



EARTH OBSERVATION AND THERMAL IMAGING INSIGHTS

16TH NOVEMBER 2022



WHAT ARE THE DIFFERENCES?



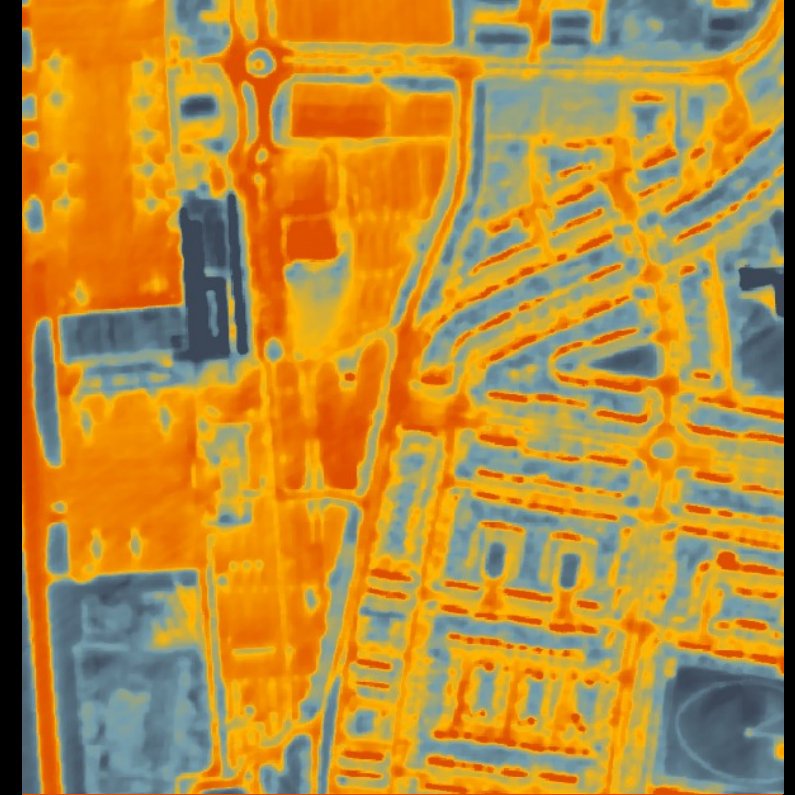
Visible & NIR

Cannot image at night
Cloud cover is an issue



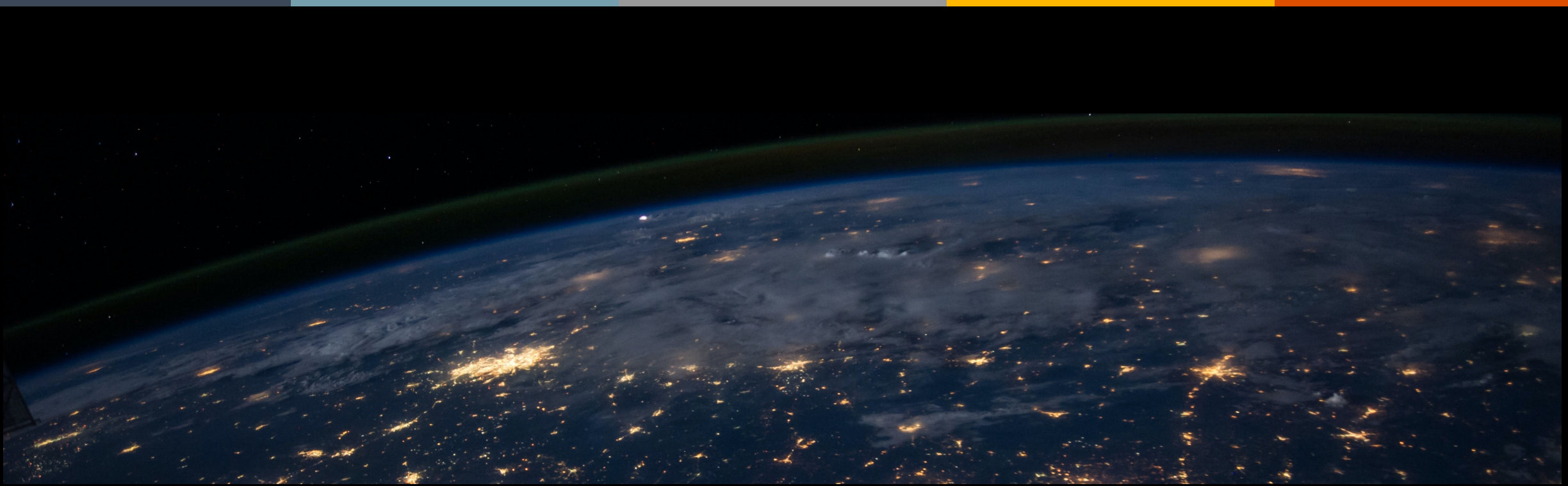
SAR

Not easy to interpret
Requires intensive processing



Thermal Infrared (TIR)

Cannot penetrate Clouds



Factors Influencing Growth in Satellite EO Industry

Lower launch costs

Off-the shelf electronics

Small sat revolution

Higher Revisit multiple images per day

Cheaper computing power

Improved User Interface Online platforms

How can this help with ESG Data Reporting?

MODEL

COMPANIES

Data-as-a-Service

Space Industry

Platform-as-a-Service

Geospatial Industry

Analytics-as-a-Service

Insights-as-a-Service

Earth Observation Industry

Software-as-a-Service

MAXAR TECHNOLOGIES ICEYE MDA

planet. AIRBUS spire

SATELLOGIC BLACK SKY

ARRBY e-geos EO1

Capella Space ConstellIR

UMBRA pixxel HySpecIQ

HawkEye360 ACME

NARA SPACE

EarthDaily analytics EARTH OBSERVING SYSTEM

ALBEDO OSK ORBITAL SPINBOX

GHGSAT KUVA SPACE

HYDROSAT tomorrow.io

LatConnect60 SPACETY KSAT

PRIMETHÉE aurora HEAD

alboorbital KLEOS PLANETIQ

SatSure GALABY ORORA TECHNOLOGIES IQPS

SCPTER isi AT SIIS

unseenlabs THE SHINING QUANT

aerospacelab SATREVOLUTION

osen SATELLITEVU PredaSAR

SATLANTIS AXELSPACE

aws sentinelhub up42

SKYWATCH astraea MEEEO

Microsoft Descartes Labs

Google Earth Engine esri

SOAR openEO Platform

cloudeco SKYFI

TERRAUE

APOLLO MAPPING Climate Engine

Orbify ARLULA

EARTH BLOX ONDA

mundi WEB SERVICES KERMAP

OPEN COSMOS Rheticus

TERRA SCOPE CREODIAS

WEKEO sobloo

Picterra

Blue Sky Analytics SkyGeo

Space sense SPACE KNOW

Kawa Space URSA SPACE

AtlasAI Ecopia

GEOSPATIAL INSIGHT Orbital Insight

CGG Rezatec

Satelytics Geollect

GEOSITE M I S PROXIMITY INTELLIGENCE SERVICES

blackshark.ai

CATALYST EARTH DATA, SIMPLIFIED.

