Methane SAT: A pioneering new technology

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In February 2024, Google partnered with the Environmental Defense Fund to create a new satellite that tracks methane emissions in a groundbreaking way (Maguire, 2024). The new satellite, called MethaneSAT, will track methane with unprecedented precision and would revolutionize methane tracking in the future. The satellite was launched in March 2024 on a SpaceX Falcon rocket and has impressive technical specifications (Maguire, 2024). MethaneSAT is designed to pinpoint methane emissions with exceptional detail. One key feature is its high-resolution imaging spectrometer. This instrument allows MethaneSAT to distinguish subtle differences in methane concentrations, down to as low as 3 parts per billion (Khurana & Tabuchi, 2024). To achieve this level of precision, the spectrometer breaks down light from Earth's surface into its component colors. By analyzing the intensity of specific wavelengths, scientists can calculate the amount of methane present in the atmosphere.

Another strength of MethaneSAT is its wide-field of view. During each orbit, the satellite can scan a swath of Earth roughly 200 kilometers wide (MethaneSAT, 2024). This expansive coverage area allows MethaneSAT to efficiently monitor large regions, pinpointing significant methane emitters. The combination of high-resolution imaging and broad coverage makes MethaneSAT a powerful tool for identifying and tracking methane emissions from various sources.

MethaneSAT will also have unprecedented data processing capabilities due to Google's AI capabilities. To calculate the amount of methane emitted in specific places and track those emissions over time, EDF developed algorithms powered by Google Cloud (Environmental Defense Fund, 2024). Google is also creating a new methane mapping technology that uses artificial intelligence to detect carbon emissions. The artificial intelligence will find the appropriate oil and gas reserves by looking through Google Maps and then overlaying it with the existing EDF data. This can pinpoint exactly from where the methane emissions originate. This will help detect previously unknown methane sources and may also be useful in pinpointing exact companies that are emitting methane and aid in holding them accountable.

This information is valuable because it allows researchers and policymakers to pinpoint specific sources of methane, such as landfills, agricultural areas, or even specific oil and gas facilities (Environmental Defense Fund, 2024). Once they know where the methane is coming from, they can implement targeted strategies to capture or reduce those emissions. For example, if MethaneSAT identifies a landfill with high methane emissions, engineers can design and implement a system to capture the methane and convert it into clean-burning energy. In agricultural areas, identifying sources of methane can help farmers adopt new practices that reduce methane emissions from livestock (United Nations Environment Programme, 2024).

By helping to focus resources on the biggest sources of methane, MethaneSAT contributes significantly to the fight against climate change by detecting methane at an unprecedented scale of precision.

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