

Piezoelectric actuators are suitable to build accurate mechanisms for instrumentation, even in harsh environment. The Optical Phase Difference Actuator (OPDA) is one outstanding example: it keeps its metrology through a lifetime test, an extended temperature test and a vibration test.

## OBJECTIVE

- Provide an optical delay line function by supporting in a very accurate way a corner cube (tripleprism),
- Provide a proved and convenient interface to an optical bench,
- Provide an ability to tune the optical delay line in the nanometer range.
- Provide a mechanical range of 60  $\mu\text{m}$  (corresponding to 120  $\mu\text{m}$  of optical travel through a corner cube).

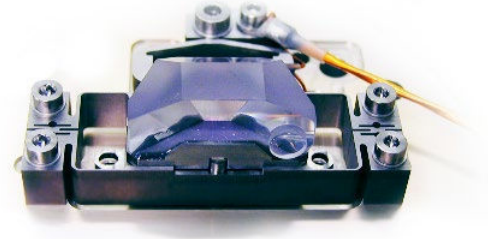


Fig. 1: View of the OPDA. Courtesy of Contraves Space (CH).

## DESCRIPTION

The architecture of the OPDA is composed of an Amplified Piezo Actuator and a mechanical stage, which is guided by some elastic guiding. The OPDA is able to accommodate some thermo-mechanical mismatch with the optical bench. The payload can be exchanged without modifying the position of the OPDA on the optical bench. With its high resonance frequency, the OPDA can withstand a high level of vibration.

## SPACE HERITAGE

Qualified for LISA-PATHFINDER (launch scheduled in 2009). OPDA based on the existing design can be customized on request.

| REFERENCES  | UNIT               | ODPA60S   |
|---|--------------------|-----------|
| Active axis   |                    | TZ        |
| Max. No-load displacement [Tz]                                      | $\mu\text{m}$      | 60        |
| Max. parasitic rotations [ Rx,Ry]                                   | $\mu\text{rad}$    | 25        |
| Voltage range   | V                  | -20...150 |
| Resolution  | nm                 | 6         |
| Height (Zaxis)  | mm                 | 42.0      |
| Dimensions  | mm                 | 66x10     |
| Mass  | g                  | 40        |
| Unloaded resonance frequency ( in the line actuation' direction)    | Hz                 | 1850      |
| Loaded resonance frequency ( in the actuation's direction) load=16g | Hz                 | 1450      |
| Capacitance ( per electrical port)                                  | $\mu\text{F}$      | 3.15      |
| Temperature range   | $^{\circ}\text{C}$ | -20 -60   |
| Random level  | Grms               | 27        |