Infrastructure & Utilities

LiveE3 ASTERRA

overstory AIDASH

orbital eye spottitt

Energy

KAYROS UPSTREAM TECH

WEGAW DELX

Sustainability

SATELLIGENCE ecometrica

SPACE INTELLIGENCE RS Metrics

Others

sust satim earth

Cloud to Street Planet Watchers

Terrabotics Space to Earth Analytics

ORBITALEOS

Chloris Geospatial.

Weather & Climate Risk

JUPITER CLIMATE X cervest

CLIMATE AI FloodMapp Salient

THM rcc Climate Service PREVISICO

S&P Global Climavision

zesty.ai TERRAFUSE AI

Carbon & Forestry

Sylvera NCX kanop

Pachama wildsense BeZero

Agriculture

indigo Perennial EARTHOPTICS

regrow Gro Intelligence

Insurance

Climate DC Descartes Underwriting ARTURO

CAPEANALYTICS Betterview

Others

REsurety

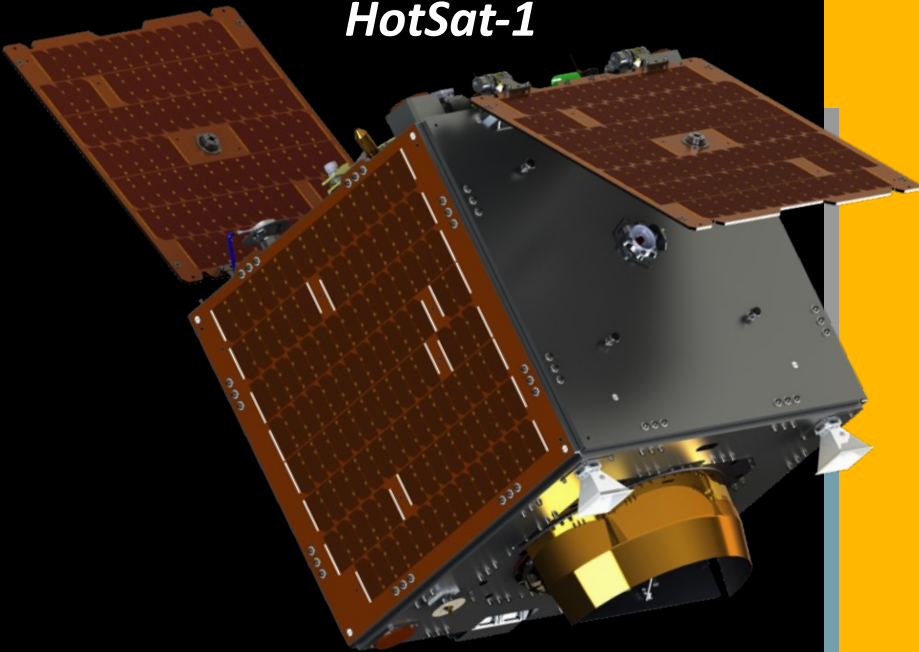
KoBold Metals fraym

APPROX 80% WERE ESTABLISHED IN THE LAST 10 YEARS

Source: TerraWatch Space by Aravind <https://newsletter.terrawatchspace.com/p/the-state-of-commercial-earth-observation?triedSigningIn=true>

SATELLITE VU UNIQUE INFRARED CONSTELLATION

HotSat-1



SPECIFICATIONS:

HIGH RESOLUTION - 3.5M

MID-INFRARED - 3.4-5.0 μm

SENSITIVITY - <2K

VIDEO - UP TO 60 SEC @ 25 FRAMES/SEC

DAY & NIGHT IMAGING

CONSTELLATION:

LAUNCHING MAY 2023

8 SATELLITE CONSTELLATION - 2 IN POLAR, 6 IN MIO

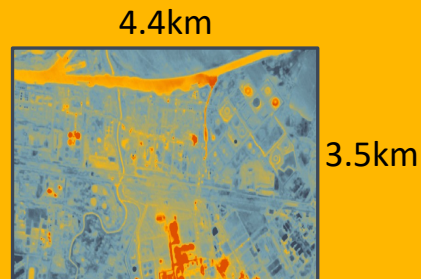
10 - 20 REVISITS/DAY OVER SAME TARGET

GLOBAL COVERAGE

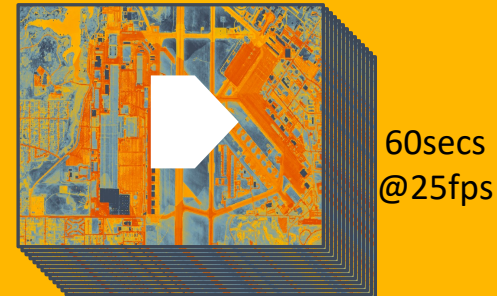
AGILE BUS/CAMERA

FULLY TASKED FROM WEB-BASED PLATFORM

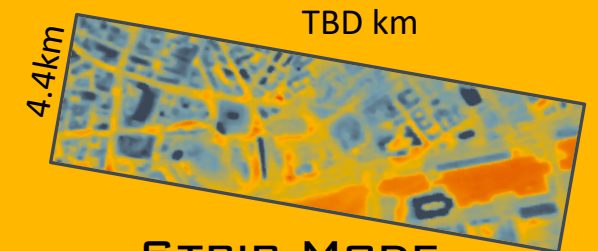
IMAGING MODES:



