

- Methane is a powerful greenhouse gas that is produced by a variety of natural and industrial processes.
- Methane is 86 times stronger as a greenhouse gas than carbon dioxide. It is increasing in the atmosphere due to human activity and is an important contributor to global warming.
- Methane does not persist in the atmosphere for a long time like carbon dioxide, but it is important to know how much of it is present, and where it enters the atmosphere.

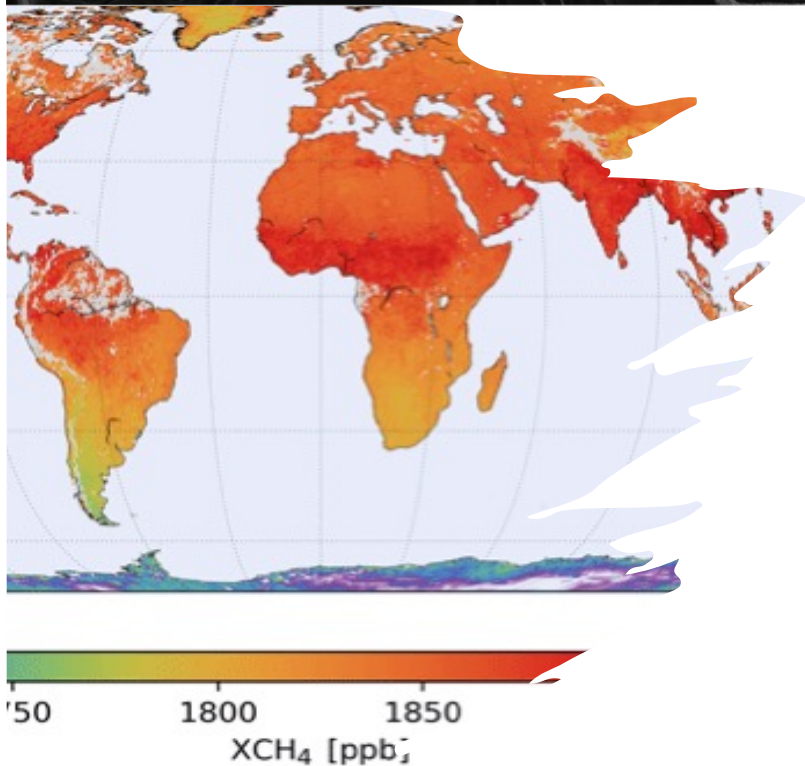


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# Detecting Methane from Space

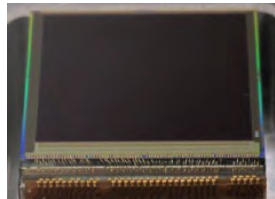


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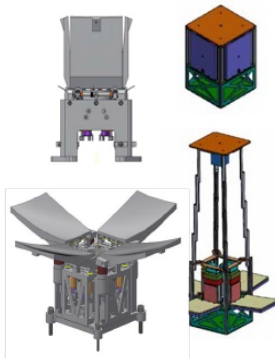


- **It would be a quick win for our climate if we could identify and eliminate emissions from the coal, gas and oil industries, and other localised sources.**
- Infrared sensors on satellites help us to identify gases in the atmosphere, including the greenhouse gas Methane.
- Existing instruments and missions show broadly where, and how much, methane is present, but each data value (pixel) represents 7-10km. With this spatial resolution, it is not possible to precisely identify sources of emission.

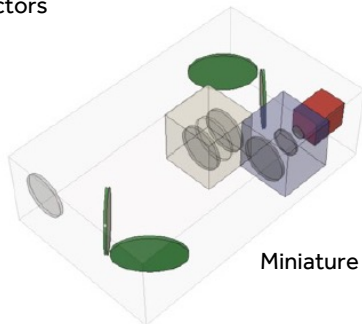




Novel IR detectors



Deployable systems



Miniature optics

- To identify an industrial source, ground resolution of better than 100 metres is required.
- CEOI and UKSA have been supporting some key technologies that can make this possible:
  - New high-resolution infrared detector technology.
  - Miniature instrumentation and deployable optics so that small, low-cost modular satellites (CubeSats) can be used.
  - Novel methane-specific narrow-band filter spectrometer design.
  - Constellation deployment, allowing many locations to be imaged daily





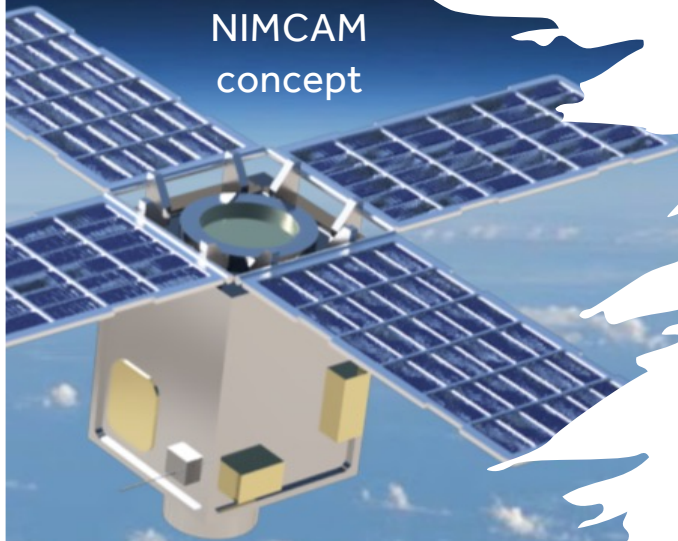
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# Detecting Methane from Space: New Missions



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NIMCAM  
concept



Credit: University of Edinburgh

## NIMCAM

NIMCAM is a new UK-led mission under development at the University of Edinburgh, supported by CEOI and UKSA.

- Suitable for deployment in a small modular satellite known as a CubeSat.
- Ground sampling distance is 60 metres, and has a 30 km field of view.
- Will image methane release plumes on the ground from industrial sites.



Credit: GHGSat

## GHGSat

GHGSat is a Canadian commercial company, with offices in the UK

- Third satellite launched in Sept 2021.
- Will be joined by ~7 other satellites to make a 10 satellite constellation in the near future.

More information



Centre for  
EO Instrumentation



RAL Space

Science and  
Technology  
Facilities Council

