

Current Status of the GHGSat Constellation

CEOS Atmospheric Composition Joint Meeting
Royal Belgian Institute of Natural Sciences

October 24, 2023

In Orbit Today

GHGSat pioneered the technology that delivers high-resolution data on greenhouse gas emissions from space.

2016
CLAIRE
Technology demonstrator proving GHG can be detected and measured accurately from space.

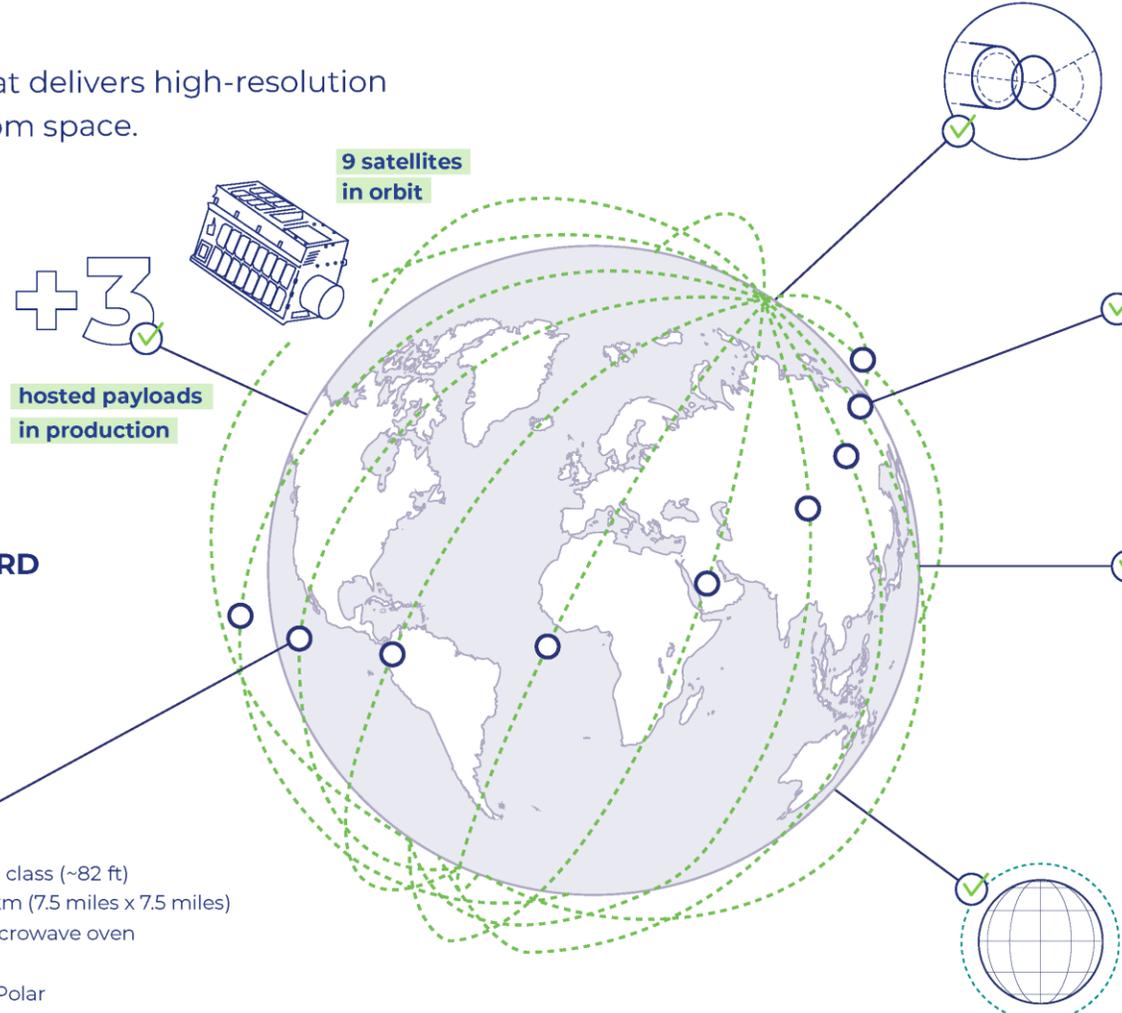
2020
IRIS
First commercial satellite delivering 10 x better performance.