SINGLE IMAGE



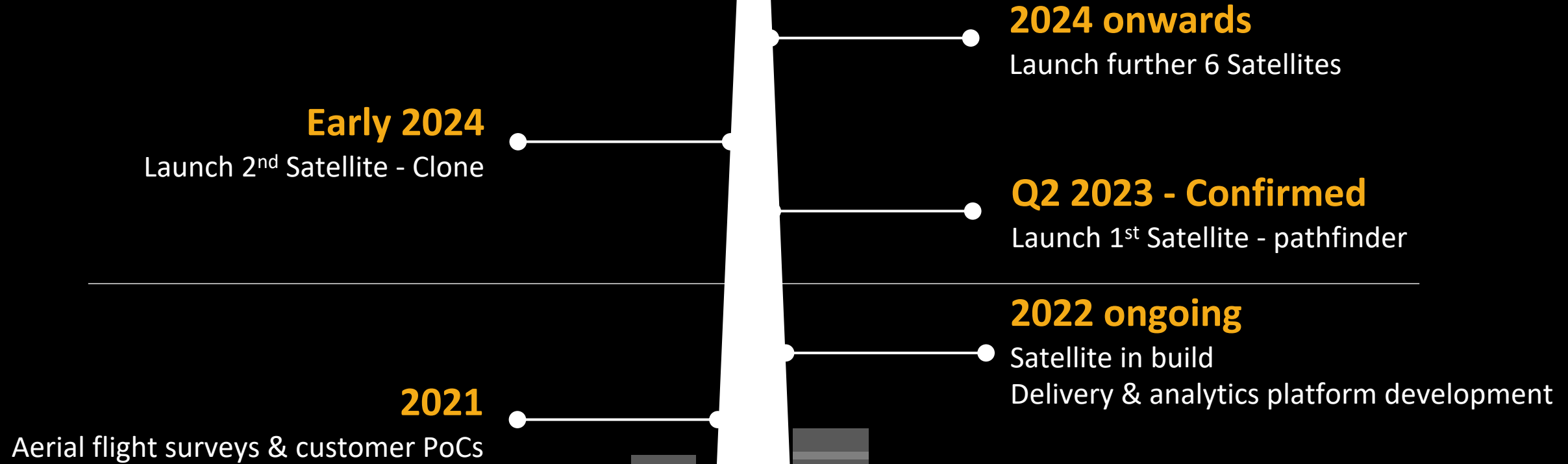
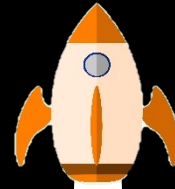
VIDEO MODE



STRIP MODE



SATELLITE VU: TIMELINE





N

Google Maps



What is currently available...

