Spectroscopic Methane Detection from Space: A Novel Multispectral Approach

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SATL | Nasdaq Listed

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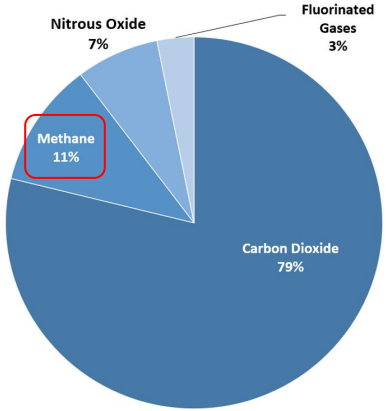
Affordable and high quality data

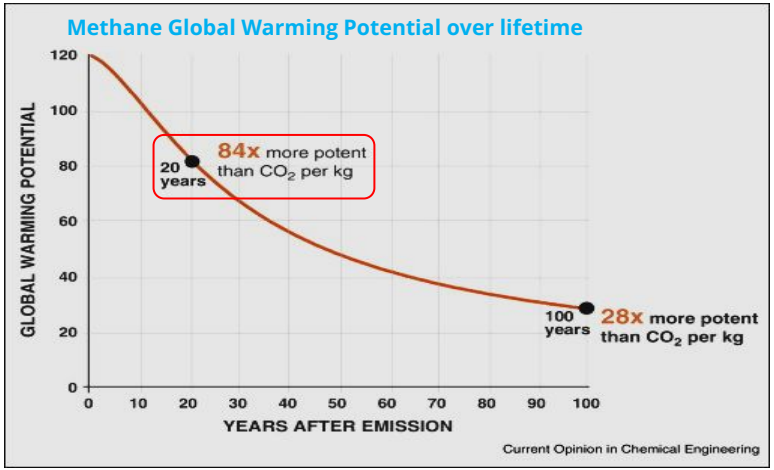
- **34 operational satellites** in orbit
- **Multispectral** payload, 70 cm resolution
- **Full motion videos**
- ***Work in progress: methane detection from space***

EARSC
European Association of Remote Sensing Companies

Methane: a key player in global warming:

- **11%** of total global GH emissions
- **84x of CO_2** GWP over in 20 years of
- **Short lifetime** ~ 12 years, fast benefits on climate change





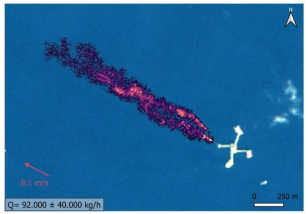
United States Environmental Protection Agency (EPA)

Why from space?

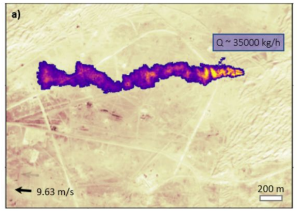
Actionable data **requirements for monitoring:**

- **surface coverage**
- ***resolution***
- ***remap frequency***

offshore leaks

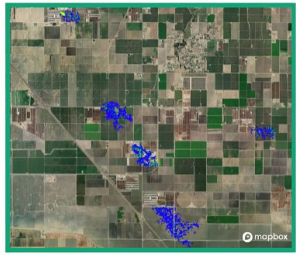


pipelines leaks



landfills emissions

cattle ranch emissions



Sanchez et al., Irakulis et al., Maasakkers et al., Varon et al.

Our proposed solution: small satellites constellation for frequent monitoring

Small sat <2U size, secondary payload:

- **Low cost**
- **highly scalable for fast deployment**

Payloads:

- **Small and light**
- **low energy consumption**

1U = 10x10x10 cm^3

Spectroscopic detection of methane in a small satellite

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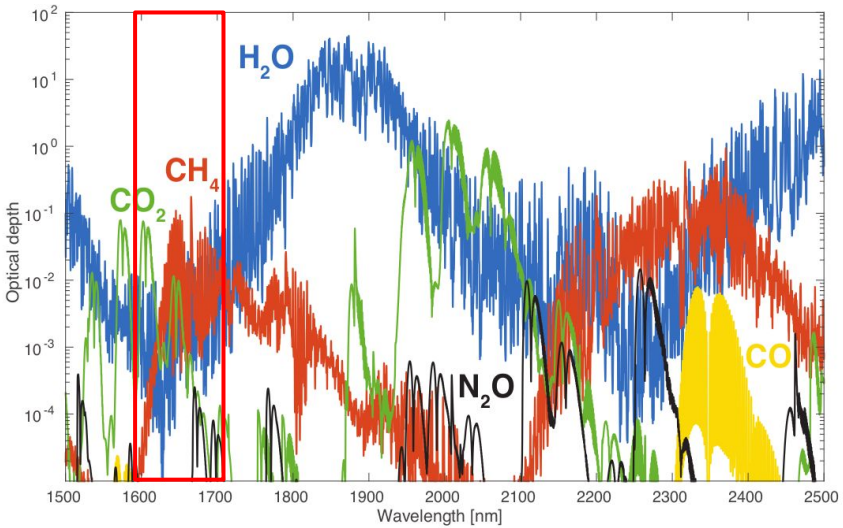
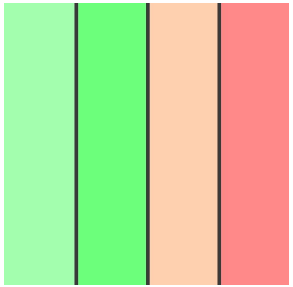
Detection range: 1.6 µm range, (InGaAs)



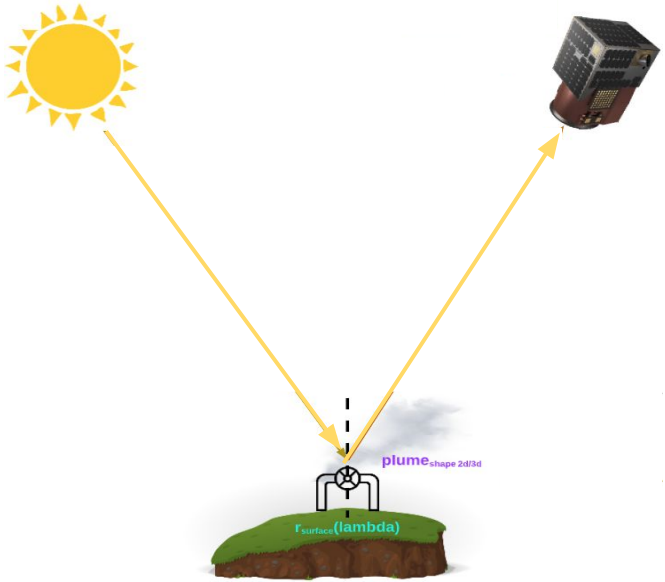
- **System architecture:**
  Optical filter in front of the detector
- **Multispectral system**
  Lower performance on heterogeneous areas



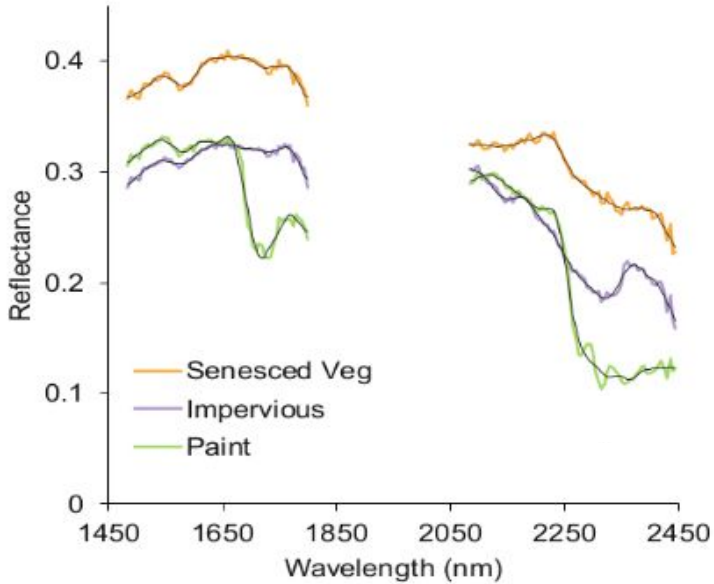
Jacob et al.

