# Using space technology for lithium exploration

**5th HVM New Materials 2019**
**6-7 November**
**Cambridge, UK**
**www.cir-strategy.com/events**

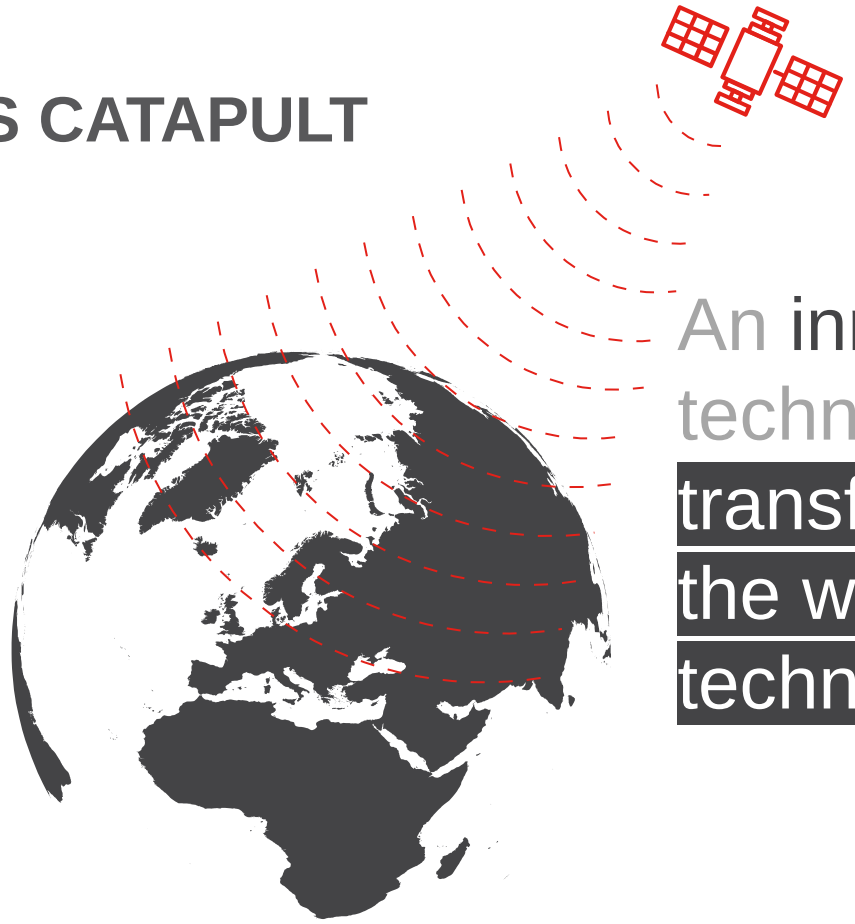
**Steve Spittle**
Satellite Solutions Architect

We work with Innovate UK

CATAPULT Satellite Applications

# SATELLITE APPLICATIONS CATAPULT

# The Catapult



An innovation and technology organisation transforming the way the world uses satellite technology and data.

## WE HELP ORGANISATIONS GROW THEIR BUSINESS

We help organisations to use satellite applications to grow their business in the UK and internationally.

## WE ARE INDEPENDENT

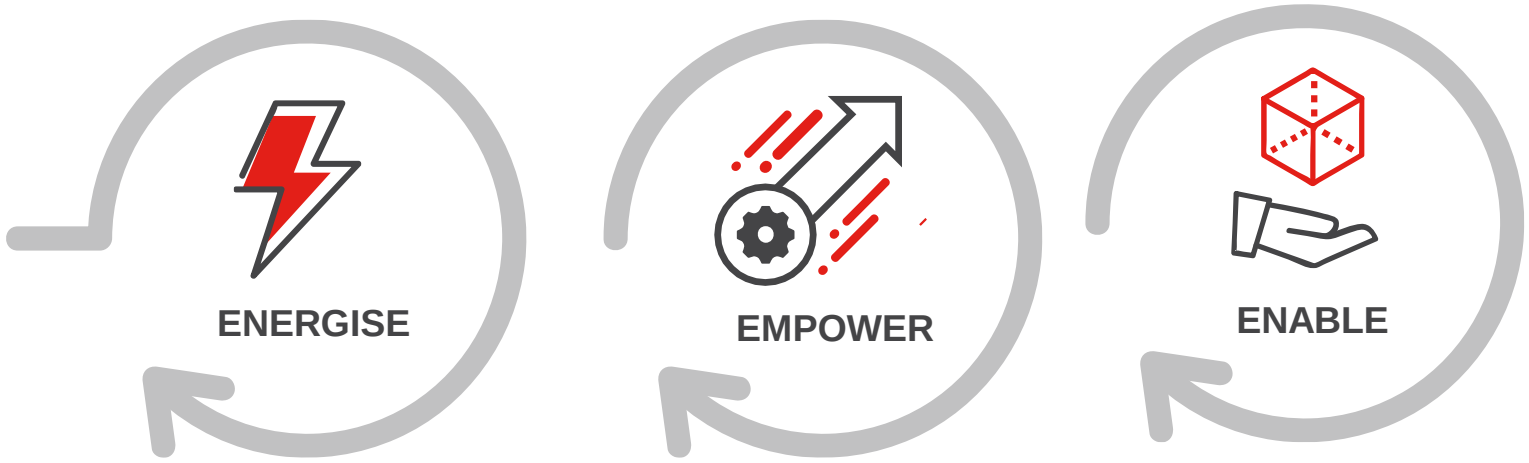
We bring together industry, researchers, end-users and government to explore and develop new ideas.

## WE ARE GOVERNMENT BACKED

We are a not for profit partly-funded by the Government organisation. We work closely with Innovate UK, UK Space Agency, UK Science & Innovation Network, and other public bodies.