2021
HUGO
2022
LUCA, PENNY and DIAKO

2023
MEY-LIN, GASPARD and OCÉANE

Coverage

Spatial resolution: ~25 m class (~82 ft)
Field of view: 12 km x 12 km (7.5 miles x 7.5 miles)
Size: Comparable to a microwave oven
Weight: 15 kg (33 lbs)
Orbit: Sun-Synchronous Polar



Instruments

GHGSat commercial satellites are designed and dedicated for methane observations. Each satellite is equipped with a wide-angle imaging spectrometer for measuring the vertical column density of greenhouse gases.

Capability

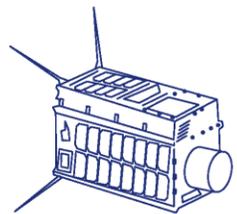
With proprietary patented sensor technology, GHGSat satellites are capable of measuring emissions from onshore and offshore platforms, attributing those large or small emissions directly to individual facilities, down to 100 kg/hr, worldwide.

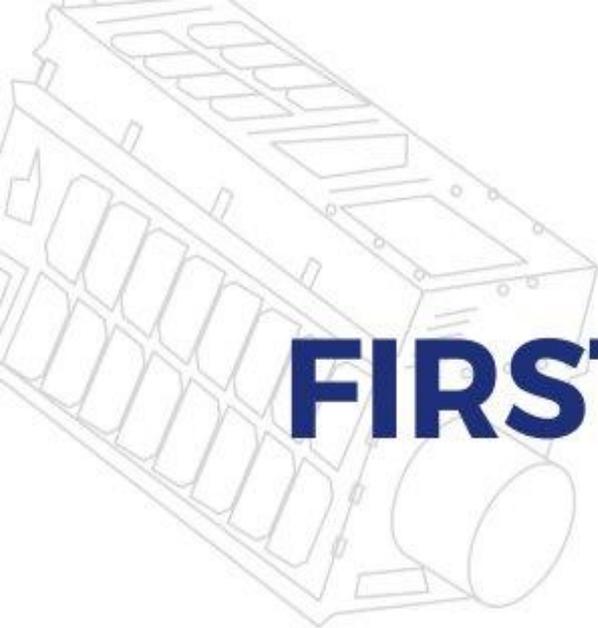
Emission Intelligence for Markets

Oil & Gas	Coal Mining	Waste Management
Environmental Services	Agriculture	Financial Services
Governments and Regulators		

Our Commitment

Bringing global transparency to greenhouse gas emissions, GHGSat is accelerating the decarbonization of our planet.

