

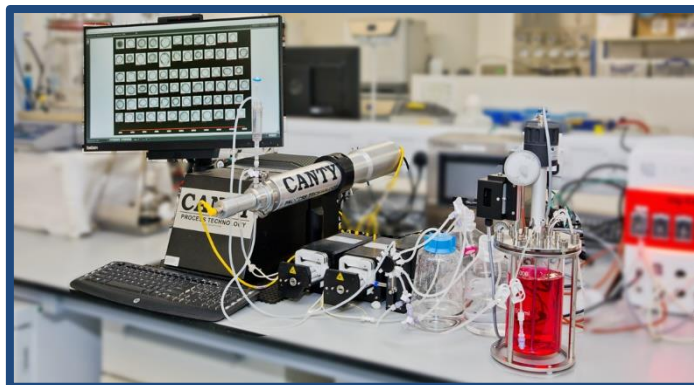
J.M. Canty International Ltd.

JM Canty International Ltd. is a world leader in the manufacture and supply of vision based process instrumentation. This includes vessel sight glasses & lighting, process vessel and high temperature cameras, and vision based particle sizing equipment, for a wide variety of industries, primarily pharmaceutical, chemical, biotechnological and oil & gas.



Vision Without Limits

Canty specializes in vision based equipment. The unique analytical systems for cell analysis and foam control use integrated fused glass technology and a bespoke software suite to achieve unparalleled process monitoring.



Canty Applications

Canty have developed a number of unique, vision based systems for process control in the Biotech Industry.

- Foam Control
- Cell Analysis

Canty Cell Analysis

Integration of Canty's optical process analytics into cell culture systems has led to novel developments in **label free** cell viability analysis. These breakthroughs have facilitated the design of a unique vision based system for detailed insights into the health of cell suspension cultures.

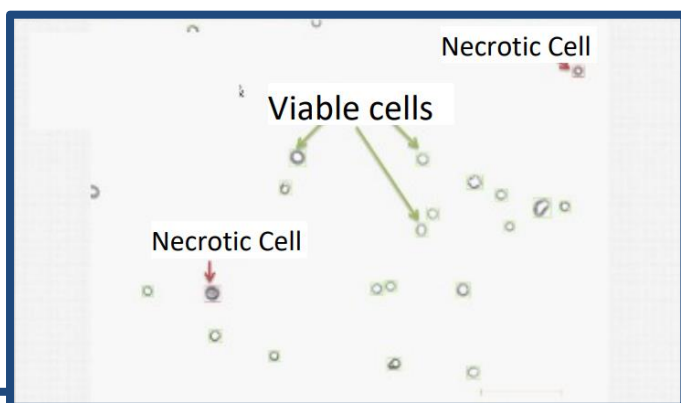
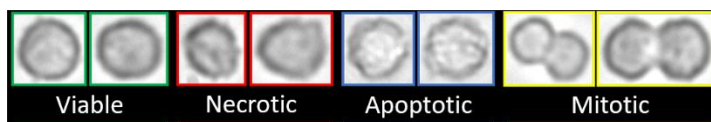
MiniCell™

The Canty MiniCell is uniquely designed to allow for the analysis of minimal sample volumes without the need for additive reagents. The system facilitates detailed viability and morphology outputs with no need for process additives.



- Label-Free
- Cell Count, Viability & Morphology
- Superior Data to Trypan Blue
- Visual Monitoring
- No Staining Reagents
- Real-Time Viability
- Autosampling
- Built in LED

Cantyvision Software

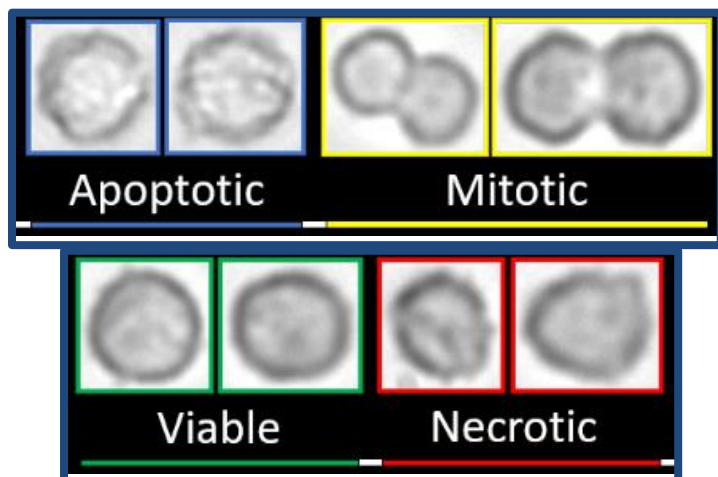


The Cantyvision cell analysis suite uses machine learning to distinguish between viable and necrotic cells. Outputs are comparable with trypan blue exclusion assays, allowing live monitoring of culture health with no additive reagents.



Cell Classification

The CantyVision Intelligent Analysis software suite uses integrated machine learning to distinguish between multiple cell morphologies during real time analysis. This determination facilitates detailed process analytics on multiple cell cycle stages including mitosis, apoptosis and necrosis. Detailed outputs go further than viability for in depth knowledge of the bioprocess.



