

> INTRODUCTION

CEDRAT TECHNOLOGIES's optronics market includes the Electro-optic or Opto electronic system manufacturers providing customers or end users with innovating & high end industrial vision solutions using CCD & CMOS Camera, Thermal Imager, Cooled & Un-cooled IR (NIR, SWIR, MWIR & LWIR) Camera for applications such as automated inspection, surveillance & security, night vision, thermal imaging, Free space optical (FSO) communication...

Our optronic customers look for mechatronic components able to improve the performances of their embedded vision system in terms of image quality & light weight structure, often operating in harsh environment (Land, Sea, Air).

To answer to their needs, CEDRAT TECHNOLOGIES has been developing compact, dynamic & precise XY piezo & magnetic stages, piezo Tip Tilt platforms & fast steering mirror as well as linear piezo motorized stages since 1998.

> MICRO-SCANNING, PIXEL SHIFT, DITHERING

Micro-scanning, Dithering or Pixel shifting is a technique which increases the true resolution of a detector (CCD, CMOS, FPA, etc...) by moving a focal lens or the detector itself by fractions of a pixel in the x- and y-directions. The main customer benefit is to enhance the resolution of their existing detector at a much lower cost than buying a twice higher resolution detector.

Depending on the optical configuration and the detector type of the customer's camera or electro optic system, C-TEC can develop either embedded XY or Tip Tilt stages with their related controllers to move respectively a focal lens, a detector or a mirror.

> OPTICAL IMAGE STABILIZATION

Image stabilization (IS) is a family of techniques used to reduce blurring associated with the motion of a camera during exposure. Specifically, it compensates for pan and tilt (angular movement, equivalent to yaw and pitch) of a camera or other imaging device. Due to their small pixel size, high resolution detectors are very sensitive to external vibrations which impact their image quality, especially with the decreasing Field of View (FoV) due to the increasing zoom demand.



Fig1: XY25XS Stage

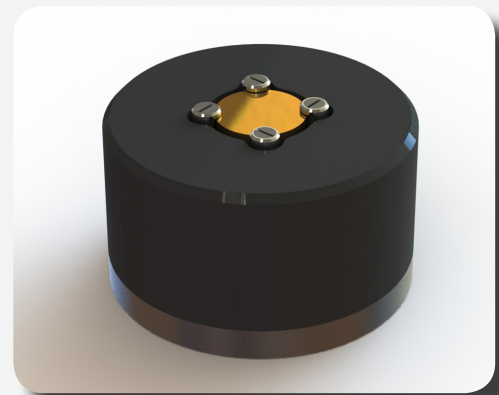


Fig2: Double Tilt Translator DTT35XS
(Tip Tilt Stage)



Fig3: Linear Stepping Piezo Stage LSPS

Depending on the optical configuration and the detector type of the customer camera or electro optic system, C-TEC can develop either embedded **XY** or **Tip Tilt stages** (Beam or Fast Steering Mirror, Point Ahead Mechanism,...) with their related controllers to move respectively a focal lens, a detector or a mirror in order to actively compensate the optical disturbances. Note that both microscanning & optical stabilisation functions can be performed simultaneously with the same piezo stage (see fig.4 & 5). This fine stability control of the line of sight is also very useful for Laser pointing on targets for identification, surveillance and recognition (ISR) systems as well as on optical detectors for free space optical communication systems.

> AUTO FOCUS

An autofocus (or AF) optical system uses a positioning sensor, a control system and a linear motorized stage to focus fully automatic on a selected target. Depending on the lens size to move, C-TEC can customize its standard Linear Stepping Piezo Stage (LSPS35XS) and related controller on demands (see fig. 6 & 7).

The customized non magnetic LSPS is more compact, robust, EMC compatible and light weight than magnetic stepper motor based AF system. These key advantages of the LSPS are immediate benefits for hand held IR camera manufacturers.

Other functions or devices like shutter, laser speckle removal, zoom, scene calibration mechanism, etc...can be developed under request.

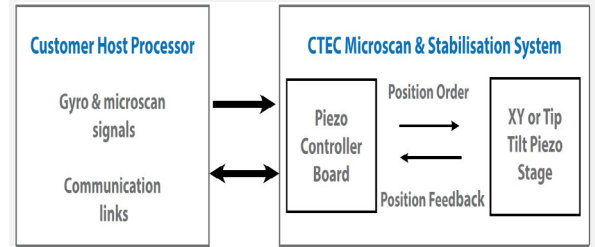


Fig4: Diagram of both microscanning & optical stabilisation system including a piezo stage and its controller.

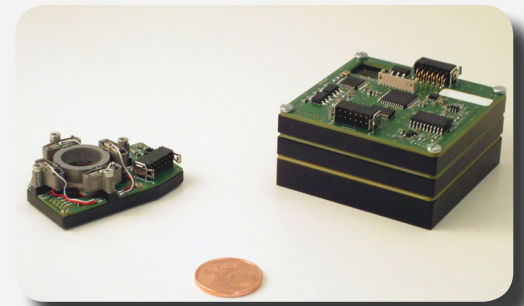


Fig5: Compact, Dynamic and Precise XY piezo stage with its controller

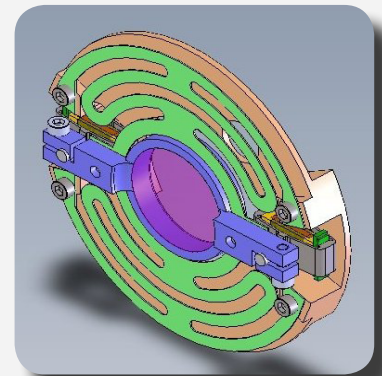


Fig6: AF lens guided with a flexure membrane and piezo motorised with 2 LSPA35XS along +/- 1mm stroke.

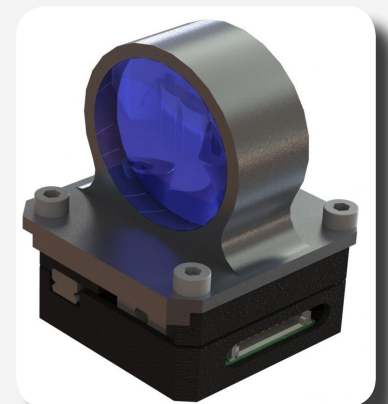


Fig7: AF Lens Piezo motorised with LSPS35XS stage along +/- 5mm stroke.

For more information, please contact:

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