## OUR APPROACH

# We do 3 things

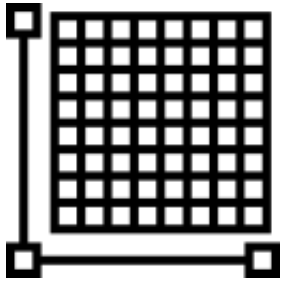



## Across Global Markets

# Satellite's in the 21st Century

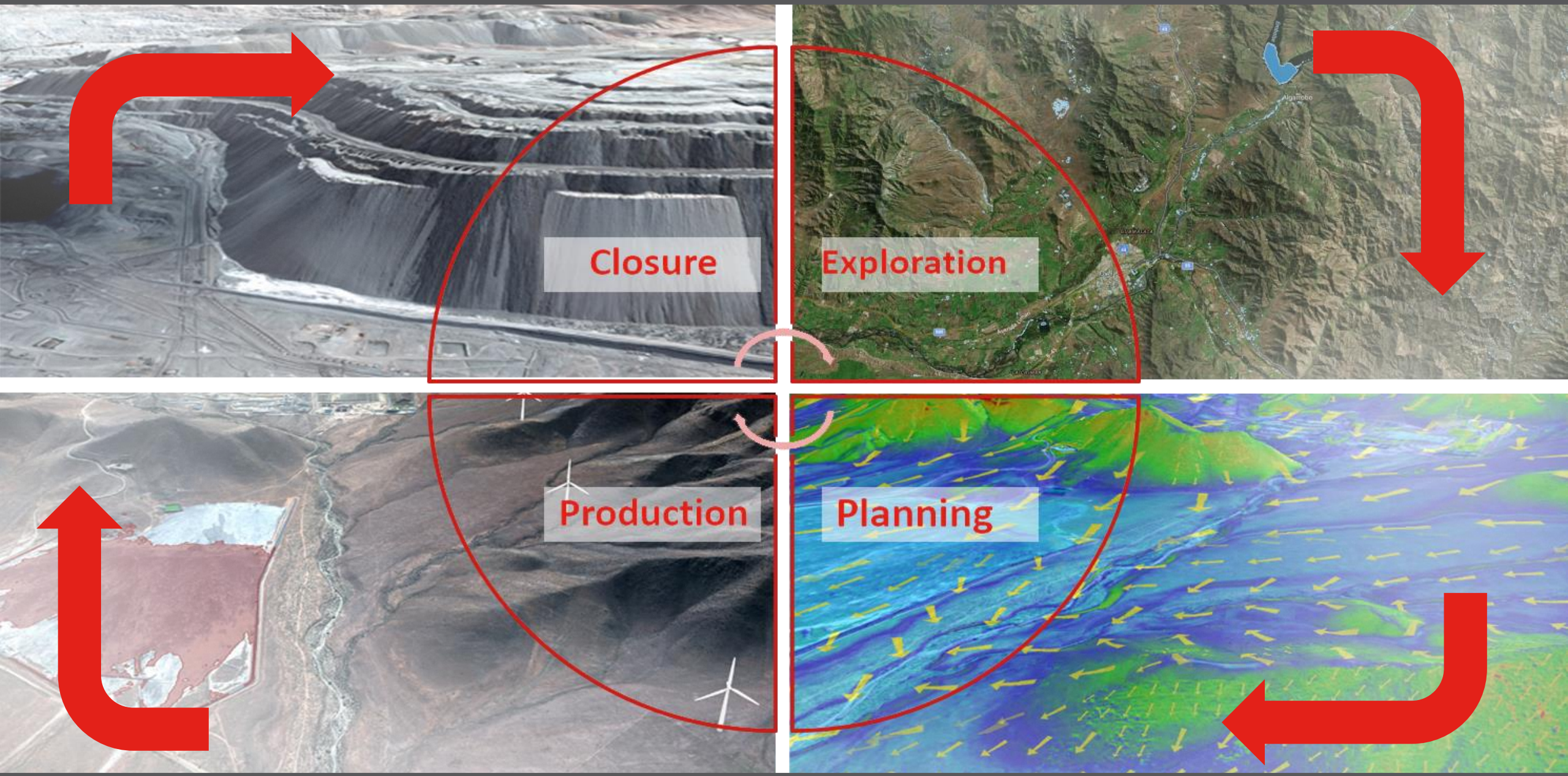
Costs

Relevance

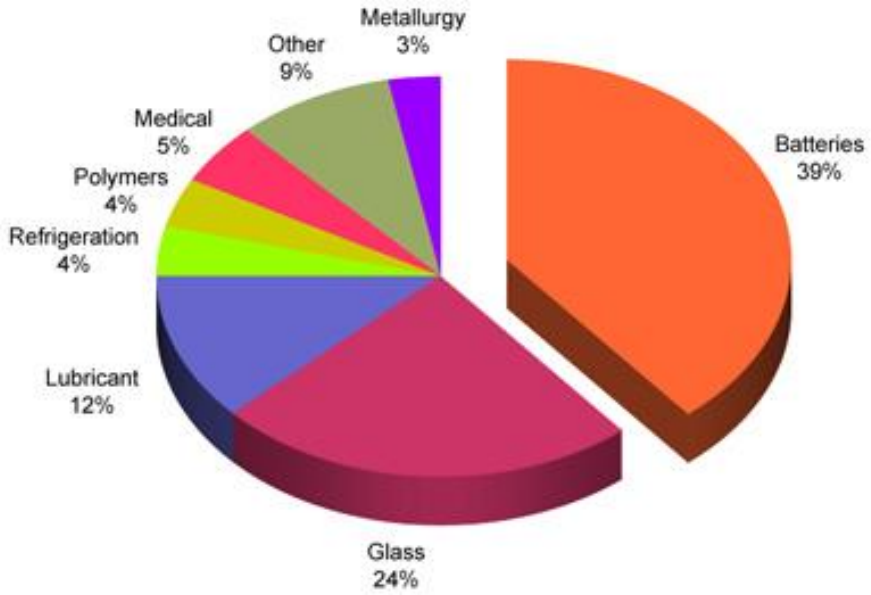


Capability

Access


Closure
Exploration
Production
Planning

# Why Lithium?



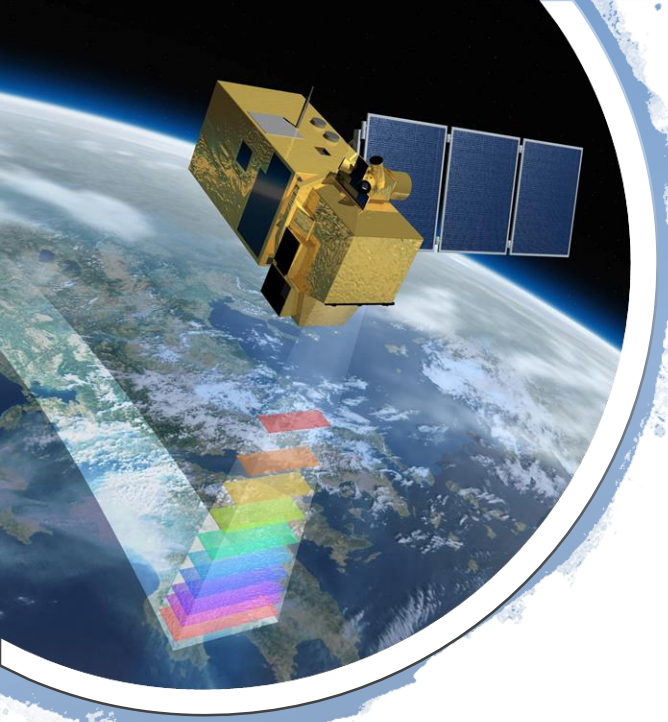

Estimated
**3.9Million metric** Tons of recoverable Lithium*

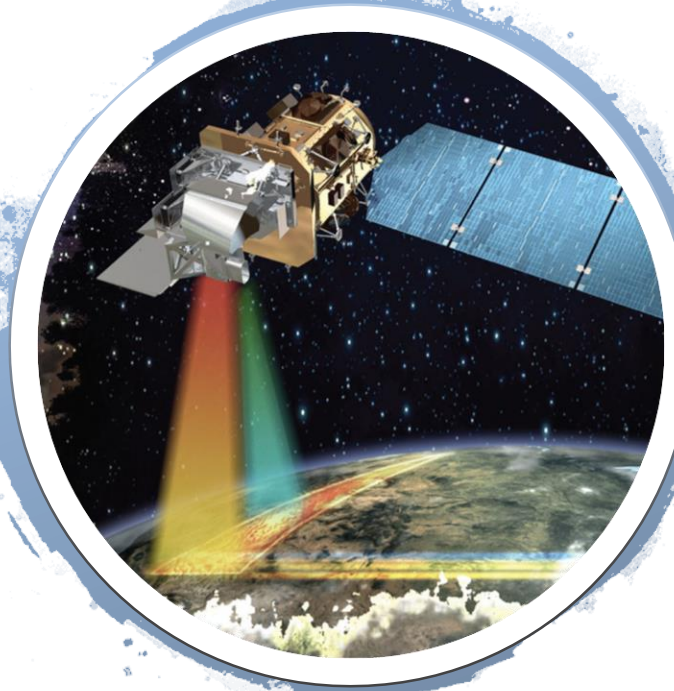
**2018** 5.1m Electric Vehicles
**2030** 130m Electric Vehicles**

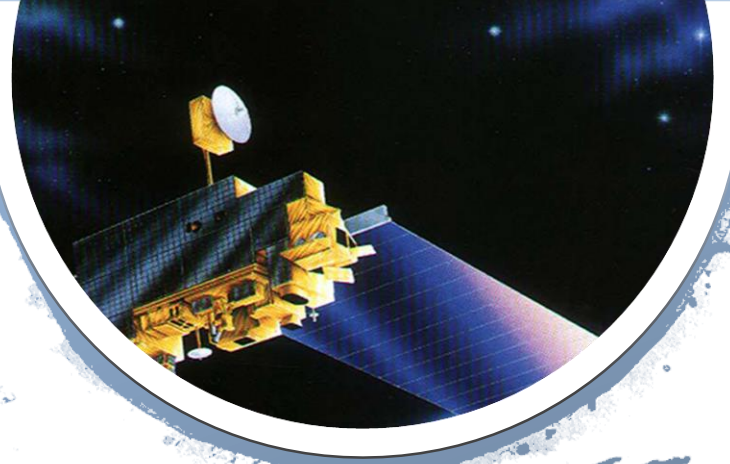
Sources: *https://www.bloomberg.com/opinion/articles/2017-09-27/take-peak-lithium-forecasts-with-a-pinch-of-andean-salt
** Global EV Outlook Publication IEA.



