnes per hour). The measurement of flowrate may then be integrated to give the total amount of material delivered, for example the number of litres or tonnes. In the case of liquids and gases the technology to measure flow is well understood and flowmeters are widespread – whether filling up a car on a garage forecourt or measuring gas consumed by a household, the amount of product is measured by a flowmeter and the indicated output of the flowmeter is accepted by both buyer and seller as the true amount delivered.

Many industrial processes use mixtures of products pumped along pipes. For example, in manufacturing processes particulate materials (plastics, grain, catalysts...) are blown along pipes

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by compressed air or pumped in liquid, while in the oil business mixtures of gas, oil and water are common in long-distance transport. Such transport systems are very efficient, but the only way to measure the amount delivered is to separate the components and meter them individually or to fill some sort of tank or vessel and measure the volume or the weight of the product in the tank. This limitation is not inherent to the pumping mechanism, it is simply that the technology for measuring the flowrate of mixtures of materials in pipes by a flowmeter is not available. The lack of flowmeter technology for these applications adds to the cost of the operation considerably (extra piping, valves, tanks and weighing mechanisms) and interferes with the process flow.

Tomoflow aims to replace these complex and expensive measurement systems with a major extension to current technology, envisaged in three stages as detailed below:

Tomoflow R100 *Flow Analysis System* is an extension to existing twin-plane process imaging systems, which gives high-speed on-line cross-sectional images of velocity and mass flow distribution across pipes and conduits. The users are engineers and scientists who need to understand the dynamics of the multiphase flows in their particular processes. With the addition of FlowanRT, real-time measurement and control is now possible.

Tomoflow *Solids Flowmeter* will be a flowmeter capable of measuring the flow of mixtures of gas and solids in pipes – particularly the amount of solids flowing in a pipe when blown along by compressed air. The availability of such a device will offer substantial cost savings and improved process control across a wide spectrum of industry.

Tomoflow *Multiphase Flowmeter* will be a complete self-contained unit capable of measuring one or several of two or three components flowing in pipes, where those components may be gas, liquid or solids.

The technology used by Tomoflow is based on process tomography, an advanced imaging technology for process pipes. Tomoflow Ltd has developed a significant extension to process tomography to enable flow analysis and measurement in multiphase flow systems in both data-recording and real-time analysis.

Multiphase flow systems are of major commercial importance, and process tomography is one of the few technologies which has the potential to measure the flow rates of the individual components at a realistic cost.. Tomoflow Ltd was established in 2001 to develop commercial tomographic multiphase flowmeters and has already launched its first product. Tomoflow works closely with Process Tomography Ltd, which has been supplying Electrical Capacitance Tomography (ECT) imaging systems for use in research applications since 1994.

The Tomoflow innovation allows the multiphase flow measurement problem to be tackled with an elegant and powerful solution. Further details can be found in the attached publications or on our website www.tomoflow.com.

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