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New optical microbarometer

Nathalie Olivier (1), Serge Olivier (2), Anthony Hue (1), and Serge Le Mallet (1)

(1) SEISMO WAVE, Lannion, France (nathalie.olivier@groupe-glemot.com), (2) CEA DAM DIF, F-91297, Arpajon, France (serge.olivier@cea.fr)

Usually, transducers implemented in infrasound sensor (microbarometer) are mainly composed of two associated elements. The first one converts the external pressure variation into a physical linear displacement. The second one converts this motion into an electrical signal. According to this configuration, MB3, MB2000 and MB2005 microbarometers are using an aneroid capsule for the first one, and an electromagnetic transducer (Magnet-coil or LVDT) for the second one.
CEA DAM (designer of MB series) and PROLANN / SEISMO WAVE (manufacturer and seller of MB3) have associated their expertise to design a new optical microbarometer:
We aim at thinking that changing the electromagnetic transducer by an interferometer is an interesting solution in order to increase the dynamic and the resolution of the sensor. Currently, we are exploring this way in order to propose a future optical microbarometer which will enlarge the panel of infrasound sensors.
First, we will present the new transducer principles, taking into account the aneroid capsule and the interferometer using integrated optics technology. More specifically, we will explain the operation of this optical technology, and discuss on its advantages and drawbacks.
Secondly, we will present the optical microbarometer in which the interferometer is positioned inside the aneroid capsule under vacuum. The adjustment of the interferometer position is a challenge we solved. The optical measurement is naturally protected from environmental disturbances. Four prototypes were manufactured in order to compare their performances, and also an optical digitizer specifically designed to record the four channels interferometer.
Finally, we will present the results we obtained with this sensor (sensitivity, self-noise, effect of environmental disturbance, etc) compared to those of a MB3 microbarometer, and discuss about the advantages of this new sensor.