Laboratory Equipment and Apparatus (I)

The single-pixel cameras being developed by the Glasgow Optics Group begin as tabletop experiments. The arrangement of components such as lenses, lasers, mirrors and single-pixel detectors on the Optical Table is simultaneously an experiment and a prototype camera. A cheap, robust and handheld camera is an important goal. With each successive experimental setup, miniaturisation of the apparatus is desired. 3-D printing technology means that experimental mounts and housing units for components can be manufactured cheaply and quickly in the laboratory. A design idea can go from a simple sketch on a piece of paper, to a precise computer design to a printed 3-D object within the space of a couple of hours.

3-D Touch Bits from Bytes Printer

Manufactured by 3-D Systems, USA, 2012
3-D printing or additive manufacturing
(AM) builds up successive thin layers of a
deposited material to create three-dimensional
objects. In fused deposition modelling
(FDM), a reel of thermoplastic material is
heated and extruded from a robotic nozzle
which immediately harden to form layers.
The movement of the nozzle, and hence the
ultimate shape of the three-dimensional
object, is controlled by a computer aided
design software package.

3-D printed housing units for prototype camera components

Printed in the Glasgow University Optics
Lab, 2013-2015

These objects record successive steps in the design process. With each step, these housing units for camera components become more compact. The cheapness and speed of the inhouse manufacturing process allows for rapid and flexible experimentation.

Optical table

Optical table set up for a computational imaging experiment using structured illumination for retrieving 2-D spatial information from a single photodetector The test object being used in this experiment is a Rubik's cube.