# Lithium In Cornwall







# Using Satellite Technology to derive lithium perspectivity maps

# Lithium Exploration in the UK

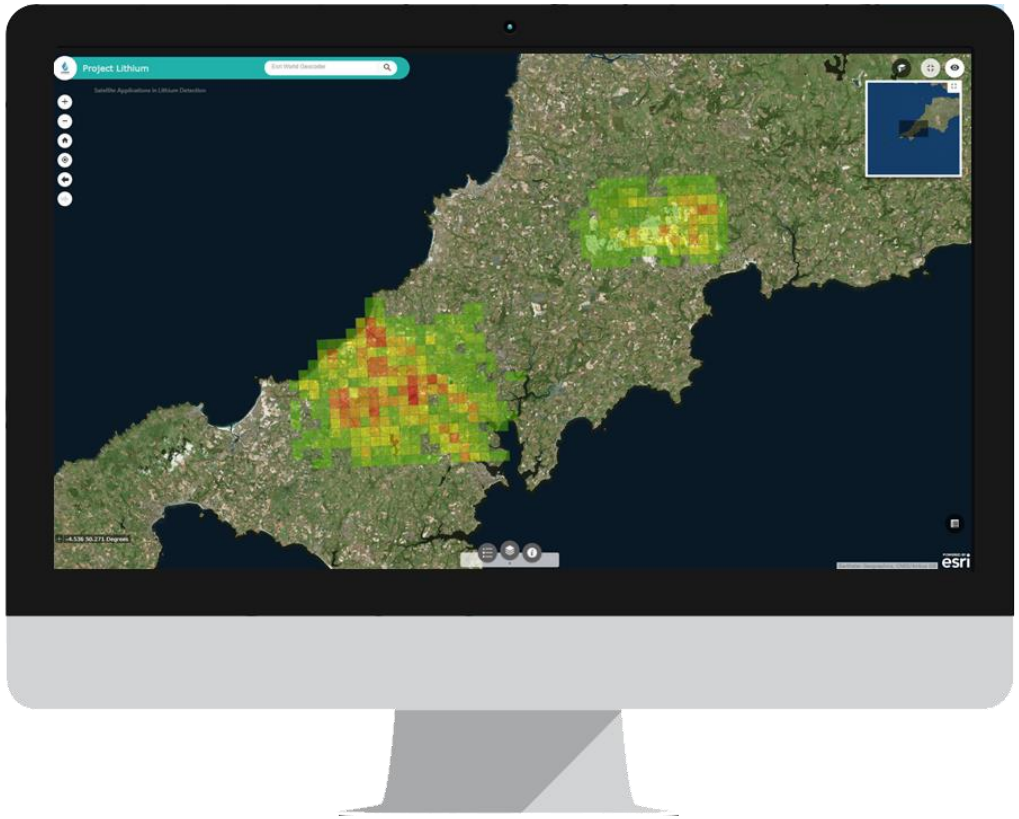
Geology

Vegetation

Faults

Environment

Data Integration and Analysis



# Lithium Exploration in the UK

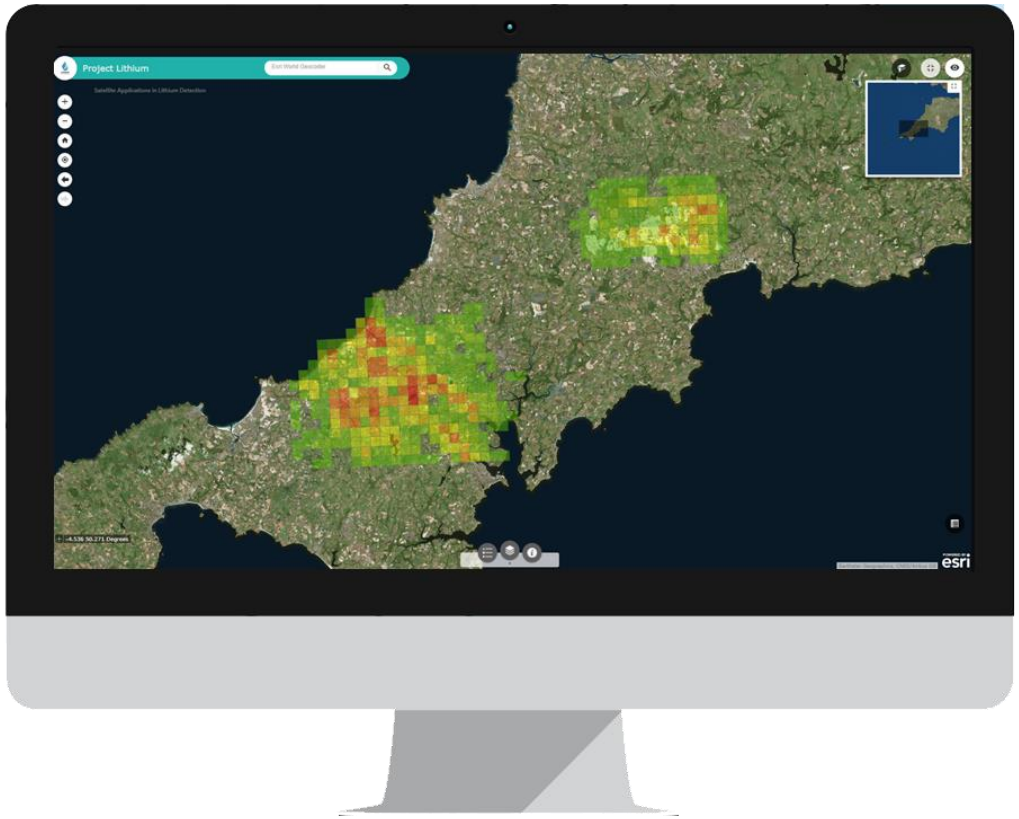
**Geology**

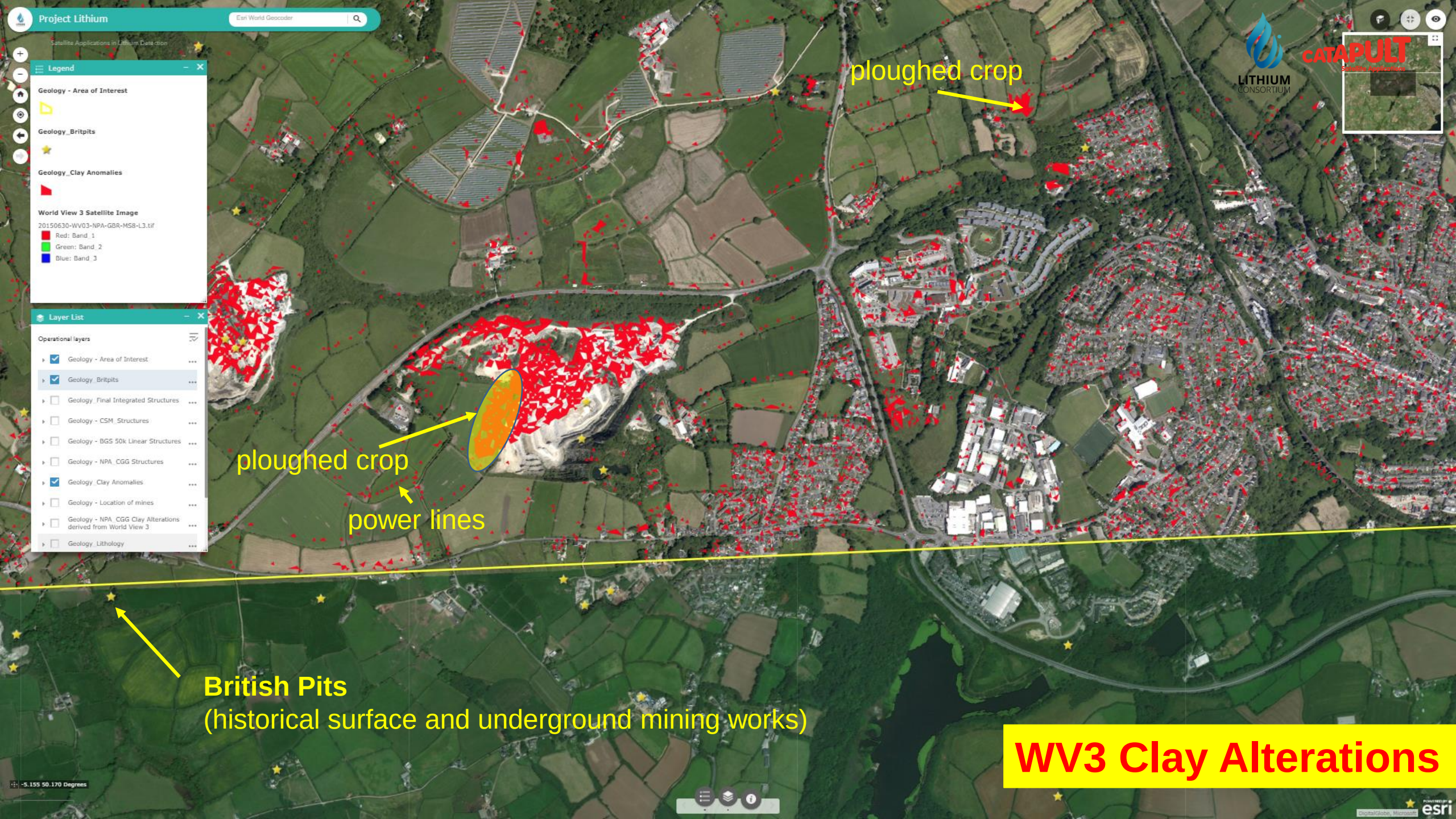
Vegetation

Faults

Environment

Data Integration and Analysis




Project Lithium
Esri World Geocoder
Satellite Applications in Lithium Detection
Legend
Geology - Area of Interest
Geology_Britpits
Geology_Clay Anomalies
World View 3 Satellite Image
20150630-WV03-NPA-GBR-MS8-L3.tif
Red: Band_1
Green: Band_2
Blue: Band_3
Layer List
Operational layers
Geology - Area of Interest
Geology_Britpits
Geology_Final Integrated Structures
Geology - CSM_Structures
Geology - BGS 50k Linear Structures
Geology - NPA_CGG Structures
Geology_Clay Anomalies
Geology - Location of mines
Geology - NPA_CGG Clay Alterations derived from World View 3
Geology_Lithology
ploughed crop
ploughed crop
power lines
British Pits
(historical surface and underground mining works)
LITHIUM CONSORTIUM
CATAPULT
-5.155 50.170 Degrees
WV3 Clay Alterations

