

# RESEARCH INTO BRANDEIS CCD ANGLE MONITOR - BCAM

The BCAM is a simple optical device which has been developed by the Brandeis University. It is principally used to monitor the geometry of large structures. At present, a lot of these devices has been installed in ATLAS and ALICE, the two mount spectrometers of Cern.

The Brandeis CCD Angle Monitor consists of an electronic camera and a pair of light sources.

The camera consists of a CCD (Charge Coupled Device) image sensor and a plano-convex lens (figure 1). The light sources of the BCAM are two red laser diodes. The configuration for a measurement needs two BCAMs which face each other. A BCAM sends two light spots to the CCD of the other BCAM. When one of them moves, the light spots on the CCD move accordingly. You need the LWDAQ (Long-Wire Data Acquisition) hard- and software for using the BCAMs. It consists of a personal computer, a driver board with a TCP/IP interface and two or more BCAMs. The BCAMs are connected over the driver board directly to a personal computer. Via Internet, the Brandeis University provides the software for free.

The BCAM has been examined in three experiments: The behavior of translational displacement is the object of this investigation. Furthermore, an inspection of the measurement procedure with differing measurement intervals takes place. At the very end, the reaction during dynamic deformation relating to other sensors is examined. A comparison is drawn between capacitive slope sensors and a lasertracker.

The results show a linear measurement procedure of the BCAM as well as the function as a reproduction scale for differing measurement intervals. Compared to the other two sensors, the BCAM shows a similar result of measurement except of a lower sensitivity.

## REFERENCES

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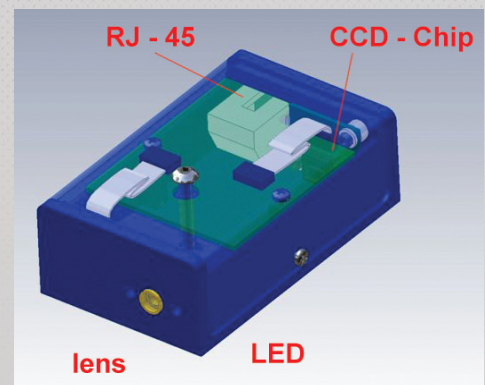


FIGURE 1. Internal structure of the BCAM

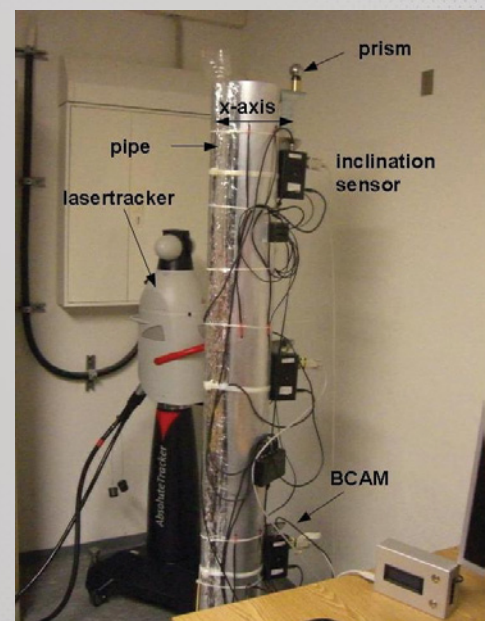


FIGURE 2. The whole photo system