Low

High

Landsat TIR – 100m Resolution

2021-03-31 11:04:08 UTC



Orders of magnitude higher
resolution

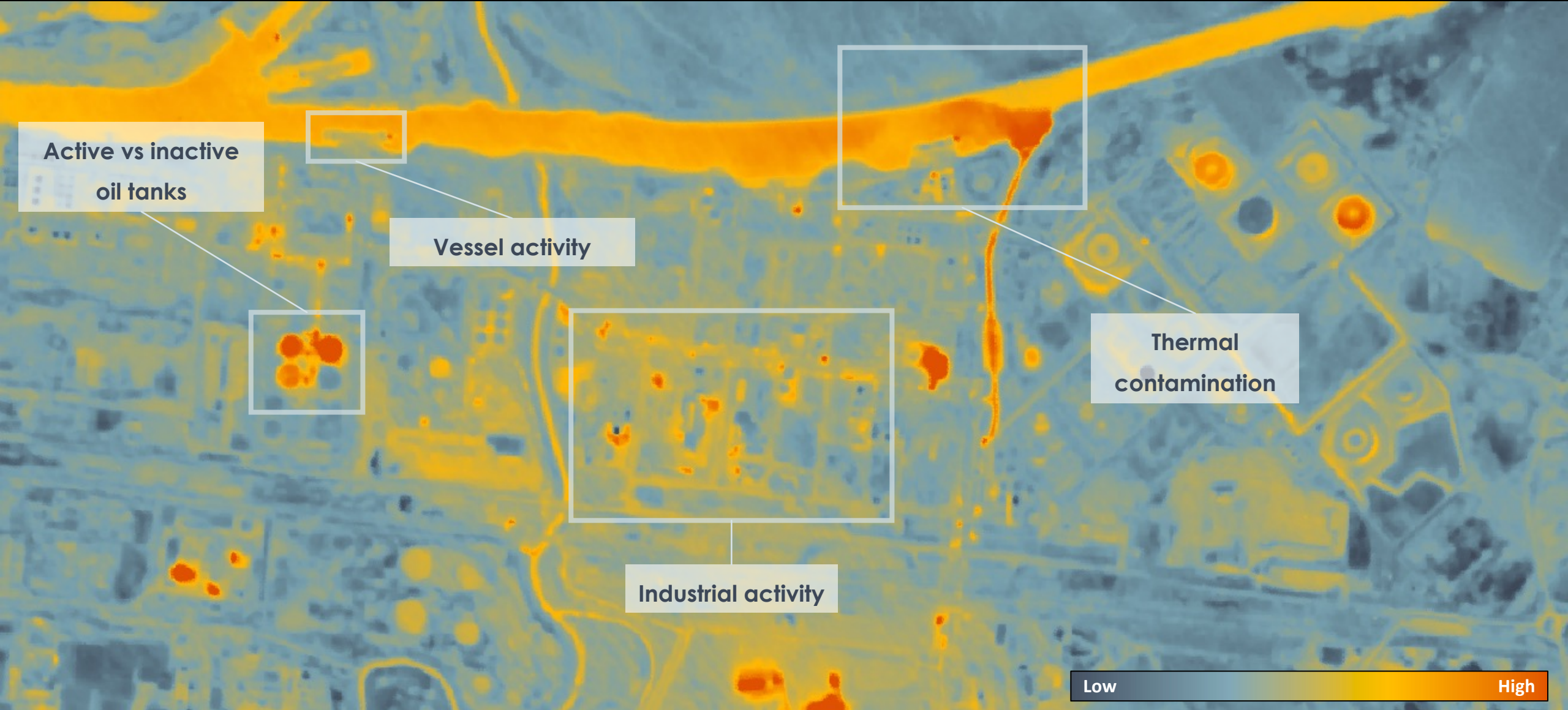
Low

High

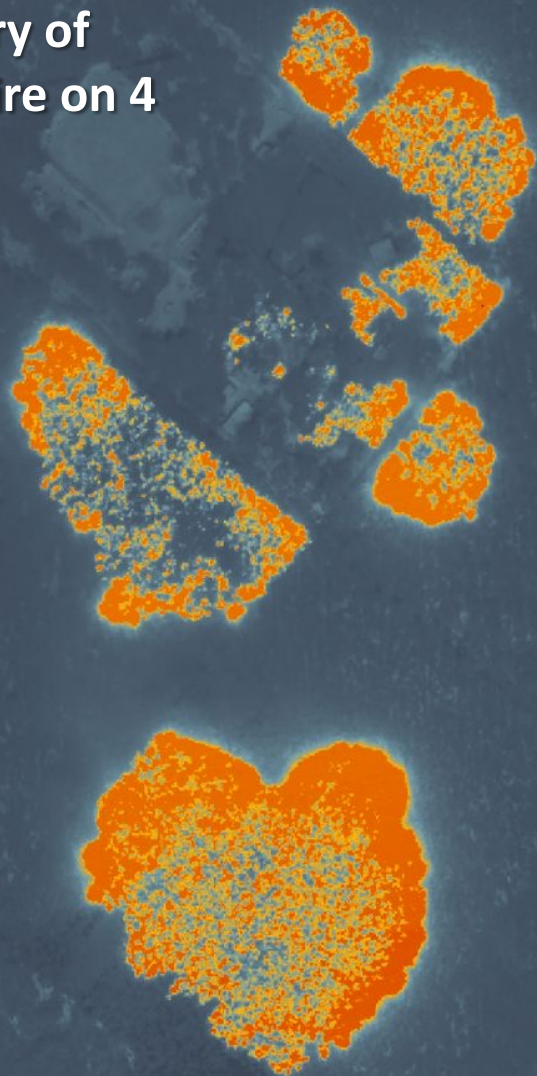
Satellite Vu – Aerial 3.5m

2021-03-02 22:02 UTC

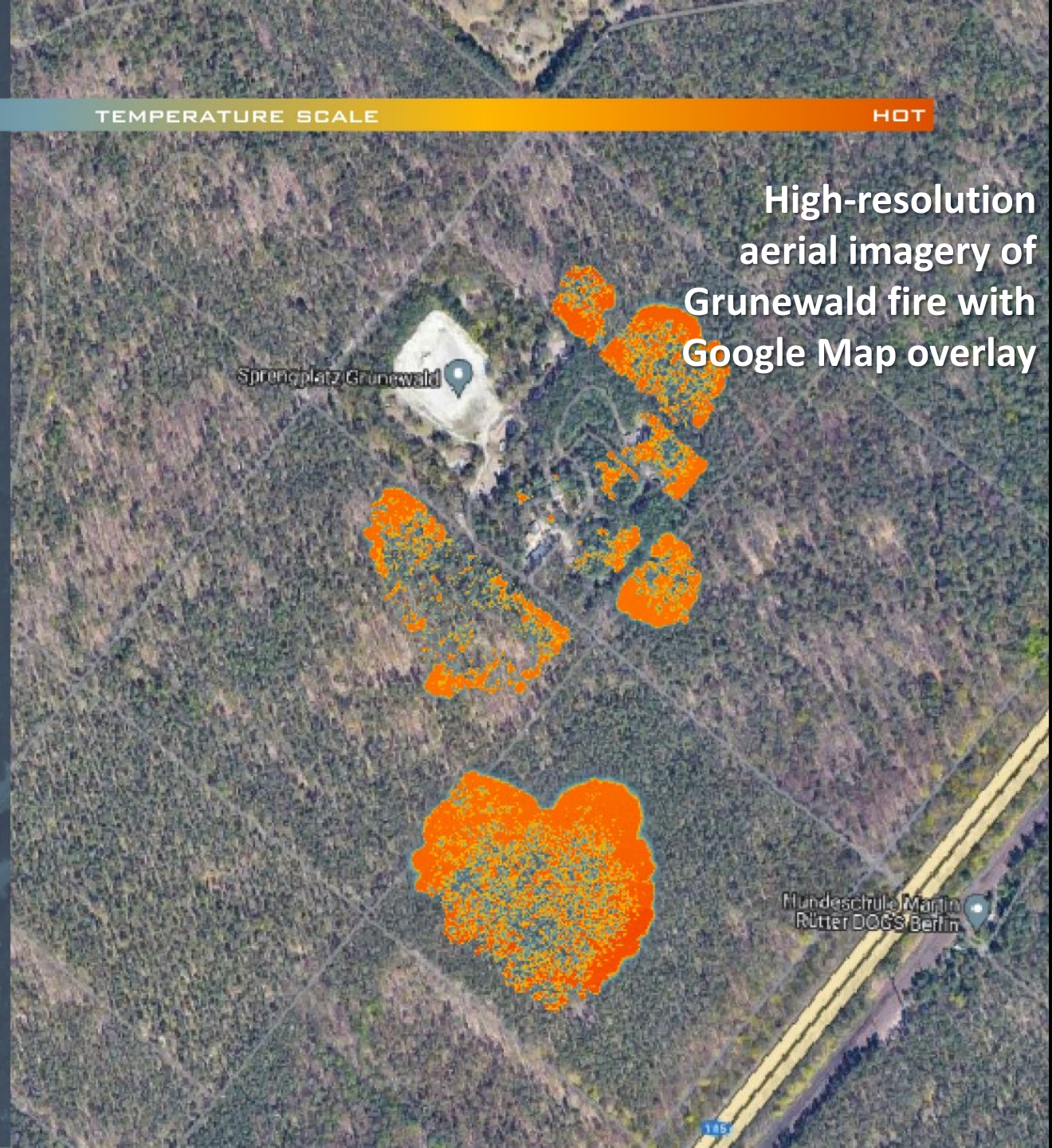
ZOOMING IN: ORDERS OF MAGNITUDE HIGHER RESOLUTION



