

One and three component laser anemometers of a novel design were developed to study a variety of droplet seeded turbulent air flows. A new technique of frequency shifting was established for the instruments. An electronic frequency tracker was developed to process laser anemometer signals from turbulent flows and is now commercially available. Data processing techniques were extended to analyse the resulting data.

Measurements were made in cylinder wake flow, turbulent pipe flow and in a free air jet. Results compared with accepted data measured by hot wires on similar flows and with hot wire studies on the same flows, gave a broad measure of agreement between the two types of instrument. Differences, where they occur, are discussed and related to fundamental differences in the two kinds of instrument.

The limitations of the particular instruments used were investigated and a new range of laser anemometers proposed to overcome these limitations.

Conclusions are drawn about the flows studied, the precision and range of current forms of laser anemometry and recommendations are made towards further improvements and extension.