# Lithium Exploration in the UK

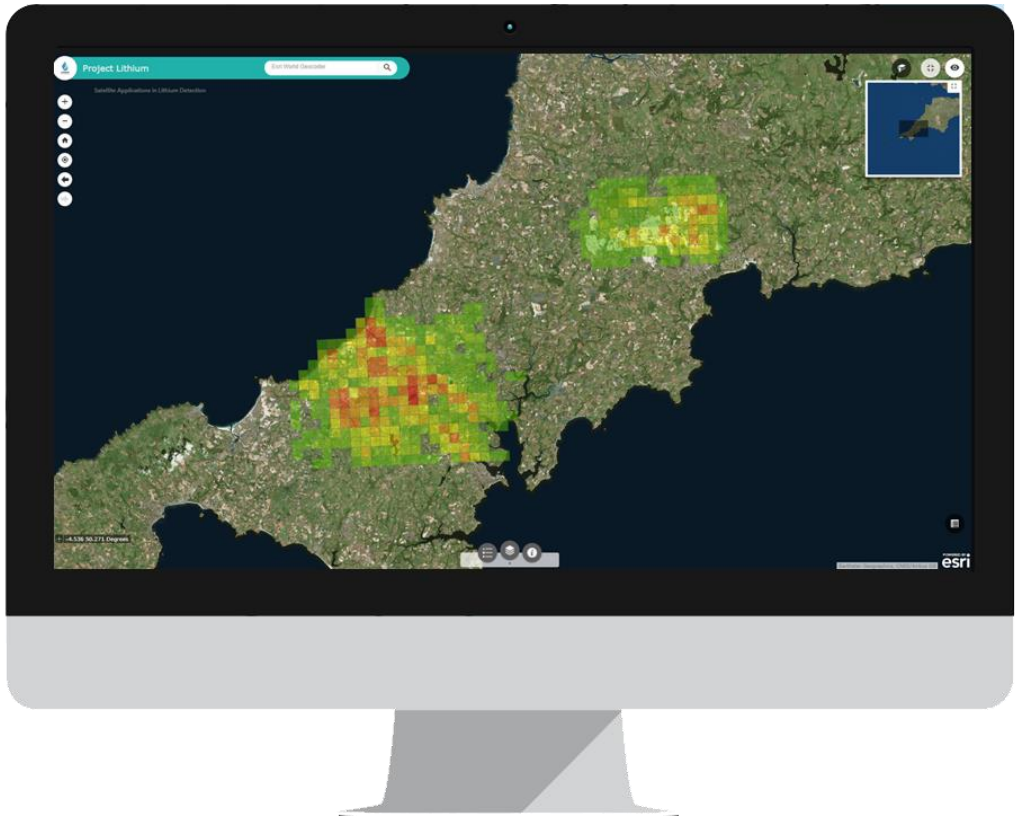
Geology

Vegetation

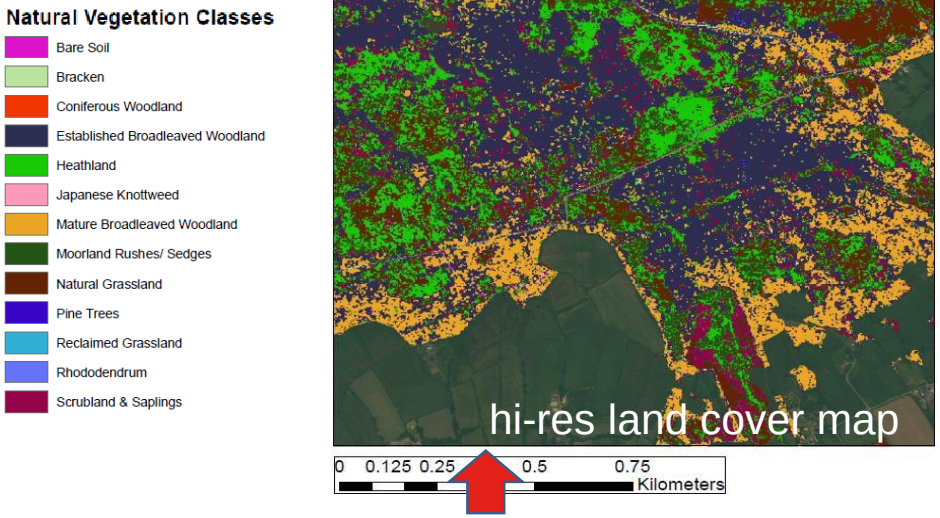
Faults

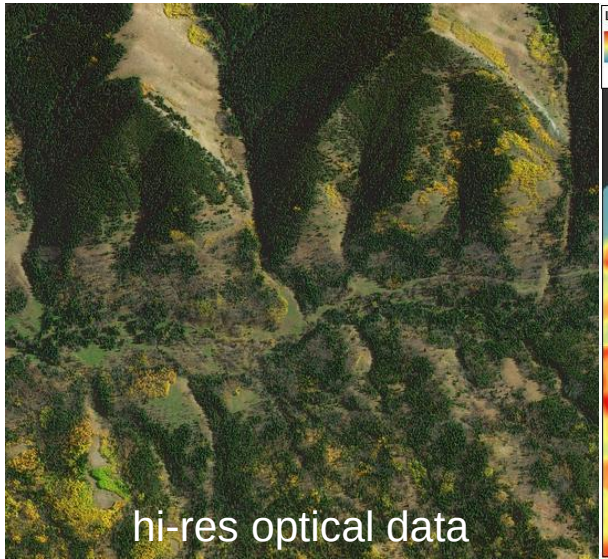
Environment

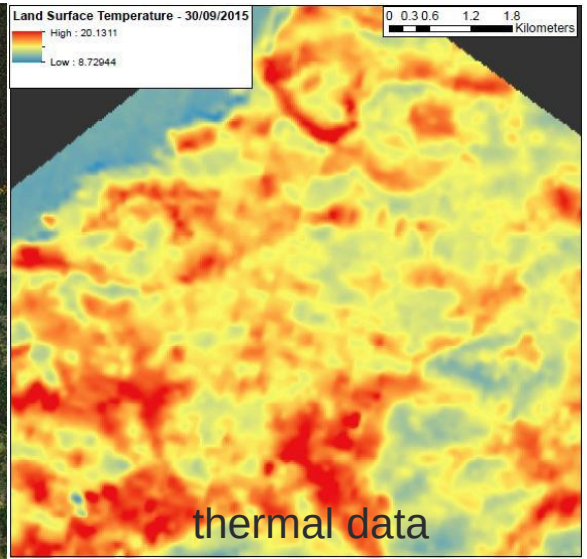
Data Integration and Analysis

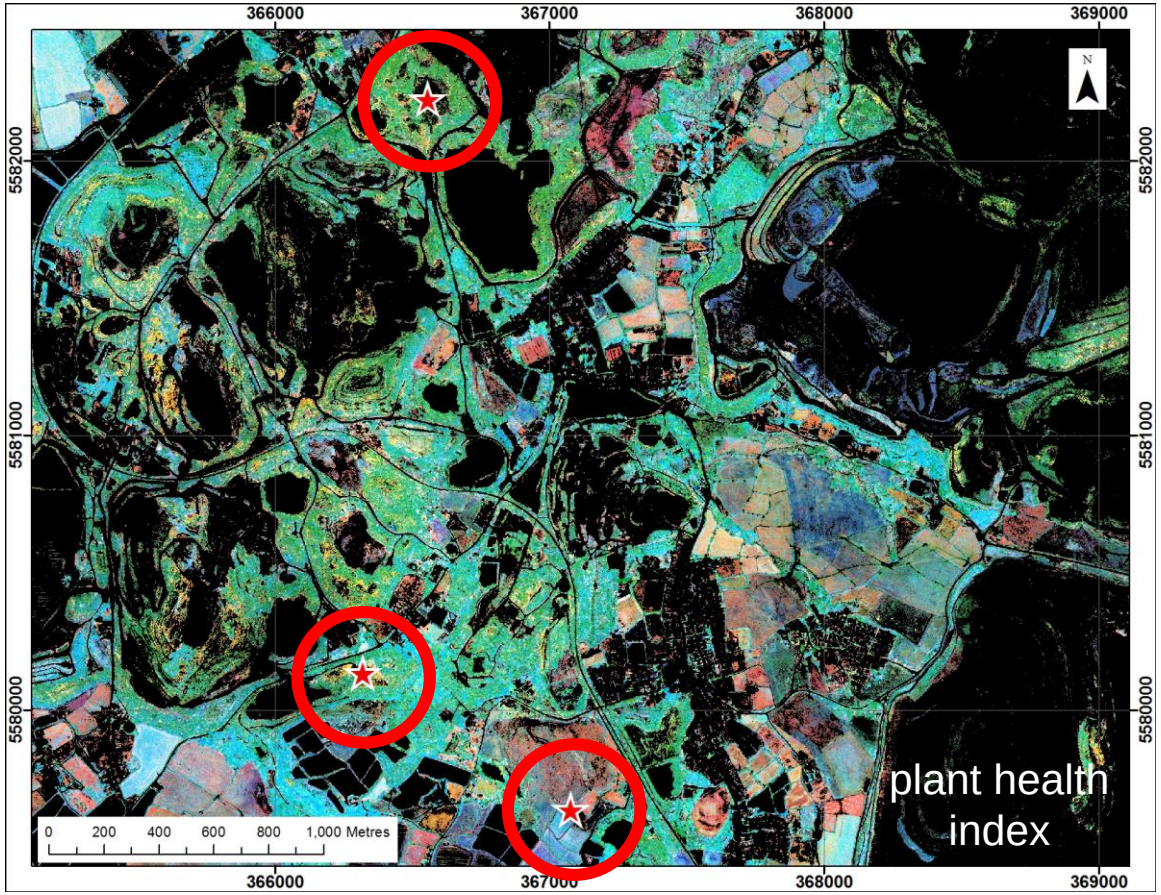


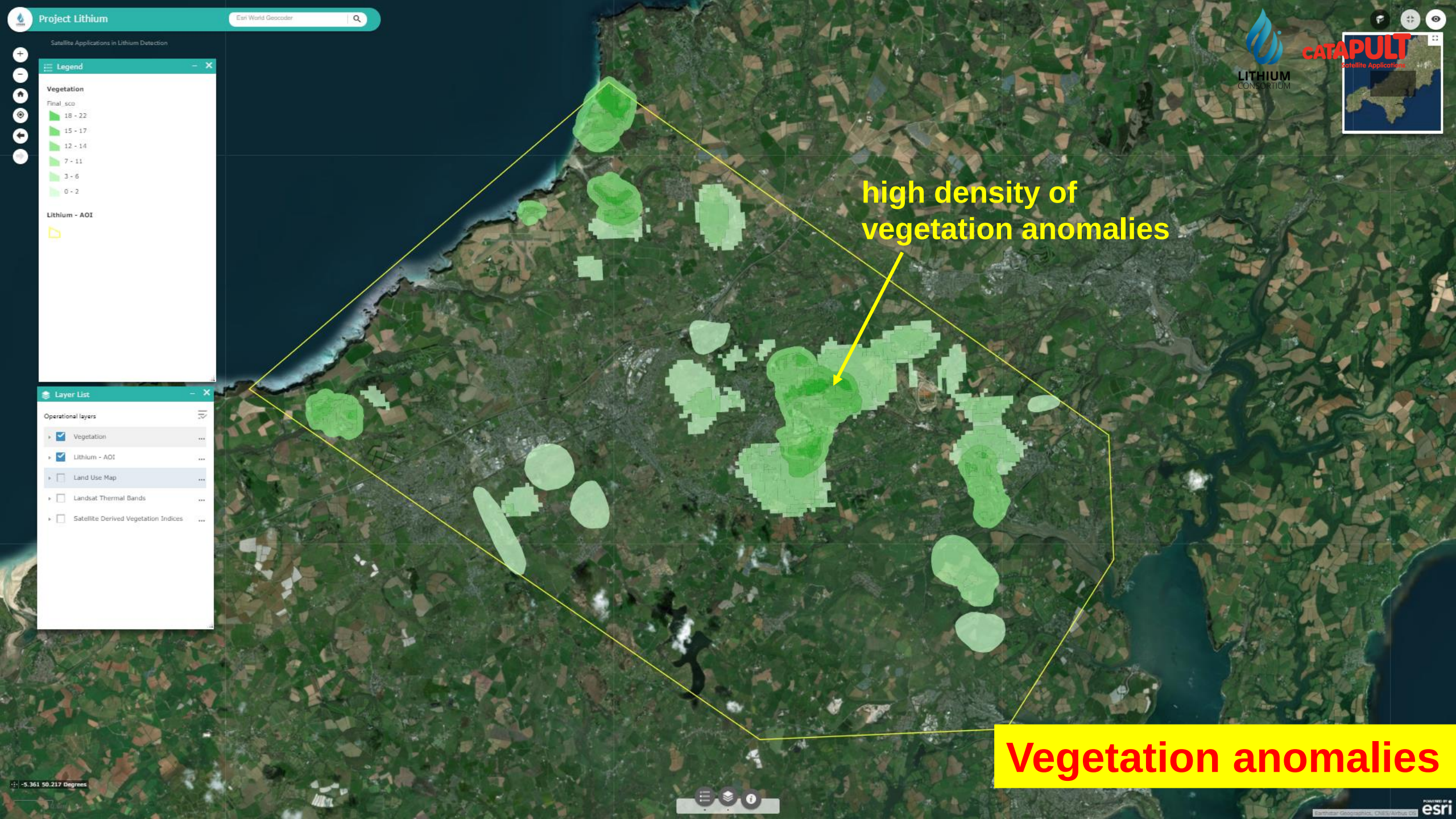
# Vegetation anomalies extraction




Project Lithium
Esri World Geocoder
Satellite Applications in Lithium Detection
Legend
Vegetation
Final_sco
18 - 22
15 - 17
12 - 14
7 - 11
3 - 6
0 - 2
Lithium - AOI
Layer List
Operational layers
Vegetation
Lithium - AOI
Land Use Map
Landsat Thermal Bands
Satellite Derived Vegetation Indices
LITHIUM CONSORTIUM
CATAPULT Satellite Applications
high density of vegetation anomalies
Vegetation anomalies
-5.361 50.217 Degrees
esri

