

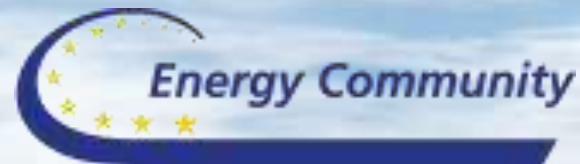
SATLANTIS



GEI-SAT

for advanced & reliable
observations of CH₄

20 June 2022



GEI-SAT

For the challenge



Detection threshold

Smallest concentration a system detects & quantifies

50% of CH₄ emissions

Come from *EDF*, small sources 2020

Coverage

Global vs targeted

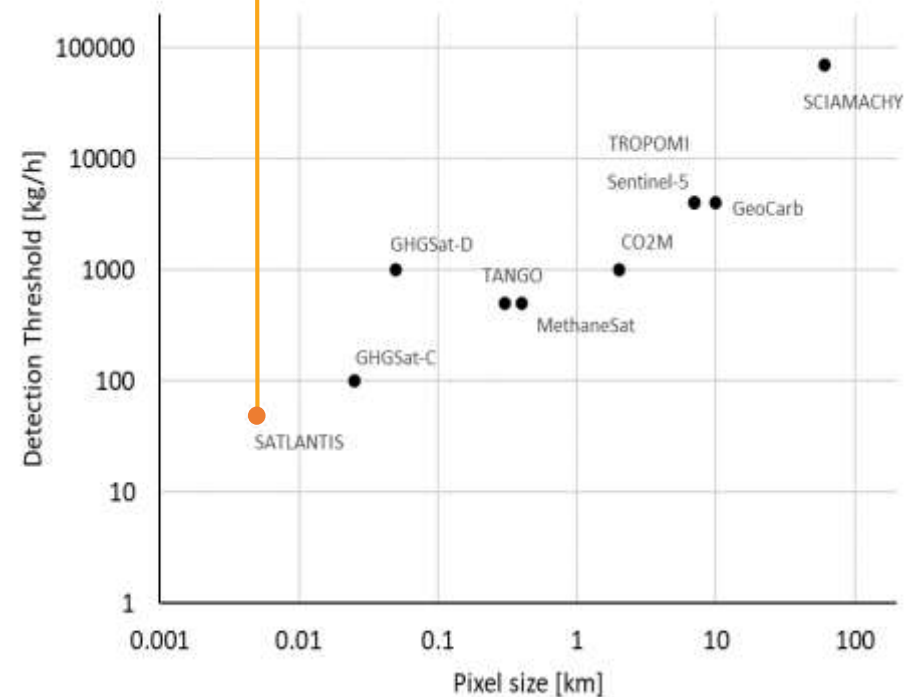
Revisit frequency

Pixel size

Identification of smallest sources and geolocation

GEI-SAT constellation

Satlantis' solution for



GEI-SAT



Key technological innovations

Filters

Resolution

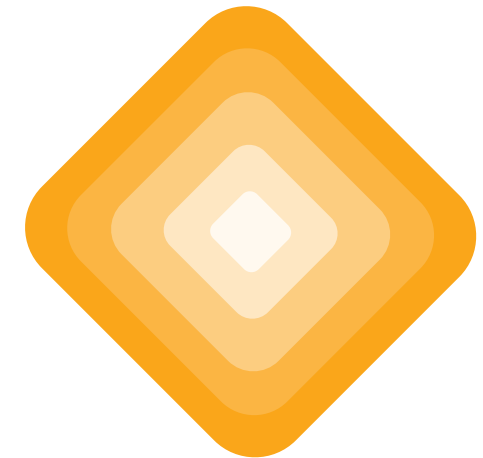
Agility



Optimized for
methane
detection



Maximize spatial
resolution



Pointing towards
specific targets

GEI-SAT Constellation:



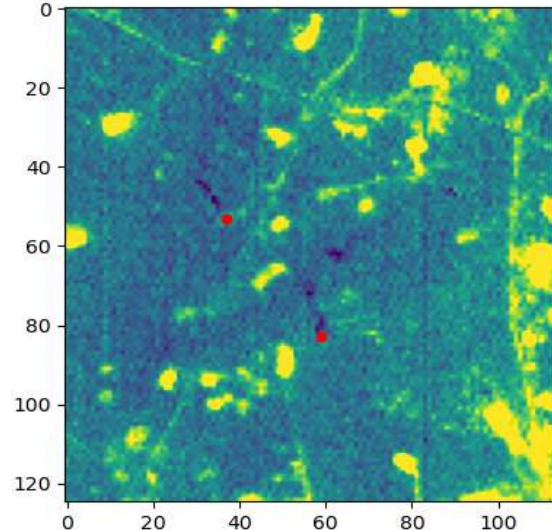
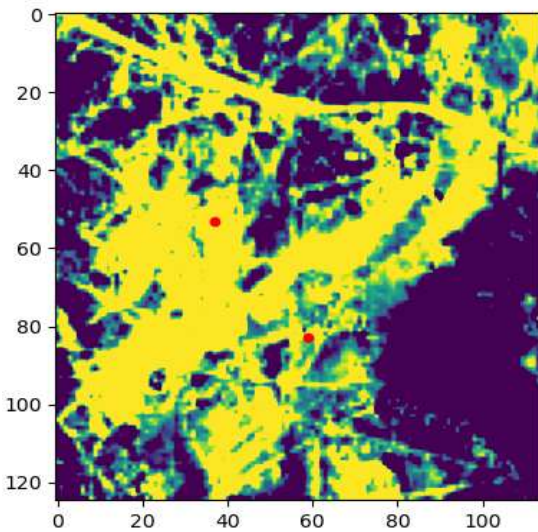
Key technological

innovations

Resolution

Sentinel

GEISAT

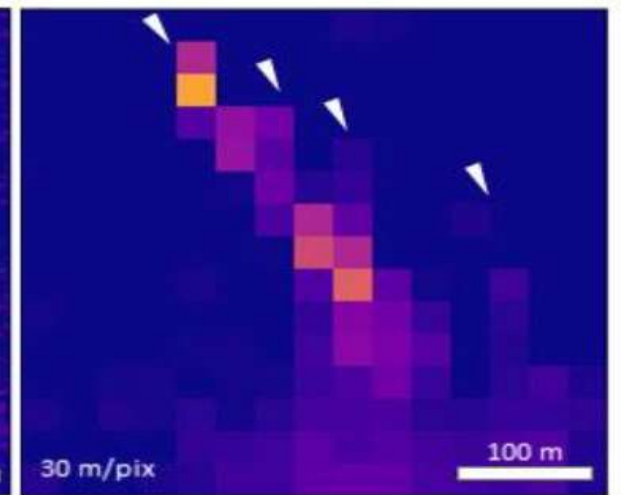
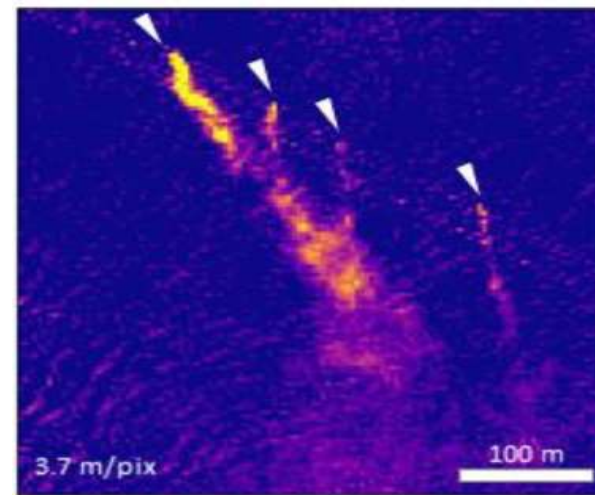


Own

Higher contrast of the signal

3.7 m

30 m



Sanchez-Garcia et al. (2022)

Non-linear increase of signal
(Jacob et al. 2016)



GEI-SAT

Key technological



innovations





GEI-SAT

Missions

Mission objective

Perform atmospheric **CH4 measurements** with **high spatio-temporal resolution** and simultaneous geolocation of source emitters, to be used for the **monitorisation and quantification of methane emissions** in the Oil&Gas industry.