High-resolution
aerial imagery of
Grunewald fire on 4
August 2022

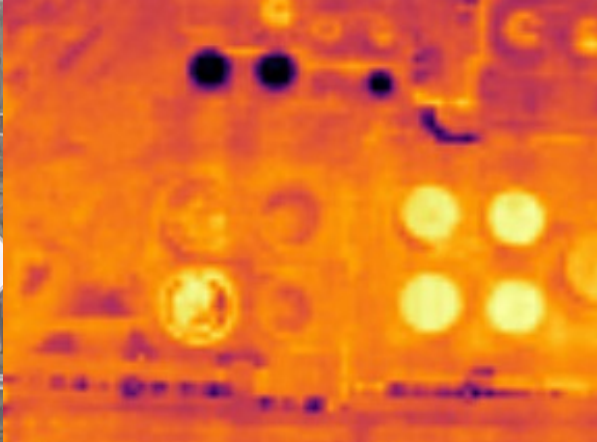


High-resolution
aerial imagery of
Grunewald fire with
Google Map overlay

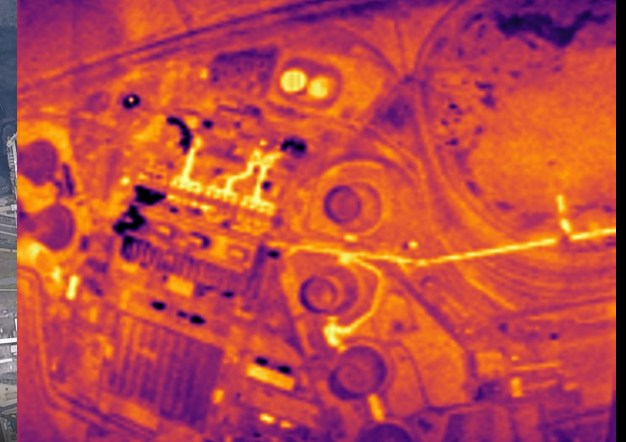


CURRENT ACTIVITY: FLIGHT TRIALS & PROOF-OF-CONCEPTS

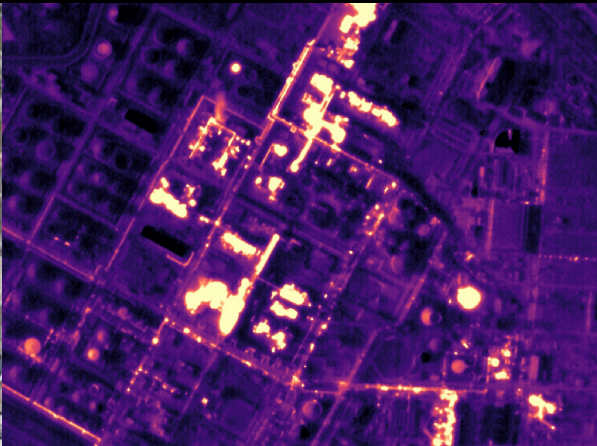
IR IMAGERY FROM AIRCRAFT FLIGHT SURVEYS, USING ENGINEERING MODEL OF SATELLITE CAMERA. RESOLUTION DEGRADED TO REPRESENT IMAGERY FROM SPACE



