



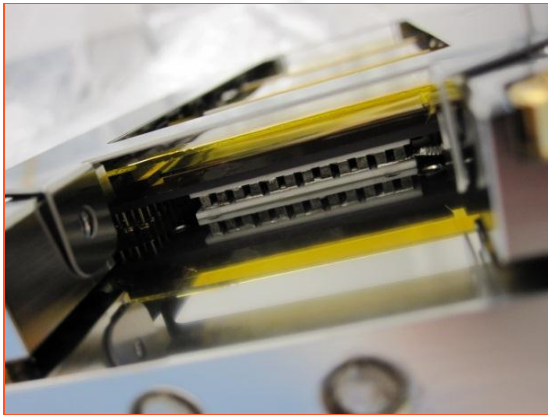
# Cameras for UCV Vacuum Applications

## Introduction

XCAM has developed a reputation for being a world-leader in the design and manufacture of cameras for UCV (Ultra Clean Vacuum) applications.

UCV vacuum is a new standard for vacuum cleanliness, in which the level of contamination and outgassing tolerated is much lower than that for UHV or XHV vacuum systems.

The challenges presented when designing cameras for this standard are extreme, and over the years that XCAM has worked in this field, we have developed a vast library of know-how, and expertise which enables us to now routinely develop custom cameras for this standard.



## Materials Choice

One of the most important considerations when designing cameras for UCV applications is materials choice. Many materials such as brass or Zinc are inappropriate for use in UCV systems. Materials which may be tolerated at UHV may not be acceptable at UCV.



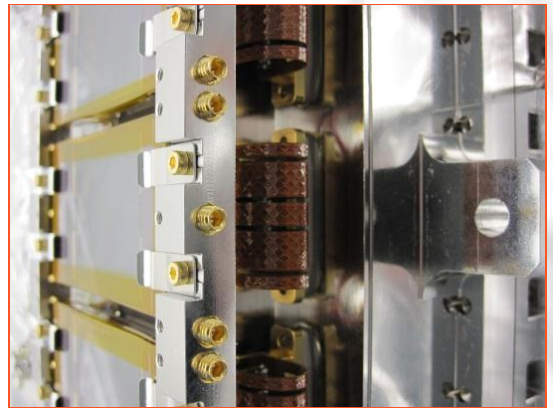
## Cleanliness of UCV Cameras

Cleanliness of cameras destined for UCV environments is absolutely critical if the UCV environment is not to be contaminated. Furthermore if a detector is operating cooled inside a vacuum chamber and contaminants are present then the contaminants will preferentially migrate to the cooled detector surface, potentially damaging it beyond repair.

All parts of XCAM cameras which are destined for UCV environments go through a multi-stage cleaning process before being baked-out at temperature for a number of days. An RGA (Residual Gas Analyser) is then used to 'sniff' for molecules present and we can separate out those molecules which belong to the natural clean background of the test chamber and those which are potential contaminants.

Some molecules, like plasticisers, are present in the air all around us, and we can never remove these. However, we learn to identify these and to understand which relate to the camera.

Once the parts are deemed to be of sufficient cleanliness then the parts are assembled in hyper-clean conditions before being specially packed and ready for use.



## Clean Fibre Optics and Custom UCV Manufacture

Cables can be one of the most difficult vacuum components when it comes to cleanliness in a UCV environment. XCAM has developed a proprietary design for 100 Ohm matched impedance Cameralink vacuum cables which avoids the use of conventional dielectrics which rely upon expanded PTFE type materials which are unsuitable for use in vacuum systems.

Additionally, XCAM has developed clean, fibre optic cameras for use in vacuum systems, with all control and data signals being transferred out of the vacuum chamber via clean glass fibres.