Expanding spectral capabilities & improving detection threshold.

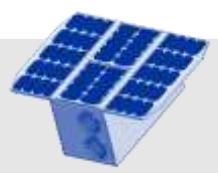
Constellation deployment roadmap

Q2 2023

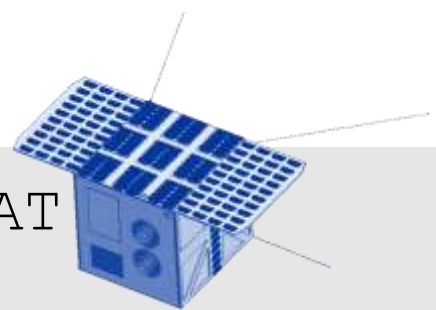
Q4 2023

2024/25

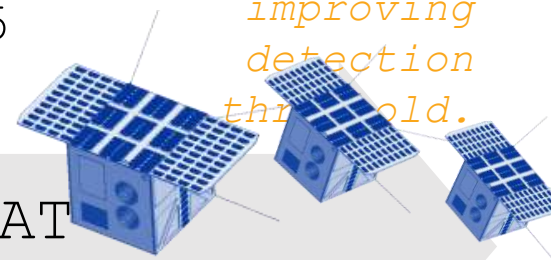
GEI-SAT Precursor



GEI-SAT Plus



GEI-SAT Constellation



Satellite Payload detection threshold Spatial resolution Spectral range

16U CubeSat (17.4 kg)
iSIM-90 VNIR + SWIR
~ **150 kg/h**
VNIR 1.65m; SWIR 13m
up to 1700 nm



Microsat (92 kg)
iSIM-170 VNIR + SWIR
~ **100 kg/h**
VNIR 0.8m; SWIR 7m
up to 1700 nm



3 Microsats (92 kg)
iSIM-170 VNIR + SWIR
~ **50 kg/h**
VNIR 0.8m; SWIR 9m
up to **2300 nm**



Orbit to be defined, reference values

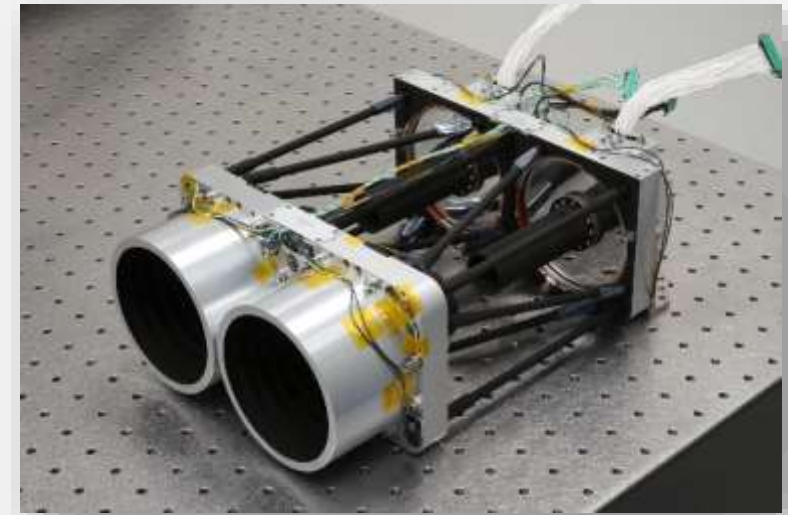
GEI-SAT precursor Features

Based on the experience of
the first Satlantia's mission
URDANETA

- **16U CubeSat** sensor-bus
- Bigger solar panels
- Higher bandwidth download 150 to 300 Mbps
X-Band
- Improved AOCS (more precise star-trackers)

Payload

- VNIR Channel with 5 bands (PAN+RGB+NIR)
- SWIR Channel with 5 bands
- Spatial Resolution **VNIR 1.65m; SWIR 13m**
- Spectral resolution **up to 1700 nm**