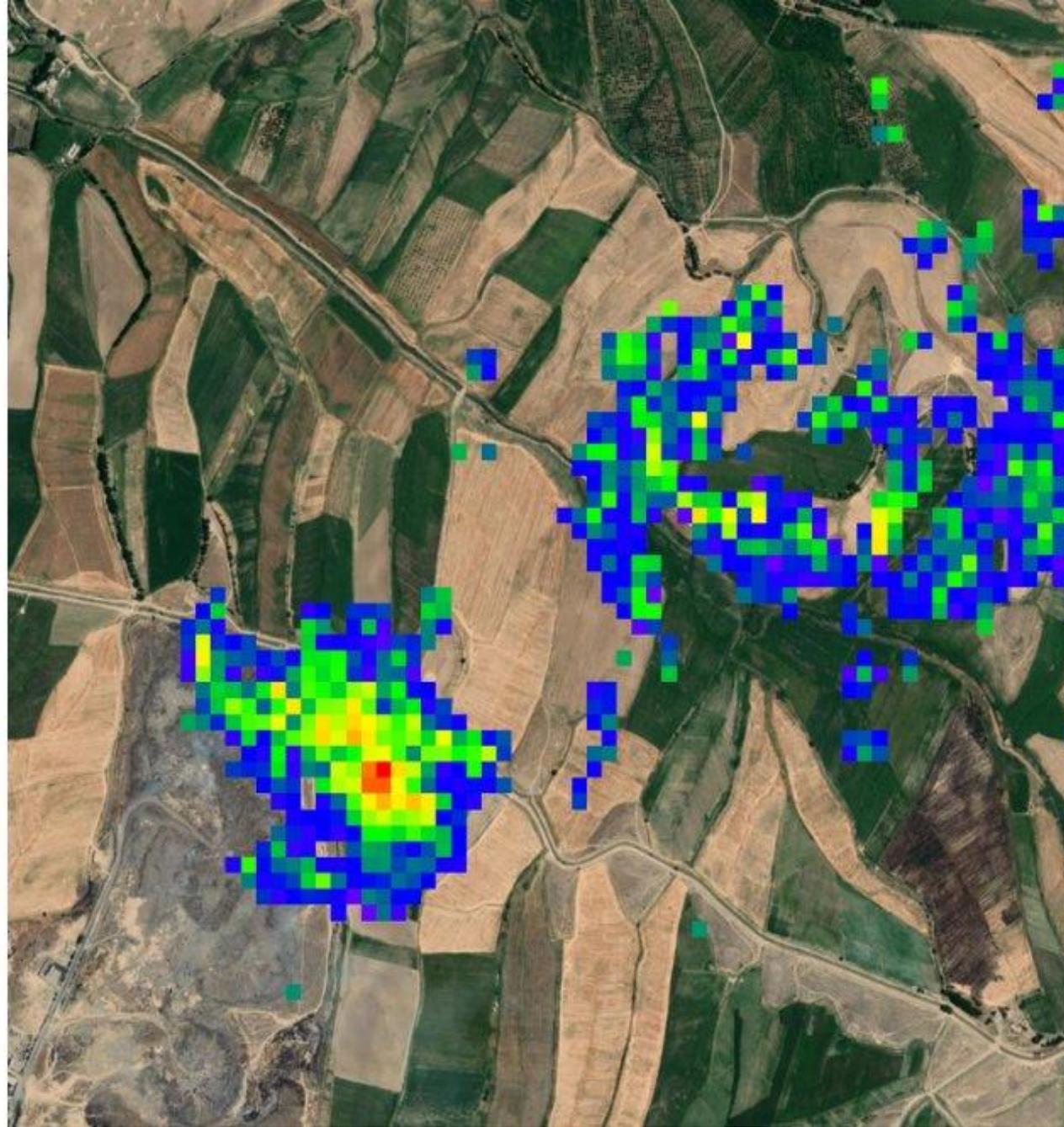




FIRST LIGHT

Gaspard GHGSat-C7

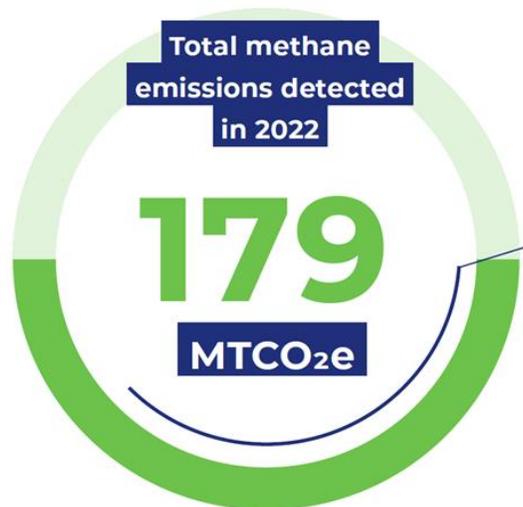
Landfill - Uzbekistan
18-04-2023
05:22:23 UTC





