Piezo Stage for Optical Delay Line OPDA

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Piezoelectric actuators are suitable to build accurate mechanisms for intrumentation, 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.

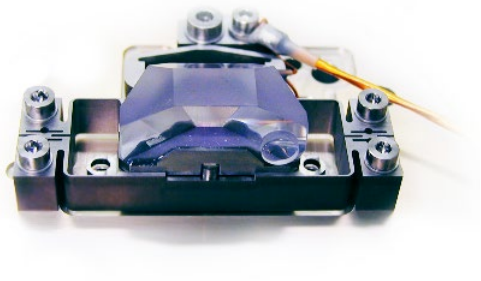

Fig. 1: View of the OPDA. Courtesy of Contraves Space (CH).

OBJECTIVE

- Provide an optical delay line function by supporting in a very accurate way a corner cube (tripleprism),
- Provide an 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 µm (corresponding to 120 µm of optical travel through a corner cube).

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 accomodate 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 to 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]	µm	60
Max. parasitic rotations [Rx,Ry]	µrad	25
Voltage range	V	-20...150
Resolution	nm	6
Heigh (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)	µF	3.15
Temperature range	°C	-20 -60
Random level	Grms	27