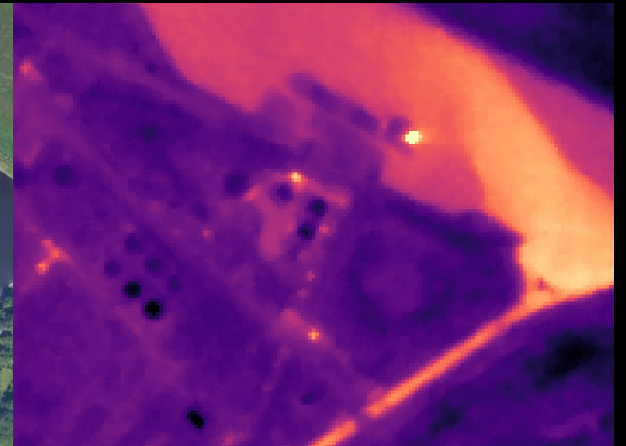
Process and Storage Insights



Power Station Insights



Industrial Process Insights



Water quality/Pollution events

INDUSTRIAL ACTIVITY DASHBOARD

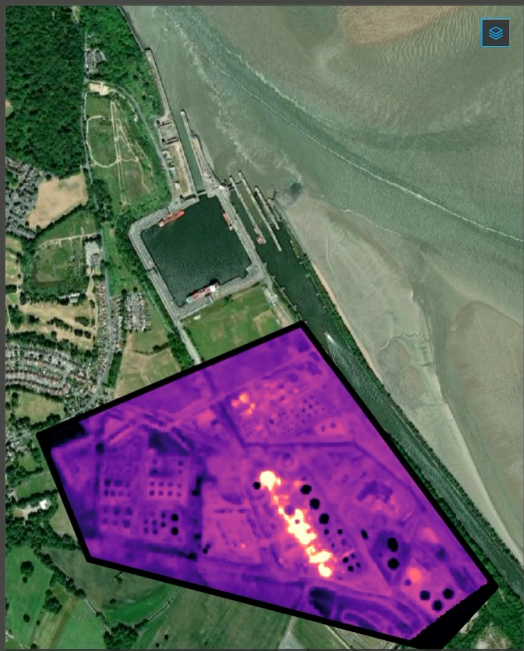
Hooton Biopower Dashboard



Landsat 8



Satellite Vu



Maxar, Microsoft

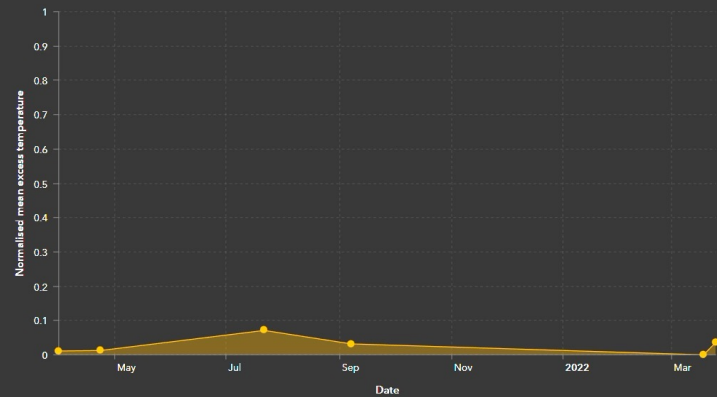
Powered by Esri

Maxar, Microsoft

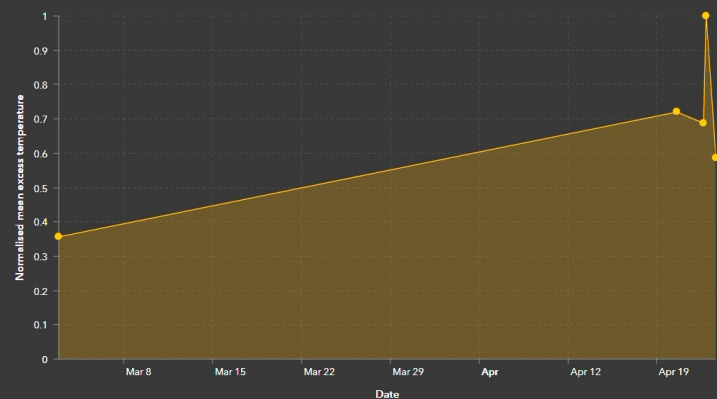
Powered by Esri

Name	Hooton Biopower and Eastham Refinery
Location	Cheshire
Coordinates	53.3129057034843, -2.9425648718344433
Industry Type	Electricity
Electrical Capacity	28.00MWe

Activity Level Index: Landsat 8



Activity Level Index: Satellite Vu



THE INDUSTRIAL ACTIVITY INDEX DASHBOARD RESPONDS TO:

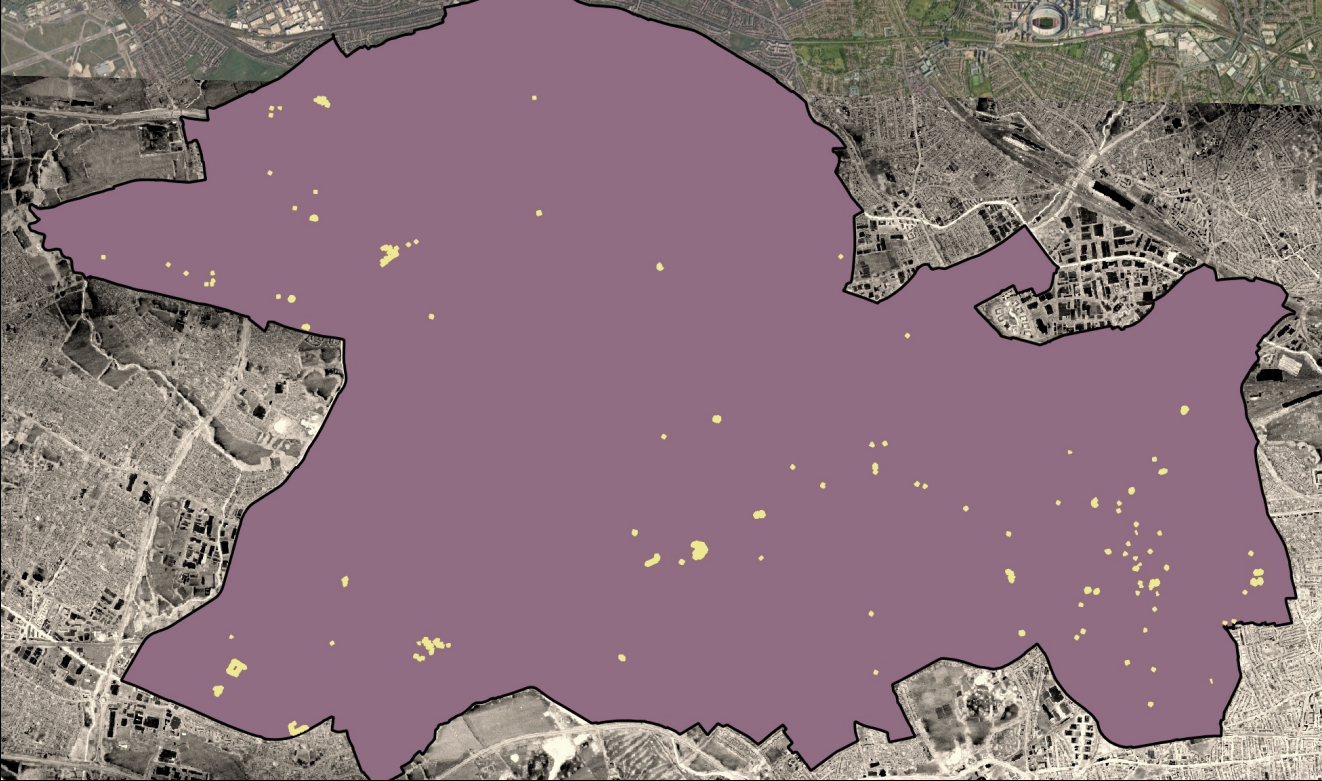
- LACK OF APPROPRIATE METHODS FOR MEASURING AND QUANTIFYING ENERGY USE
- NEED TO IDENTIFY EMISSION SOURCES ASSOCIATED WITH EACH FACILITY

BUILDING EFFICIENCY VALUE PROPOSITION

We want to offer an additional layer of insight to address the following questions:

- Can we detect heat loss from a residential property and what is the relationship with efficiency?
- Which areas are emitting more heat?
- Where do we have outliers?