Payload **delivery** for satellite integration
2022

Launch Q2 2023



GEI-SAT precursor

Roadmap



*From the ground
to space*



ENGINEERING MODEL

COTS cameras &
lenses
Ad-hoc filters
design
Extensively tested
(2020, 2021 & 2022)

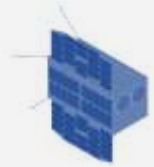


PLANE MODEL

On ground tests: Q1
2022
Enagás : Q2 & Q3
2022
Madrid: Q3 2022
USA : Q3 2022

SIMULATIONS

Knowledge, planning
and design
(2021, 2022 & 2023)



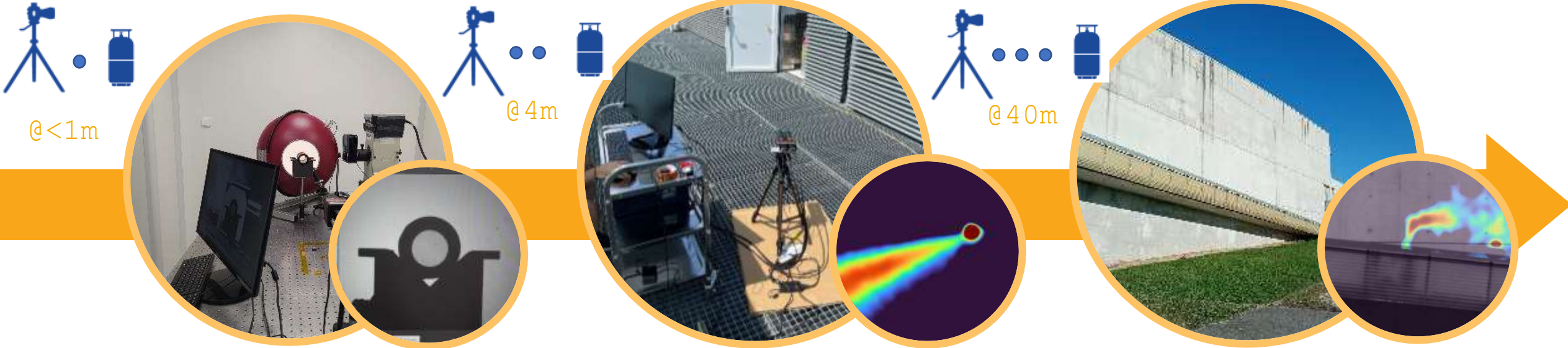
FLIGHT MODEL

Payload delivery
for satellite
integration: Q4
2022
Launch GEI-SAT
precursor: Q2 2023

GEI-SAT precursor Roadmap – EM



*From the ground
to space*



@<1m

@4m

@40m

Lab

Controlled conditions
measurements
Absorption vs.
concentration
Filter testing

Field test

Short distance
Simplest observation
strategy
Automated cloud
masking

Field test

(not so) Short
distance
More complex strategy
Worse background

GEI-SAT precursor

Roadmap

*From the ground
to space*



ENGINEERING MODEL

COTS cameras &
lenses
Ad-hoc filters
design
Extensively tested
(2020, 2021 & 2022)

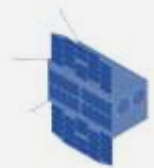


PLANE MODEL

On ground tests: Q1
2022
Enagás : Q2 & Q3
2022
Madrid: Q3 2022
USA : Q3 2022

SIMULATIONS

Knowledge, planning
and design
(2021, 2022 & 2023)



FLIGHT MODEL

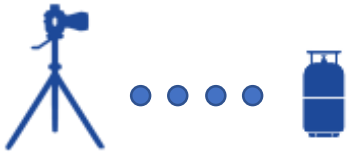
Payload delivery
for satellite
integration: Q4
2022
Launch GEI-SAT
precursor: Q2 2023



