Active Sensing of Greenhouse Gases: airborne demonstration and spaceborne discussion

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Poster

Active remote sensing of greenhouse gases offers many unique opportunities and challenges. BAE Systems, Space and Mission Systems (formerly Ball Aerospace) developed and demonstrated Methane Monitor, an airborne Integrated Path Differential Absorption (IPDA) lidar, integrated with a wide field-of-view camera. The system has sufficient resolution and sensitivity to identify and quantify individual methane sources with high spatial resolution. Here, we present data from a large demonstration in the Denver-Julesburg Basin, flying 1000 m above ground at a coverage rate of just under one-square kilometer per minute and providing total coverage of 1850 square kilometers (~750 square miles). Emission quantification, source identification, and flux estimates are provided; in addition, the sensor's capability to aid in satellite instrument validation is demonstrated. Methane Monitor's wide area coverage allows for efficient mapping of emissions from oil & gas gathering/distribution networks, processing facilities, landfills, natural seeps, agriculture, and other distributed methane sources. Unexpected fugitive emissions from pipeline leaks were also discovered and verified during the survey. Beyond identifying sources and quantifying emissions, we discuss and present a pathway for demonstrating the value of a combined passive-active sensing spaceborne observing system for measuring, monitoring, reporting, and verification (MMRV) of greenhouse gasses to enable Earth Action.

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