Our proposed solution: small satellites constellation for frequent monitoring

Detection process



Typical albedo

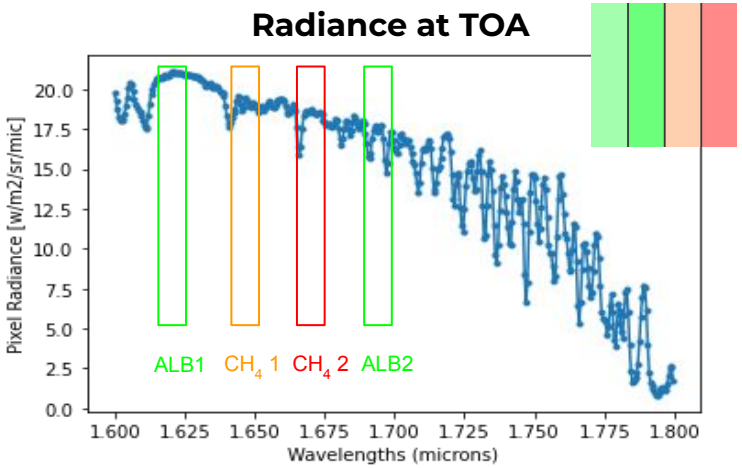


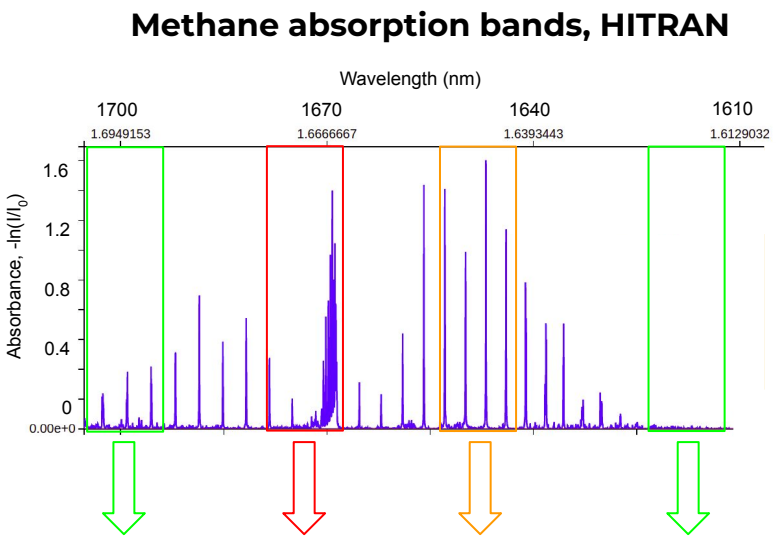
Methane absorption lines = **high frequency of spectra**

Albedo = **low frequency of spectra**

Foote et al.

Our proposed solution: multispectral optical filter with surface albedo retrieval





4 spectral bands:

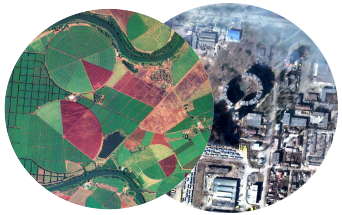
- **10 nm full-width half-maximum**
- **2 methane detection**
- **2 albedo retrieval**

Bands (nm)	1690-1700	1665-1675	1642-1652	1615-1625
Methane Abs. (%)	2	24	25	6

What we can offer to the community: access to data, space, new space technologies

DATA for climate change monitoring

- Methane emissions imaging, soon!
- Multispectral imaging



HOSTED PAYLOAD Third-party sensor and hardware testing

- <2U of volume available
- 1100g mass budget

SPIRAL BLUE

Palantir

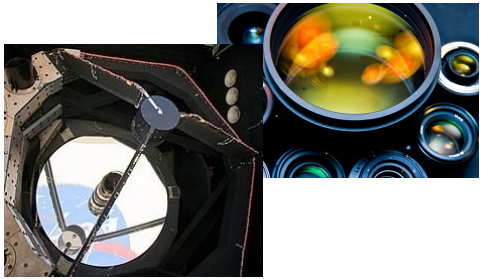
Open to PARTNERSHIPS for technology prove of concepts

- GM plants fluorescence https://innerplant.com

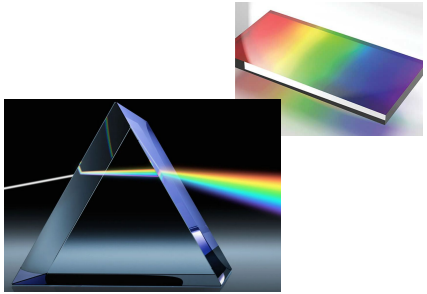
INNERPLANT

What we are interested in: photonics technologies for development, integration

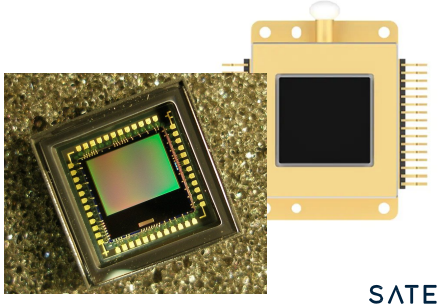
Light collection



Light manipulation



Light detection



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Thank you for the attention!