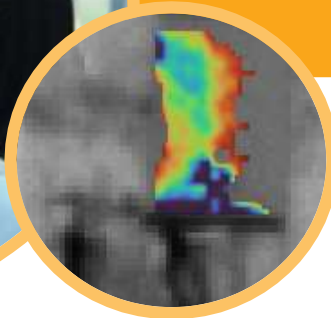
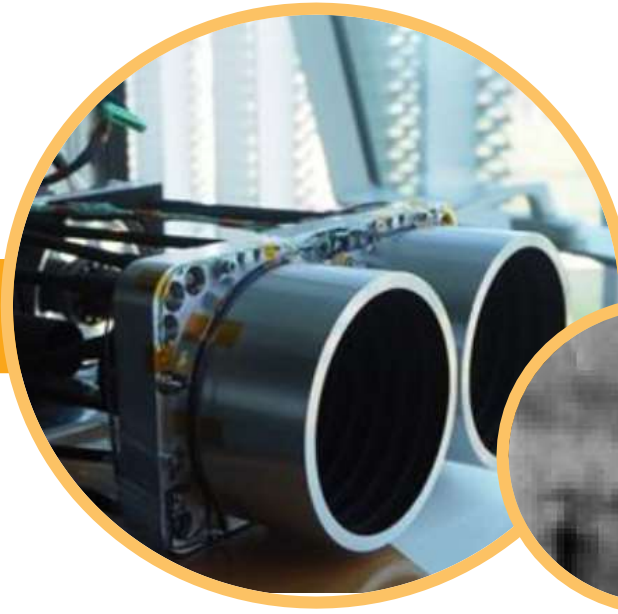
GEI-SAT precursor

Roadmap – PM

*From the ground
to space*



@1000m



Field test

Medium distance
Simple strategy
Optics and
electronics



@3000m



Flight test

Medium distance
More complex strategy
Worse background

GEI-SAT precursor

Roadmap

*From the ground
to space*



ENGINEERING MODEL

COTS cameras &
lenses
Ad-hoc filters
design
Extensively tested
(2020, 2021 & 2022)

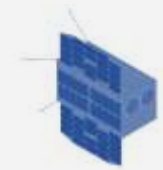


PLANE MODEL

On ground tests: Q1
2022
Enagás : Q2 & Q3
2022
Madrid: Q3 2022
USA : Q3 2022

SIMULATIONS

Knowledge, planning
and design
(2021, 2022 & 2023)