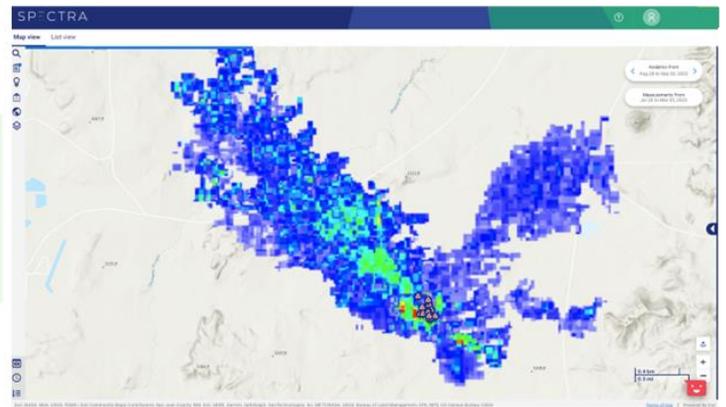
METHANE EMISSIONS DETECTED BY GHGSAT IN 2022

Delivering impact today



25%
increase on 2021

Where in the world would there be 17 detections from the same site in 6 months?



Oil & Gas +38%

Coal +48%

Landfill +52%

Other +16%

Volume increase from H1 to H2 2022



1M km²

Our satellites monitored > 1 million km² in 2022, 83% more than in 2021

500K+ sites

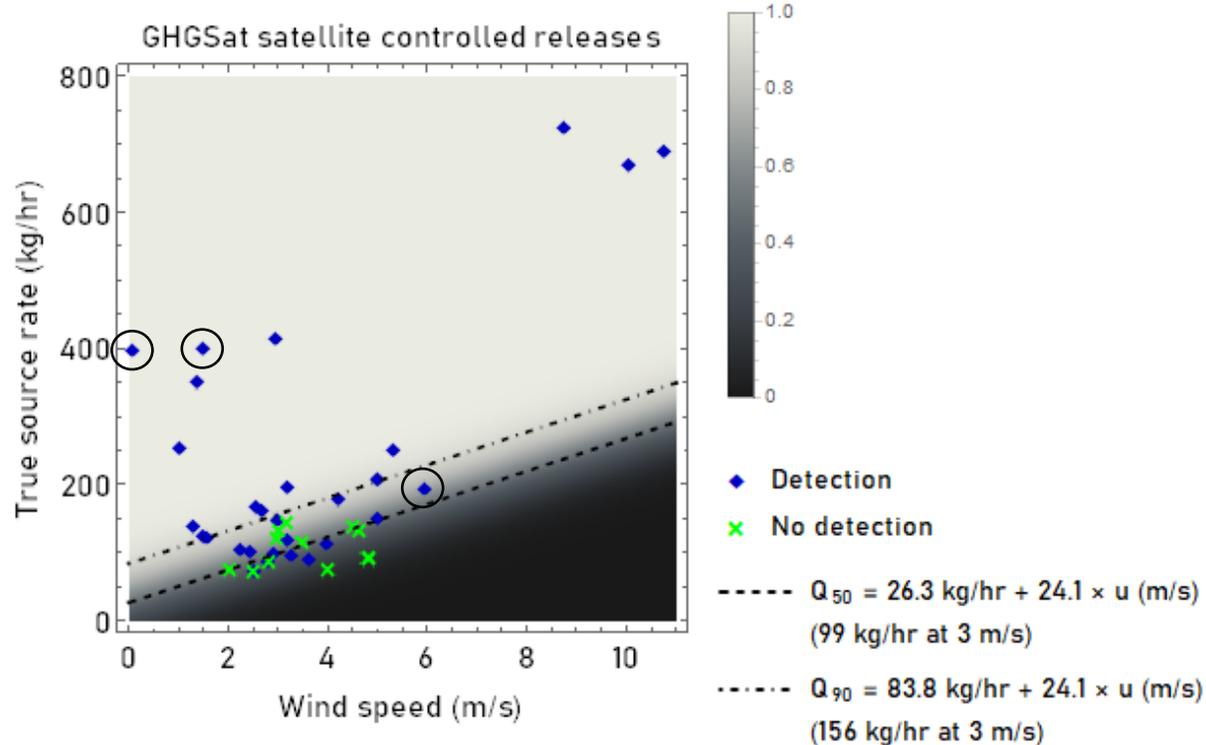
Our satellites monitored > 500k facilities worldwide in 2022, over 5x more than in 2021