# Lithium Exploration in the UK

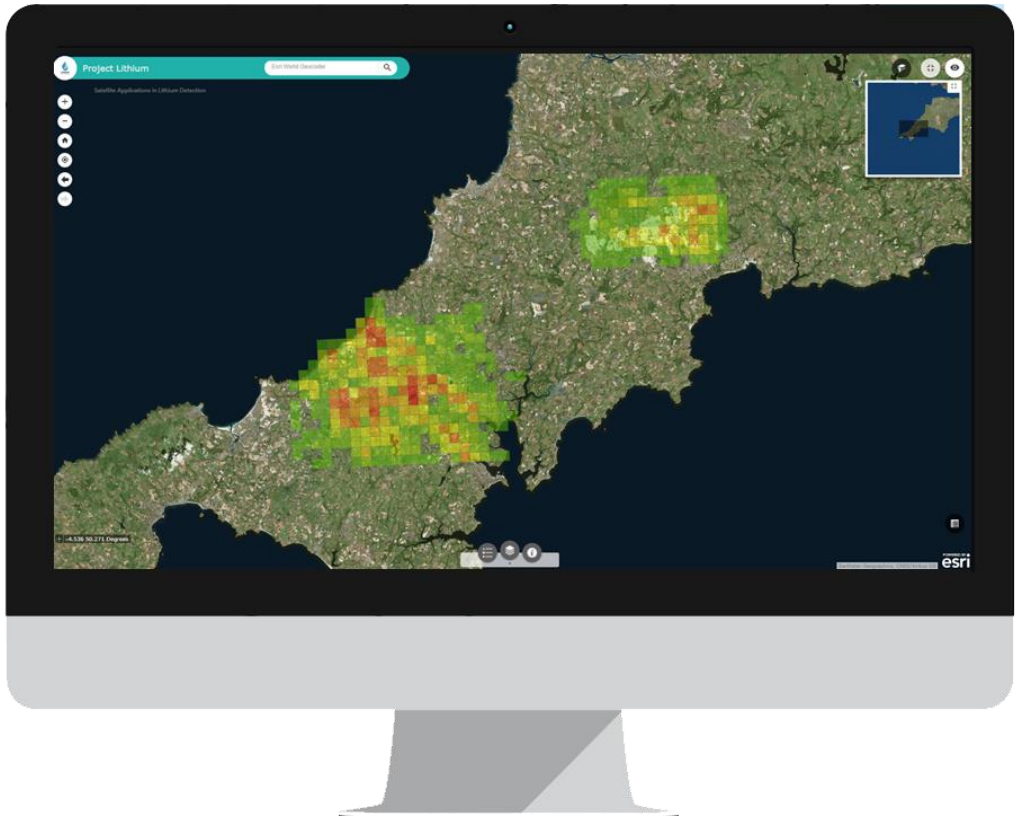
Geology

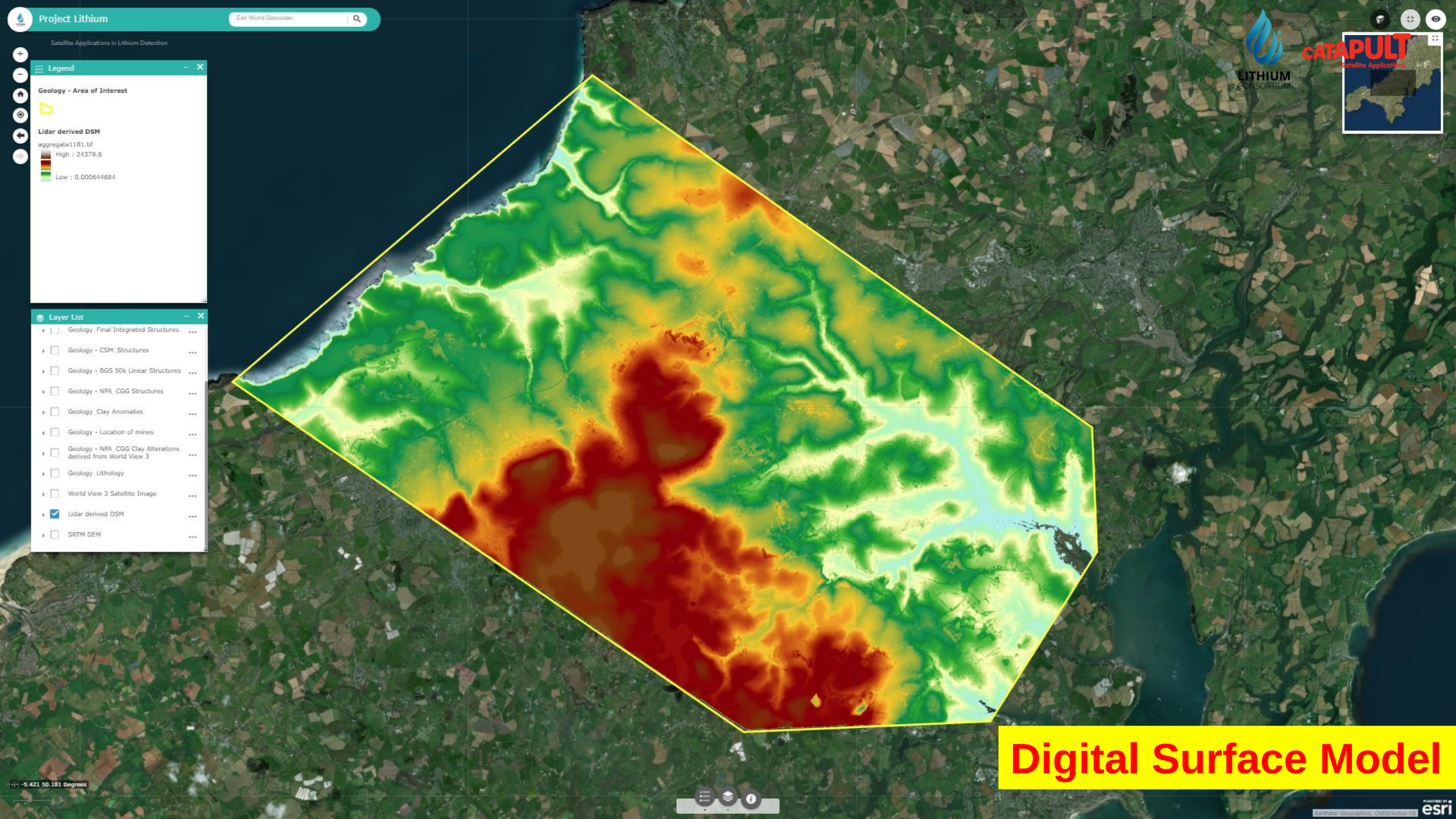
Vegetation

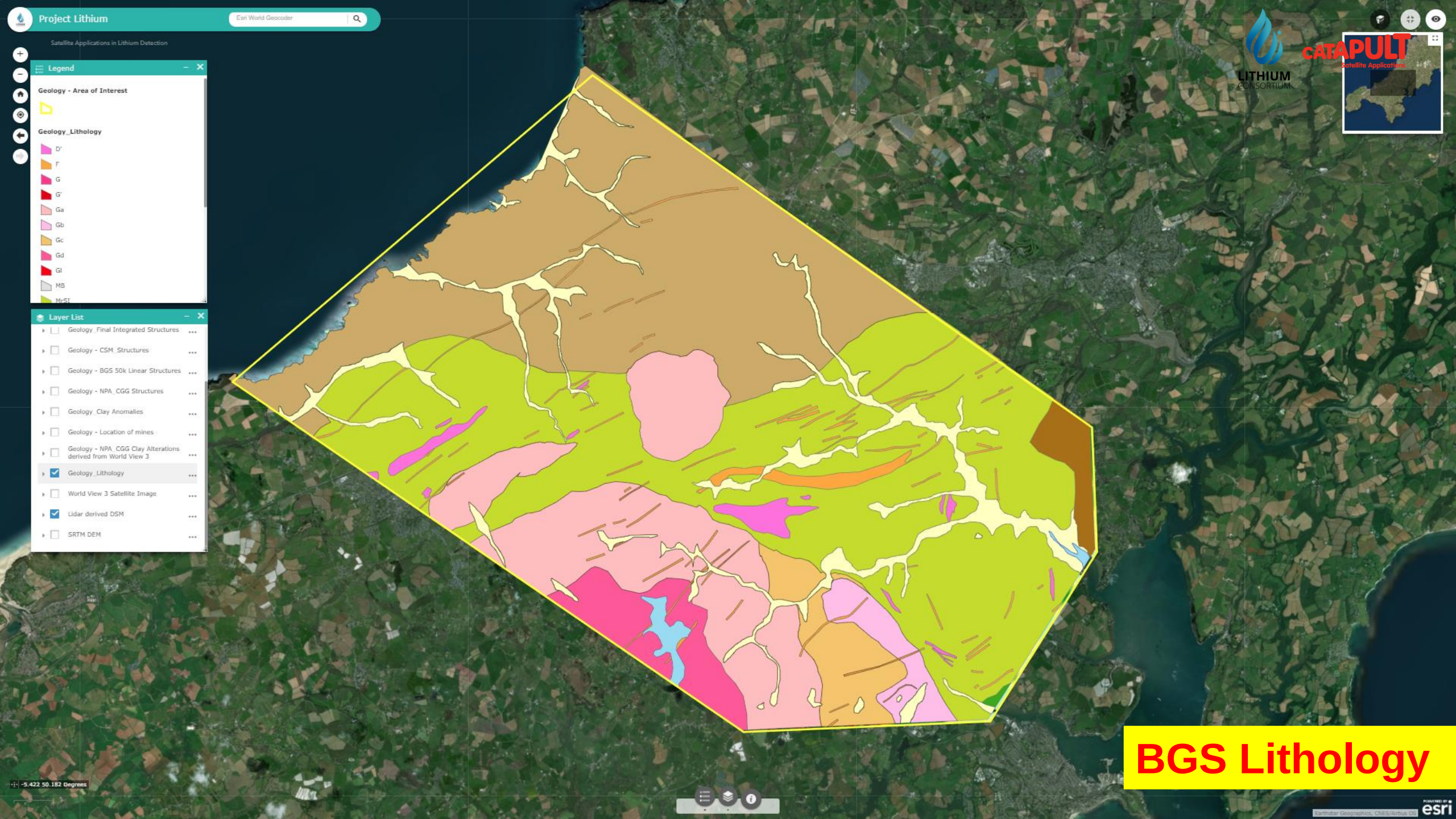
**Faults**

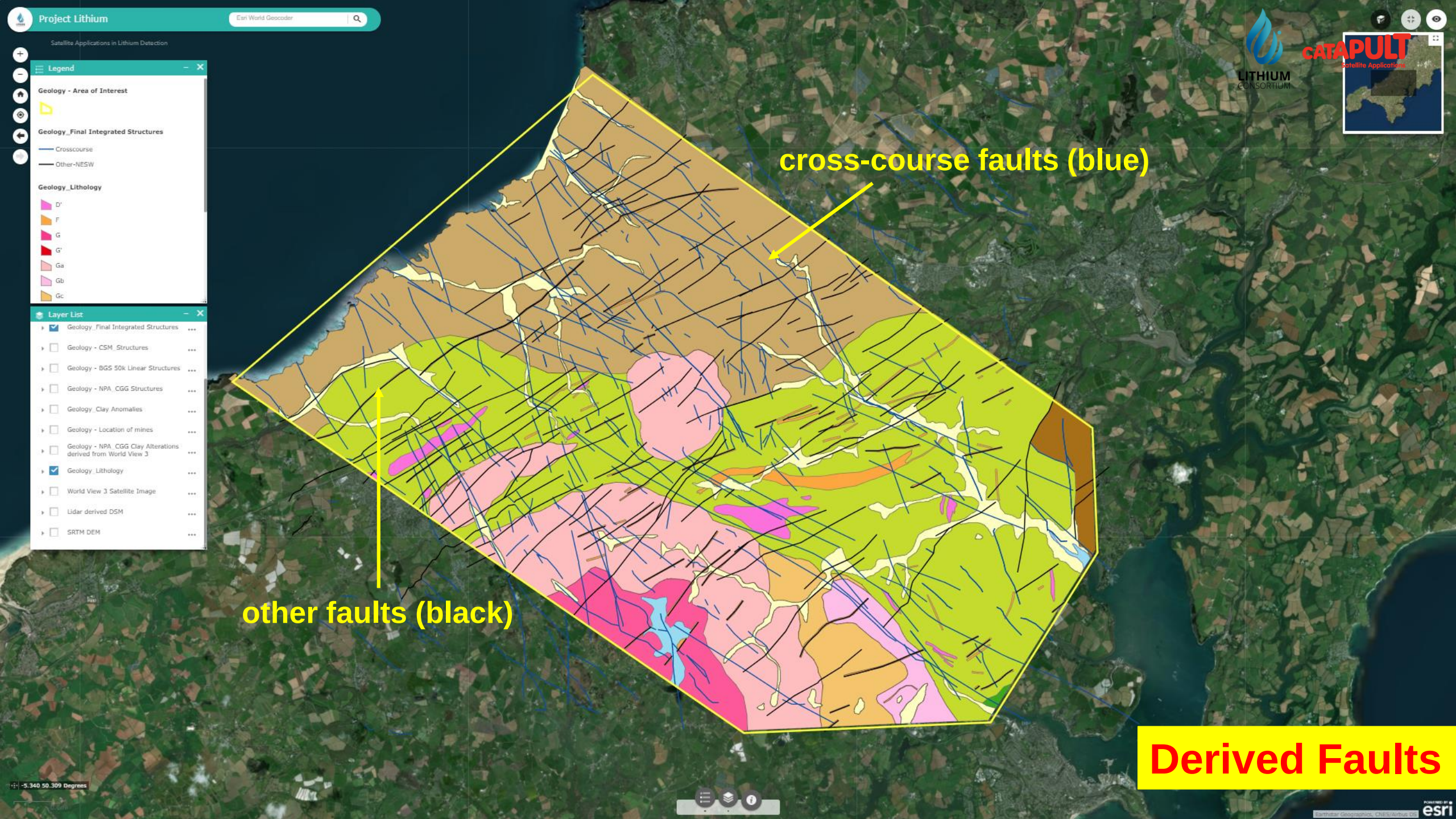
Environment

Data Integration and Analysis




Project Lithium
Esri World Geocoder
Satellite Applications in Lithium Detection
Legend
Geology - Area of Interest
Lidar derived DSM
aggregate1181.tif
High : 24379.6
Low : 0.000644684
Layer List
Geology_Final Integrated Structures
Geology - CSM_Structures
Geology - BGS 50k Linear Structures
Geology - NPA_CGG Structures
Geology_Clay Anomalies
Geology - Location of mines
Geology - NPA_CGG Clay Alterations derived from World View 3
Geology_Lithology
World View 3 Satellite Image
Lidar derived DSM
SRTM DEM
LITHIUM CONSORTIUM
CATAPULT
Satellite Applications
-5.421 50.181 Degrees
Digital Surface Model
esri