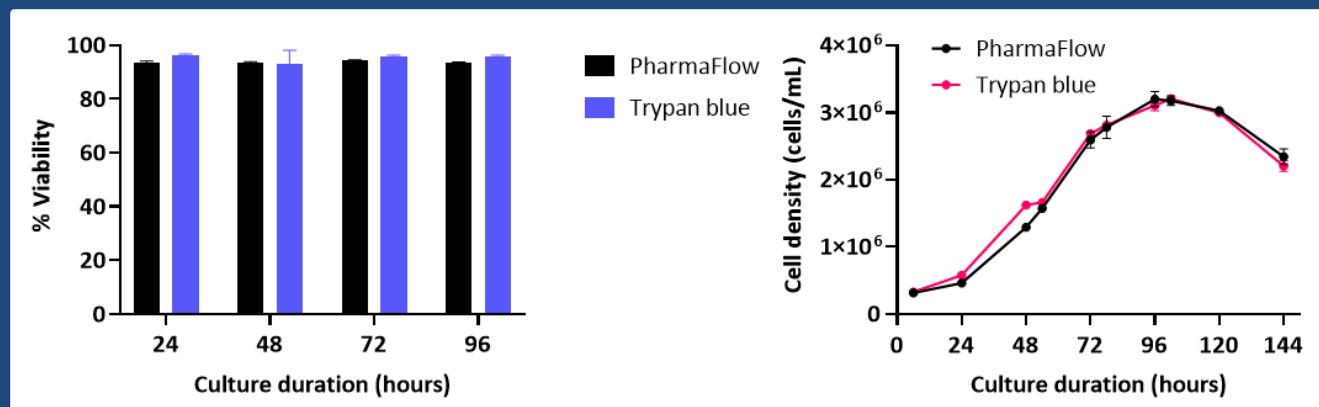
On-line Sampling

The system incorporates an automated sampling system to facilitate scheduled sampling and eliminate the need for operator input. Large scale data outputs gathered over the course of a batch culture can be integrated into the control system as indicators for process intervention. Cultures trending toward apoptosis can be recovered and process yield increased.

Case Study: NIBRT

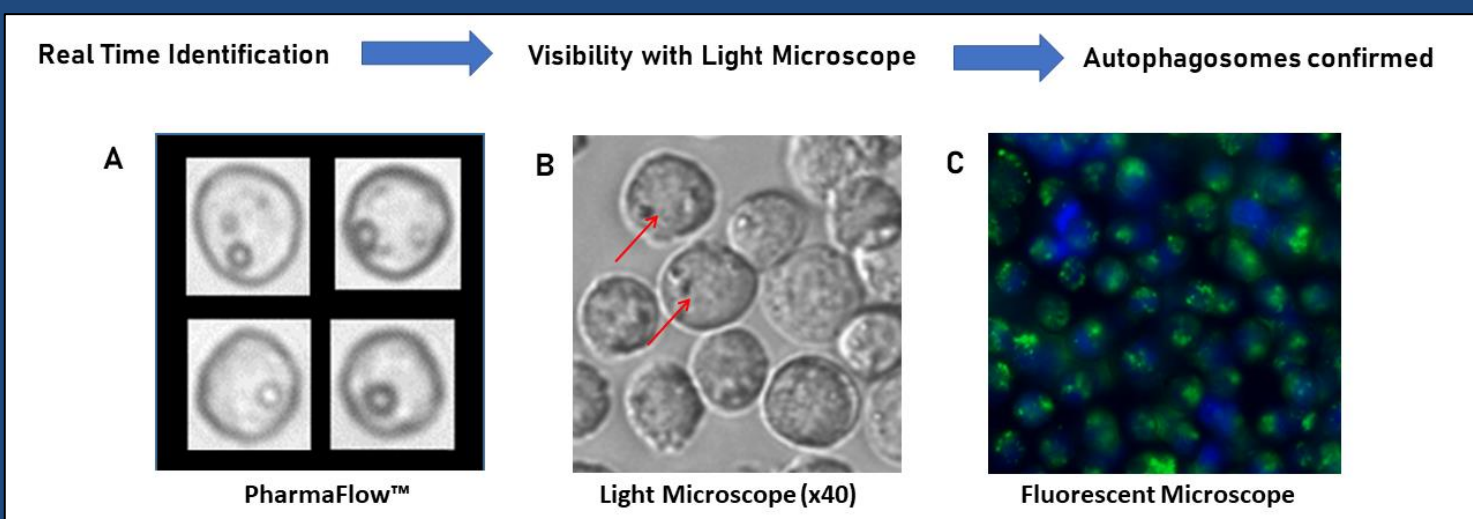
Canty partnered with the National Institute for Bioprocessing Research and Training (NIBRT) of Ireland to demonstrate the systems efficacy in comparison to traditional exclusion dye assays for **cell viability** in CHO cell lines.

Canty vs Trypan Blue



Periodic samples were taken over the course of CHO-EG2 cell cultures and analysed using both an automated trypan blue based cell counter and the Canty PharmaFlow™. Total cell density, percentage viability and viable cell density results demonstrated the **comparability** of the Canty technique to traditional trypan blue assays.

Morphological Changes



As culture health declined “holes” indicative of **vacuole formation** were detected by the Canty system from day 4 and are likely related to the induction of cellular **autophagy**. The system could thus signal a timepoint for process intervention at earlier indicators of culture decline than membrane degradation

Canty Foam Control

The latest innovations in foam control automation employ Canty's world leading vision based hardware and software developments to develop a unique instrument for optimizing bioprocesses and removing operator error.

BioCam™

The CANTY BioCam™ is a process camera engineered and designed for sanitary applications. The BioCam™ combines the latest in LED lighting with Ethernet camera technology in a streamlined package.



- Foam Detection
- Fermenter Control
- Visual Verification
- SU Options
- Built in LED
- Compact Design

Foam Control



The system provides continuous, real time view from the beginning to the end of the process. CantyVision Intelligent Analysis (CVIA) software avoids manually viewing foam in the vessel goes one step further, facilitating detailed foam readouts for the duration of the process