

IAF EARTH OBSERVATION SYMPOSIUM (B1)
Mitigating the Climate Crisis from Space (6)

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NOCTUACH4, COMPACT SINGLE SITE METHANE EMISSION MONITORING FROM SPACE

Abstract

“Information Made in Space” has clear added value through world-wide monitoring of the large number of single site Methane emitters. Using readily available solutions, worldwide monitoring homogeneity and low cost-per-site can be ensured. Today, our atmosphere is like an open sewer. All kinds of substances are discharged into it, causing a major degradation of our climate, health and biodiversity. To curb this degradation over 80 countries have set net-zero emission targets, including the world’s largest emitters. In contrast to CO₂, emitted Methane is cleared from the atmosphere within about a decade. This makes Methane emission cuts the low hanging fruit to slow down climate change. The single-site level Methane emission regulation that is being drafted by the Oil Gas Monitoring Platform is the first concrete step towards global measuring and monitoring of emissions. It is foreseen that the regulation of other emissions (like SO₂, NO₂, NH₃) will follow in near future. To be able to achieve these targets, actionable information is needed worldwide on: who is emitting what, what emissions to reduce, and whether these emissions are successfully reduced. CubeSats provide repetitive homogeneous global measurements at relatively low cost. It avoids one of the drawbacks of in-situ sensors: the operational expenditure of periodic certification/ calibration to ensure the consistency of the information. With respect to airborne campaigns, which are typically targeting specific areas for a limited duration at relatively high cost, satellites provide the advantage of repetitive measurements at low cost. Airbus Defence and Space Netherlands has a ready-to-go turn-key solution for single site Methane emission monitoring from space. Early 2021, the Airbus Netherlands/ SRON team has delivered their first compact (8.5U) high-end aerosol monitoring instrument SPEXone to NASA for the PACE mission. With SPEXone we continue the long-standing Dutch commitment to deliver best-in-class atmospheric monitoring instruments (OMI, SCIAMACHY, TROPOMI). SPEXone lays the foundation for our mature and competitive emission monitoring space instrument solutions that can be placed in a 16U CubeSat; the Noctua instrument family. By retaining the SPEXone design and only modifying discrete elements, the different Noctua versions are configured to measure either CH₄, NO₂, SO₂, or aerosol. A Noctua can be delivered within 24 months by re-using the SPEXone. The first new member of the family is a dedicated CH₄ monitoring instrument NoctuaCH₄. The target is to reach detection thresholds (well) below 100 kg/hr for single sources, with a localization better than 100x100m².