DATA DISCOVERY: PRE-PROCESSING



AREA OF INTEREST – EALING LONDON

CONTEXT

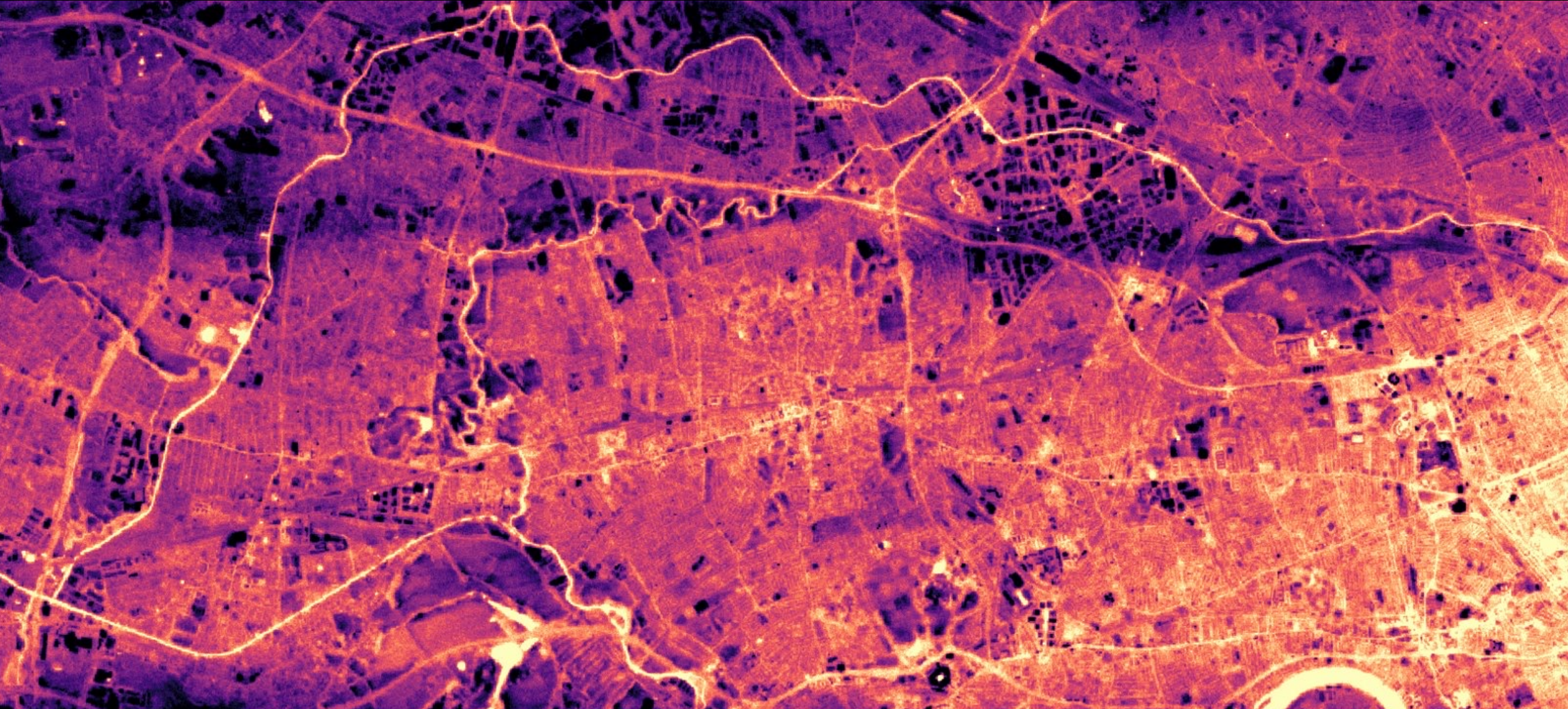
Property outlines containing 2K+ assets

Out of those assets, 820 are single dwellings with an EPC rating

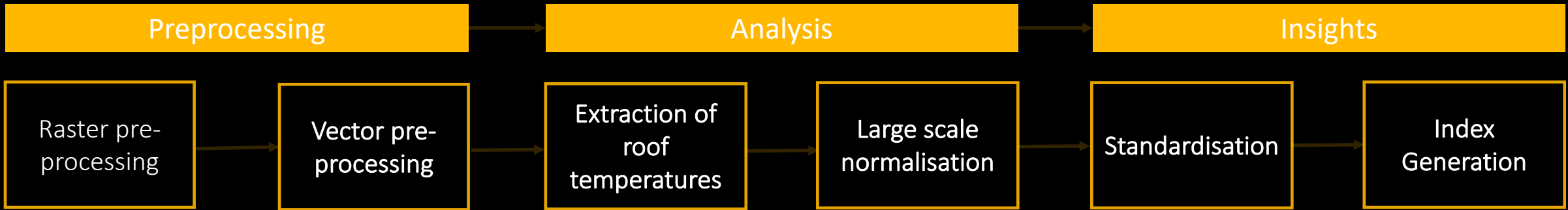
SATELLITE VU INSIGHTS:
EALING OPTICAL IMAGERY



SATELLITE VU INSIGHTS:
EALING THERMAL IMAGERY



END TO END WORKFLOW



Imagery and vector pre-processing takes place initially to bring data to "Analysis Ready" stage

Extraction of roof temperature takes place, along with additional steps to denoise the data and account for local effects



An index is generated as a result allowing us to compare roof temperature between units and understand trends, outliers, distribution of high-low emitters and geographical effects (hotspots)