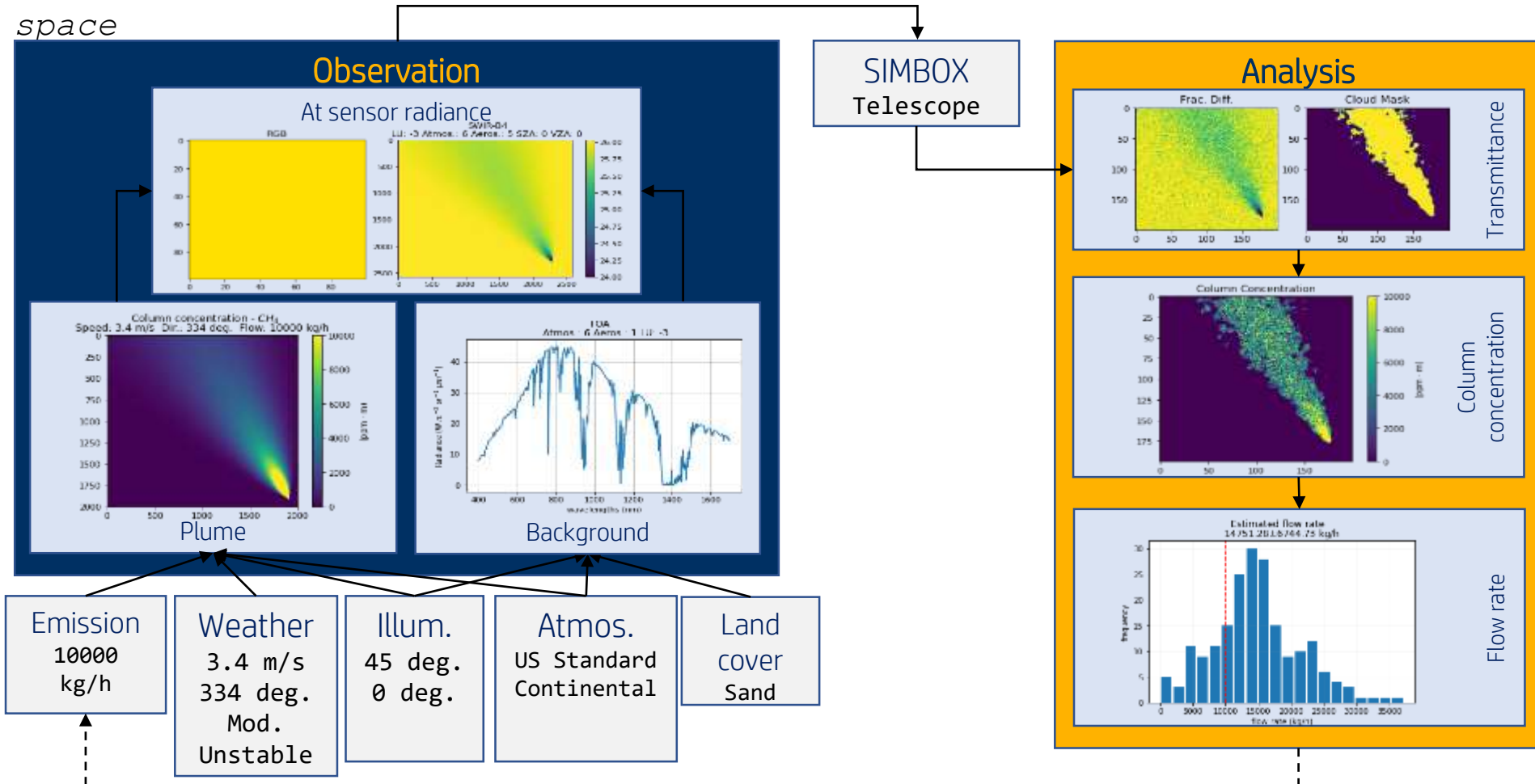
FLIGHT MODEL

Payload delivery
for satellite
integration: Q4
2022
Launch GEI-SAT
precursor: Q2 2023



GEI-SAT precursor Roadmap - Simulations

*From the ground
to space*



GEI-SAT Constellation



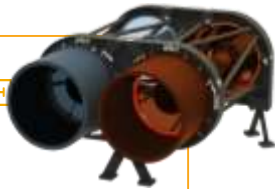
Methane End-to-End

We provide Full Solutions, from scientific-grade payloads to final data products

UPSTREAM



ADDED VALUE PAYLOADS & PLATFORMS



Simultaneous VNIR & SWIR, to aid solving ambiguities in emission detections.

Very High Spatial resolution, to provide precise and instantaneous geolocation, and infrastructure



DATA CENTRE

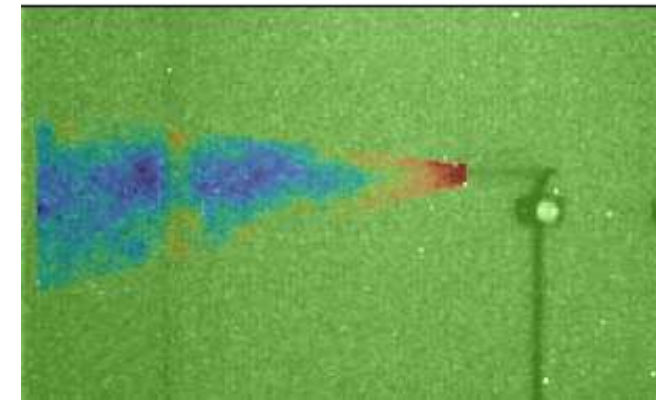
Data fusion.
Proprietary & third-party data.

Additional datasets

- + Public datasets
- + Complementary third-party data
- + Bottom-Up measurements,

DOWNSTREAM

Data analytics for methane measurements with satellite data



USER PLATFORM

Real time data visualization.
Layered maps/thematic mapping.



+ Periodical O&G reports

SATLANTIS



Spain Headquarters

Science Park
University of the Basque
Country
Sede Building
48940 Leioa-Bilbao
SPAIN



USA R&D laboratories

Innovation Hub
University of Florida
747 SW 2nd Avenue Suite
235
Gainesville, FL 32601
USA

www.satlantis.com

com