69 countries

Our satellites monitored facilities in 69 countries, on all continents worldwide

CONSTELLATION VALIDATION: DETECTION LIMIT



- Binary regression analysis
- Data from 2021-2023, **including C6-C8**
 - **Updated with July 2023 data**
- **More releases to come with C9-C11**
- Internal and **single-blind** releases (**circled** ○)
- Fit model for probability of detection (PoD)

$$p = \frac{1}{2} \left(1 + \operatorname{erf} \left(\frac{\beta_0 + \beta_1 Q + \beta_2 U}{\sqrt{2}} \right) \right)$$

- Accounts for wind-speed dependence
- **Implies detection limit of 99 kg/hr (50% PoD, 3 m/s)**



DATA AVAILABILITY FOR THE SCIENTIFIC COMMUNITY

Augmenting and complementing space agency scientific missions

NASA Selects GHGSat Data for Evaluation

The data are part of ongoing efforts by NASA's Commercial Smallsat Data Acquisition (CSDA) program to acquire commercial smallsat data.

NASA has selected [GHGSat](#) to provide commercial small constellation satellite products for evaluation to determine their suitability for advancing NASA's Earth science and application goals. The purchase agreement is the result of ongoing efforts by NASA's Commercial Smallsat Data Acquisition (CSDA) program to identify, evaluate, and acquire commercial satellite data that may augment and/or complement NASA Earth science observations. CSDA is a component of NASA's Earth Science Data Systems (ESDS) Program.

- Technologies
- Commercial Data
- Smallsat

European Space Agency

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GHGSat X

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GHGSat Mission

GHGSAT INSTRUMENTS
Explore instruments used in the GHGSat mission.

GHGSAT DATA
GHGSat data is freely and openly available to everyone.

CATAPULT
Satellite Applications

GHGSat and Satellite Applications Catapult Accelerating Climate Innovation in the UK

A new partnership was announced today between the Satellite Applications Catapult and GHGSat, the global leader in high-resolution emissions monitoring from space, to provide satellite data on domestic and international methane emissions for R&D in the UK. The company will also be opening an international analytics centre co-located in London and Edinburgh.

The partnership will provide UK organisations with access to high-resolution methane emissions satellite data. GHGSat is also providing observation data directly to the UK Space Agency, Ordnance Survey and other government departments as part of the initial £5.5m deal, funded by the UK Space Agency and delivered by the Satellite Applications Catapult



FUTURE ROADMAP

New satellites and new capabilities

GHGSat-C6/C7/C8 – Launched April 15, 2023



GHGSat-C9/C10/C11 – Scheduled launch Q4 2023
GHGSat-C12 to -C15 – Scheduled launch in 2024

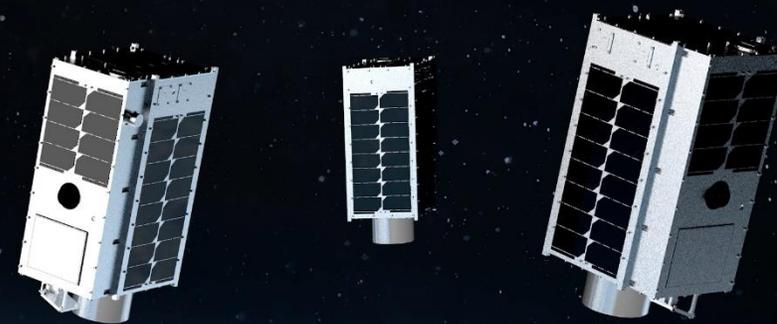


- Three newest satellites launched on April 15, 2023, bringing total commercial satellites to eight
- Next three satellites scheduled for launch later this year, including the first CO₂ sensor (GHGSat-C10)
- Four more satellites (GHGSat-C12 to -C15) have been ordered for launch in 2024

Thank You! Questions?

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GHGSAT