Application Note
SPECTROSCOPY

**DLR Institut für Physik der Atmosphäre, Oberpfaffenhofen**

**Menlo Systems, Martinsried**

# Frequency comb helps ground-based, airborne, and space-borne LIDAR systems for weather and climate research

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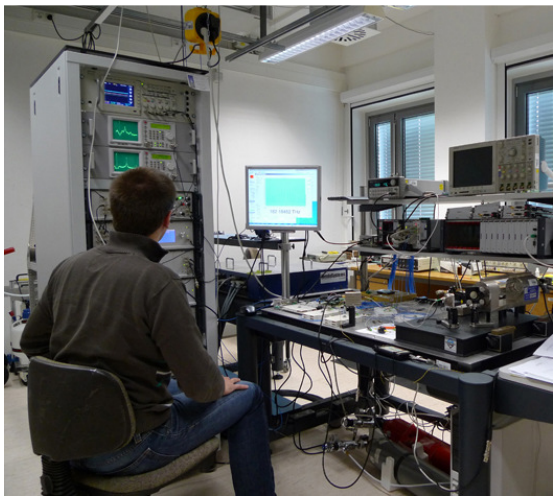

**Figure:** Self-referenced frequency comb used as an absolute independent frequency reference.

Within the LIDAR group of the Institute for Atmospheric Physics at DLR Oberpfaffenhofen, an airborne demonstrator for simultaneous Integral Path Differential Absorption measurements of carbon dioxide and methane has been developed. The stringent absolute knowledge requirements on the optical frequency of the emitted on-line pulses in the 1.6 micron region require accurate stabilization and monitoring of the seed lasers up to the 10 kHz to 100 kHz level. Using our self-referenced frequency

comb (see picture) as an absolute independent reference, it has been shown that the requirements could be met with a carefully optimized yet simple top-of-fringe and offset-locking scheme relying on Doppler-broadened $CO_2$ and methane lines observed in a multipass absorption cell. In parallel with its integration within the airborne system, the compact seed laser stabilization subsystem is being further optimized and characterized with the help of the frequency comb.

## Weblinks:

Link to the DLR department:
http://www.dlr.de/pa/desktopdefault.aspx/tabid-2510/3981_read-5895/

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