VCSEL Hygrometer

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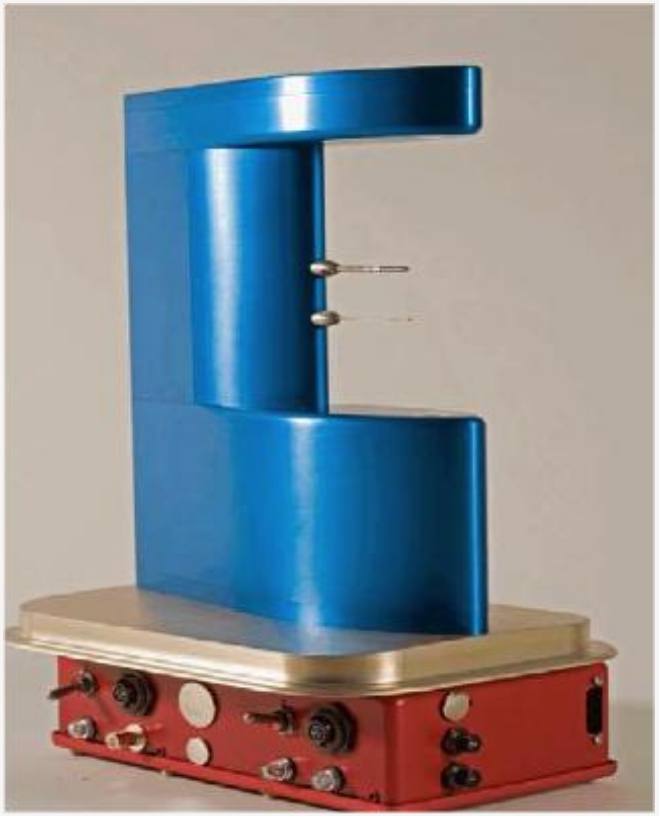

VCSEL Hygrometer

- Vertical Cavity Surface Emitting Laser
- Developed by Southwest Sciences: Mark Zondlo (now at Princeton), Mark Paige, Joel Silver.
- GV instrument since ~2008
- Typically on top right aperture plate

VCSEL Hygrometer

- open path, multi-pass (375 cm) absorption cell.
- Two wavelengths (1853.3, 1854.0 nm), three operating modes.
- Mode changes at about -20 °C, -60 °C
- Typically lose a few seconds of data during mode change.

VCSEL Hygrometer

- Dewpoint from -85 °C to +20 °C
- Sensitivity ~ 0.1 ppm (SNR=1, 1 Hz)
- Sample rate 25 Hz
- Accuracy ~ 5%

- Maintenance: Cover between flights, mirror cleaning as needed.

VCSEL Hygrometer

- Lower operating dew point (-85°C) than chilled mirror hygrometers (-65°C).
- Fast response (25 independent samples per second).
- Doesn't flood or overshoot.

VCSEL Hygrometer