Project Lithium
Esri World Geocoder
Satellite Applications in Lithium Detection
Legend
Geology - Area of Interest
Geology_Lithology
D'
F
G
G'
Ga
Gb
Gc
Gd
Gl
MB
MrSI
Layer List
Geology_Final Integrated Structures
Geology - CSM_Structures
Geology - BGS 50k Linear Structures
Geology - NPA_CGG Structures
Geology_Clay Anomalies
Geology - Location of mines
Geology - NPA_CGG Clay Alterations derived from World View 3
Geology_Lithology
World View 3 Satellite Image
Lidar derived DSM
SRTM DEM
LITHIUM CONSORTIUM
CATAPULT
Satellite Applications
-5.422 50.182 Degrees
BGS Lithology
esri


Project Lithium
Esri World Geocoder
Satellite Applications in Lithium Detection
Legend
Geology - Area of Interest
Geology_Final Integrated Structures
Crosscourse
Other-NESW
Geology_Lithology
D'
F
G
G'
Ga
Gb
Gc
Layer List
Geology_Final Integrated Structures
Geology - CSM_Structures
Geology - BGS 50k Linear Structures
Geology - NPA_CGG Structures
Geology_Clay Anomalies
Geology - Location of mines
Geology - NPA_CGG Clay Alterations derived from World View 3
Geology_Lithology
World View 3 Satellite Image
Lidar derived DSM
SRTM DEM
LITHIUM CONSORTIUM
CATAPULT Satellite Applications
cross-course faults (blue)
other faults (black)
Derived Faults
-5.340 50.309 Degrees
esri

# Lithium Exploration in the UK

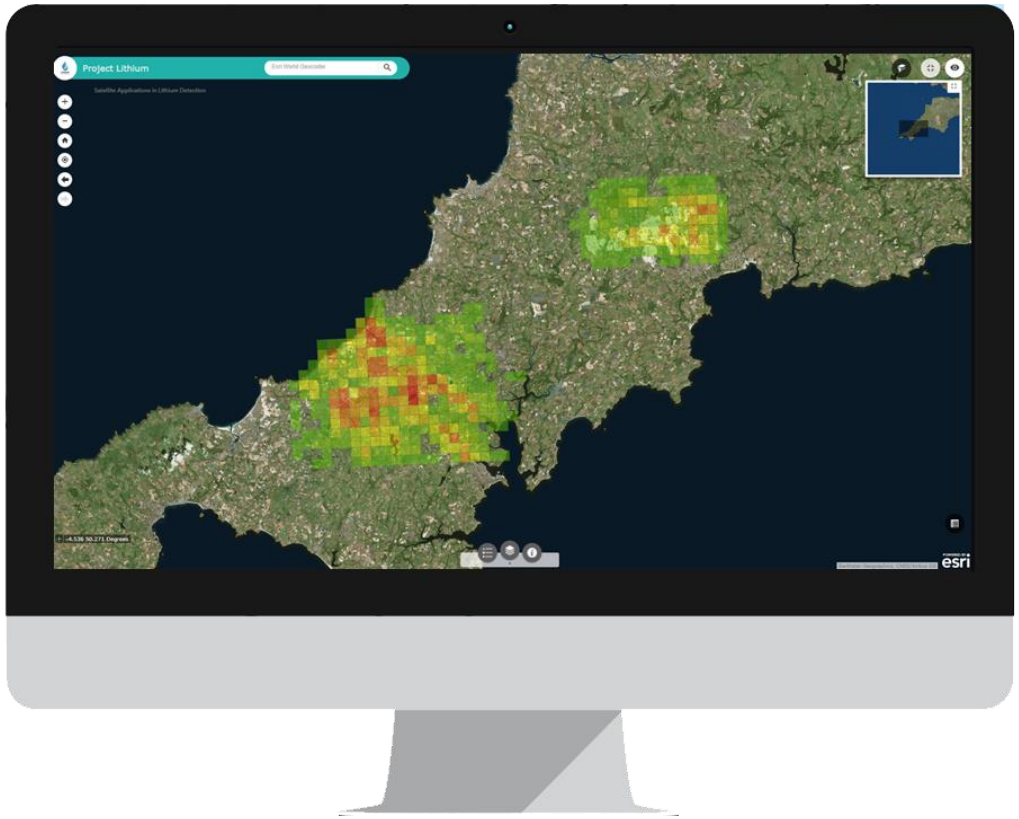
Geology

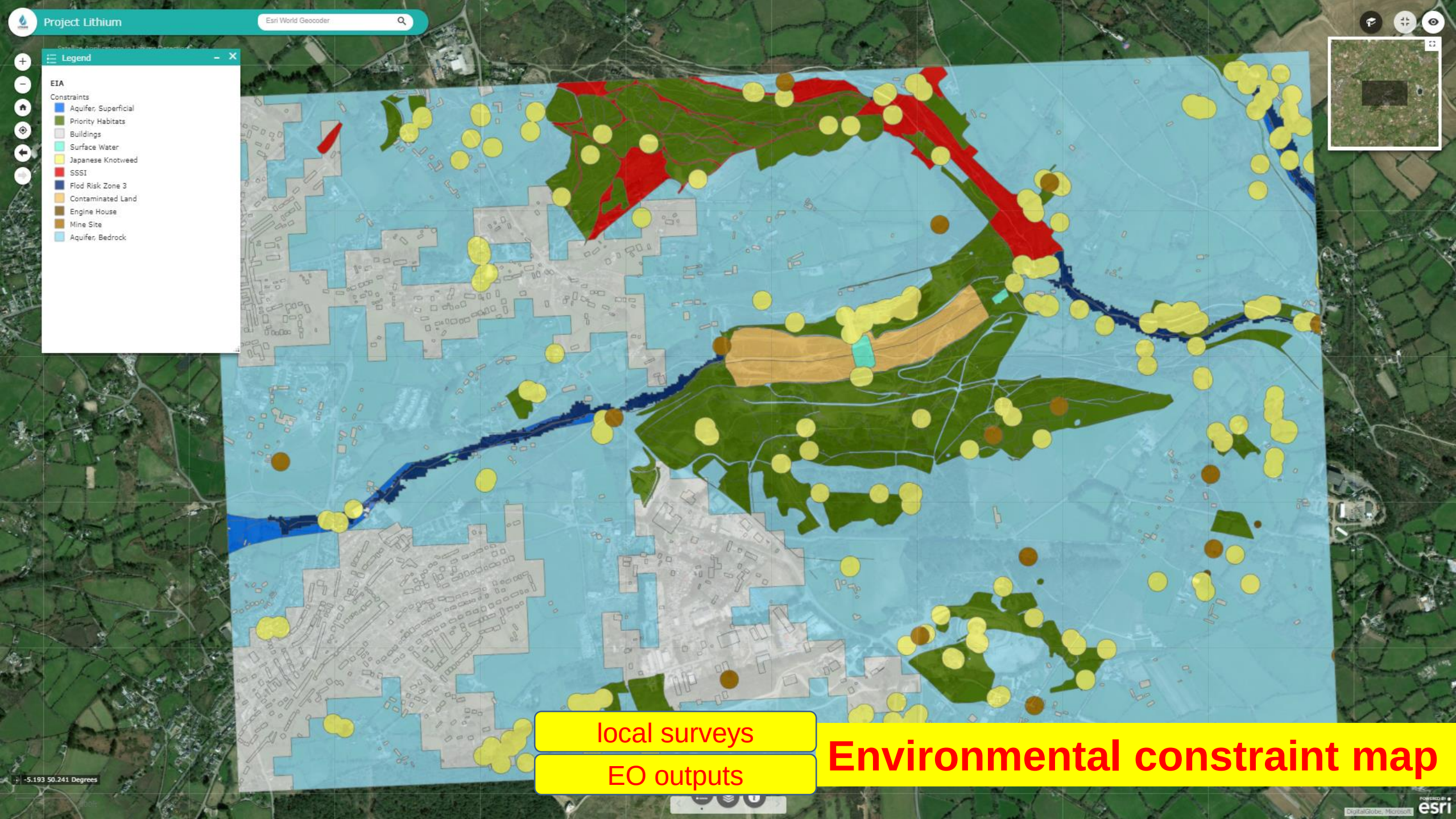
Vegetation

Faults

**Environment**

Data Integration and Analysis




Project Lithium
Esri World Geocoder
Legend
EIA
Constraints
Aquifer, Superficial
Priority Habitats
Buildings
Surface Water
Japanese Knotweed
SSSI
Flod Risk Zone 3
Contaminated Land
Engine House
Mine Site
Aquifer, Bedrock
-5.193 50.241 Degrees
local surveys
EO outputs
Environmental constraint map
DigitalGlobe, Microsoft
esri