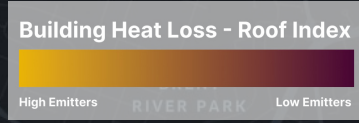
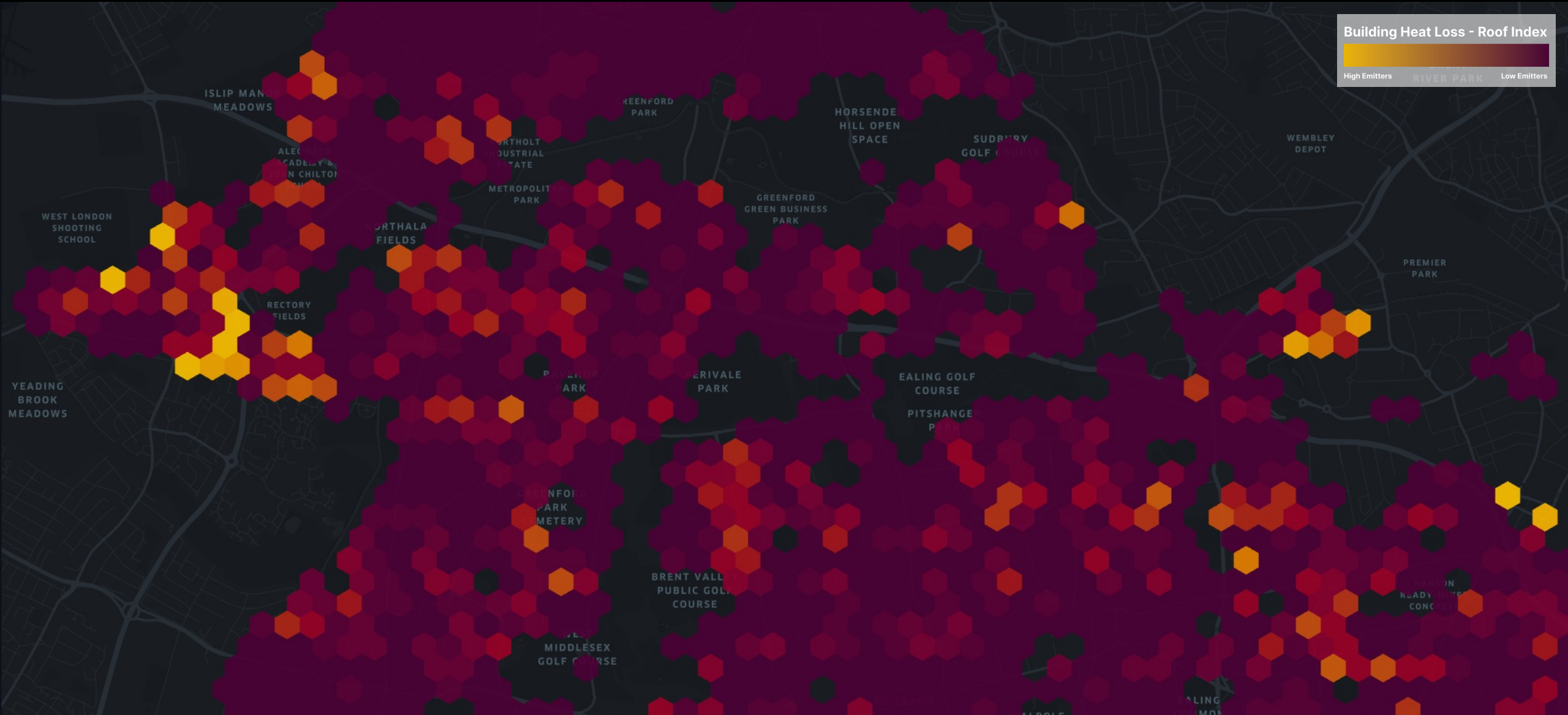
INSIGHTS:

SPATIAL PATTERNS – EALING DISTRIBUTION



INSIGHTS:

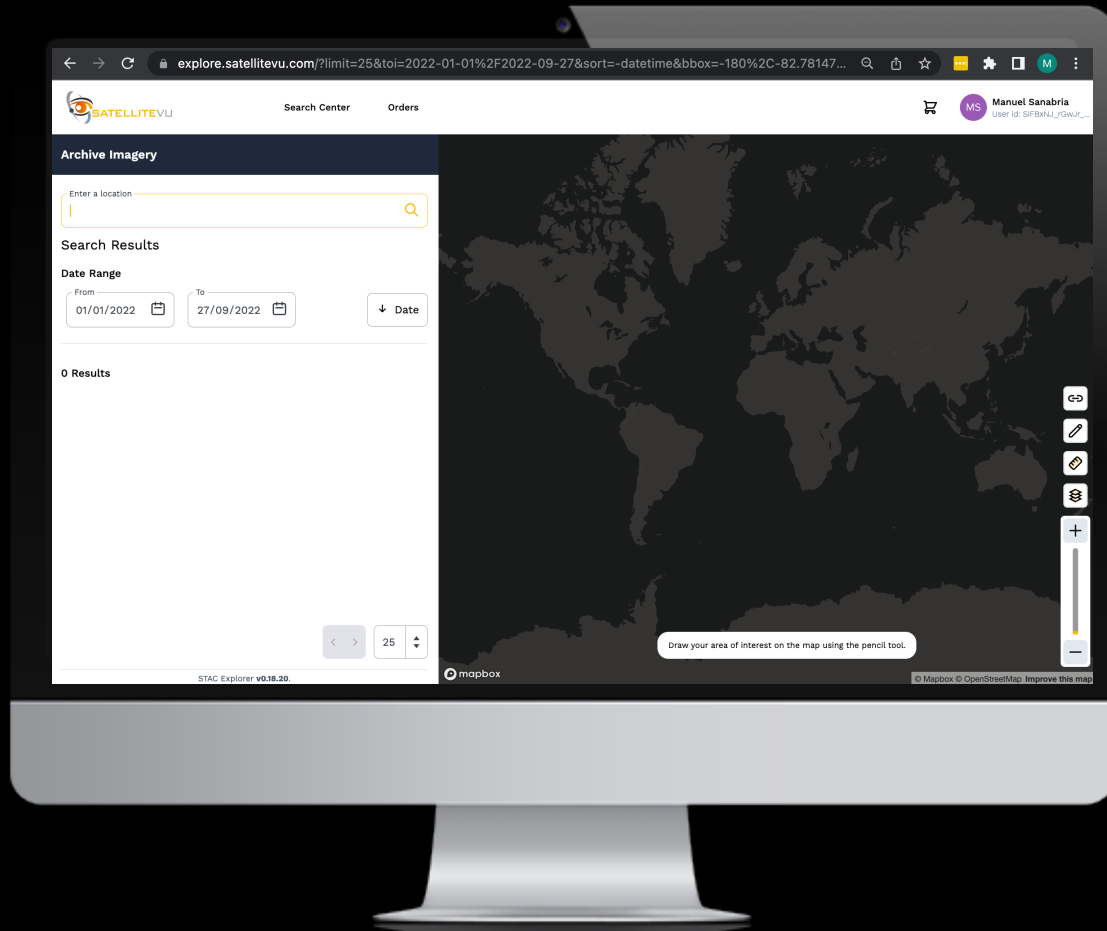
SPATIAL PATTERNS – EALING DISTRIBUTION



PROPOSED NEXT STEPS

- Ground truth data available to support validation of some of the hypotheses
- Additional data to work with
- Keen to work with asset property management companies, industrial facility managers for more testing

SATELLITE VU: EARLY ACCESS PROGRAMME



TEST OUR DATA

No financial commitment - Access to archive data via Satellite Vu platform to test use cases before launch

INFLUENCE DEVELOPMENT

Influence Satellite Vu imagery collection and product development with your feedback

SECURE LIMITED CAPACITY ON 1ST SATELLITE

Secure capacity by entering into a Satellite Vu Services agreement