# Lithium Exploration in the UK

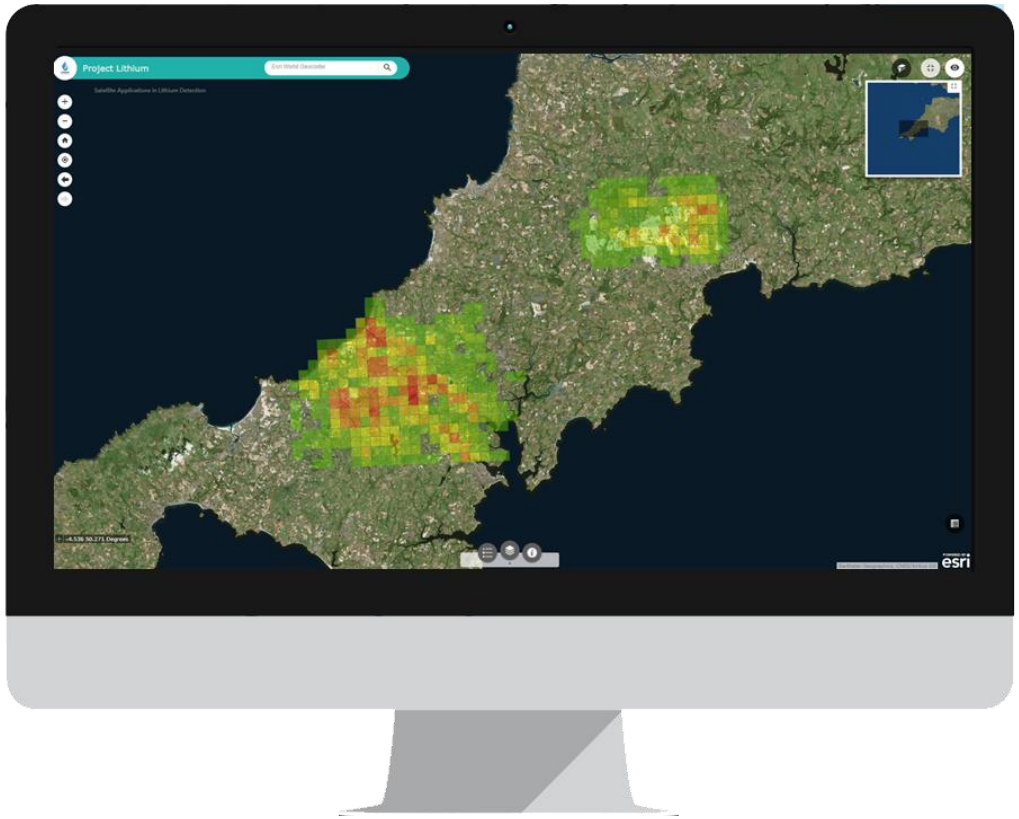
Geology

Vegetation

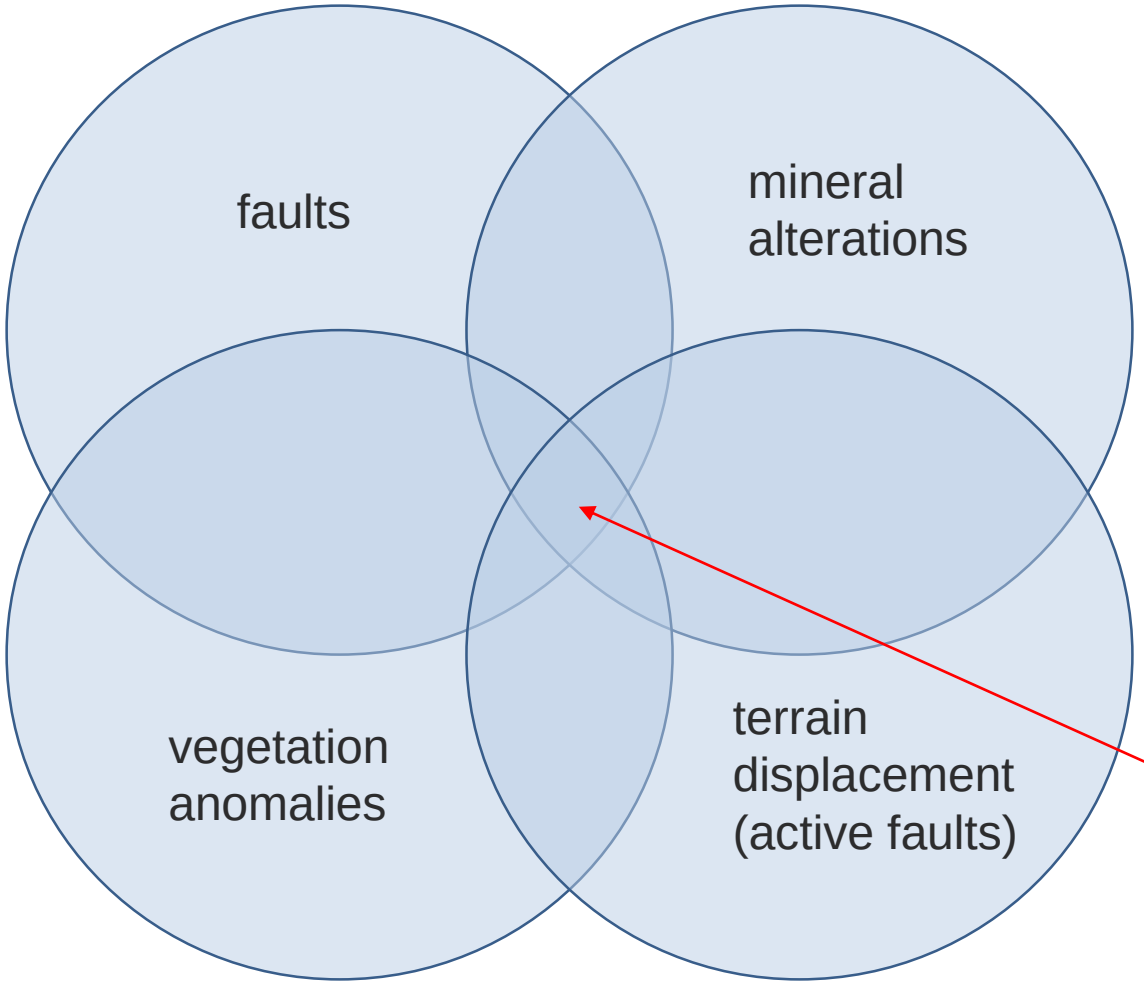
Faults

**Environment**

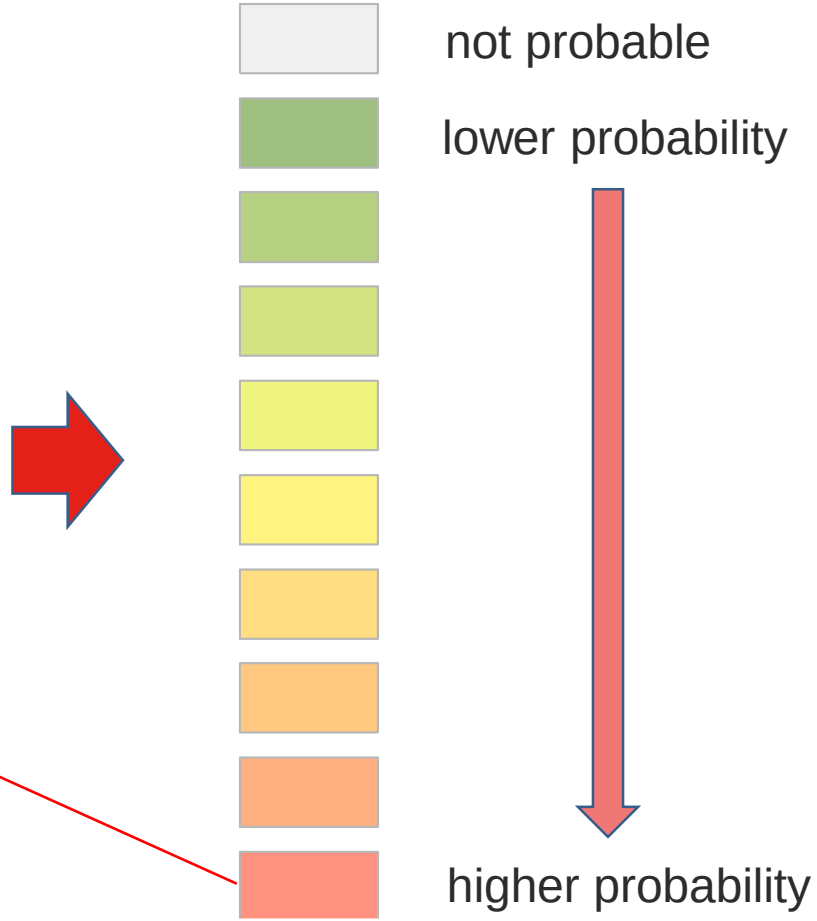
**Data Integration and Analysis**



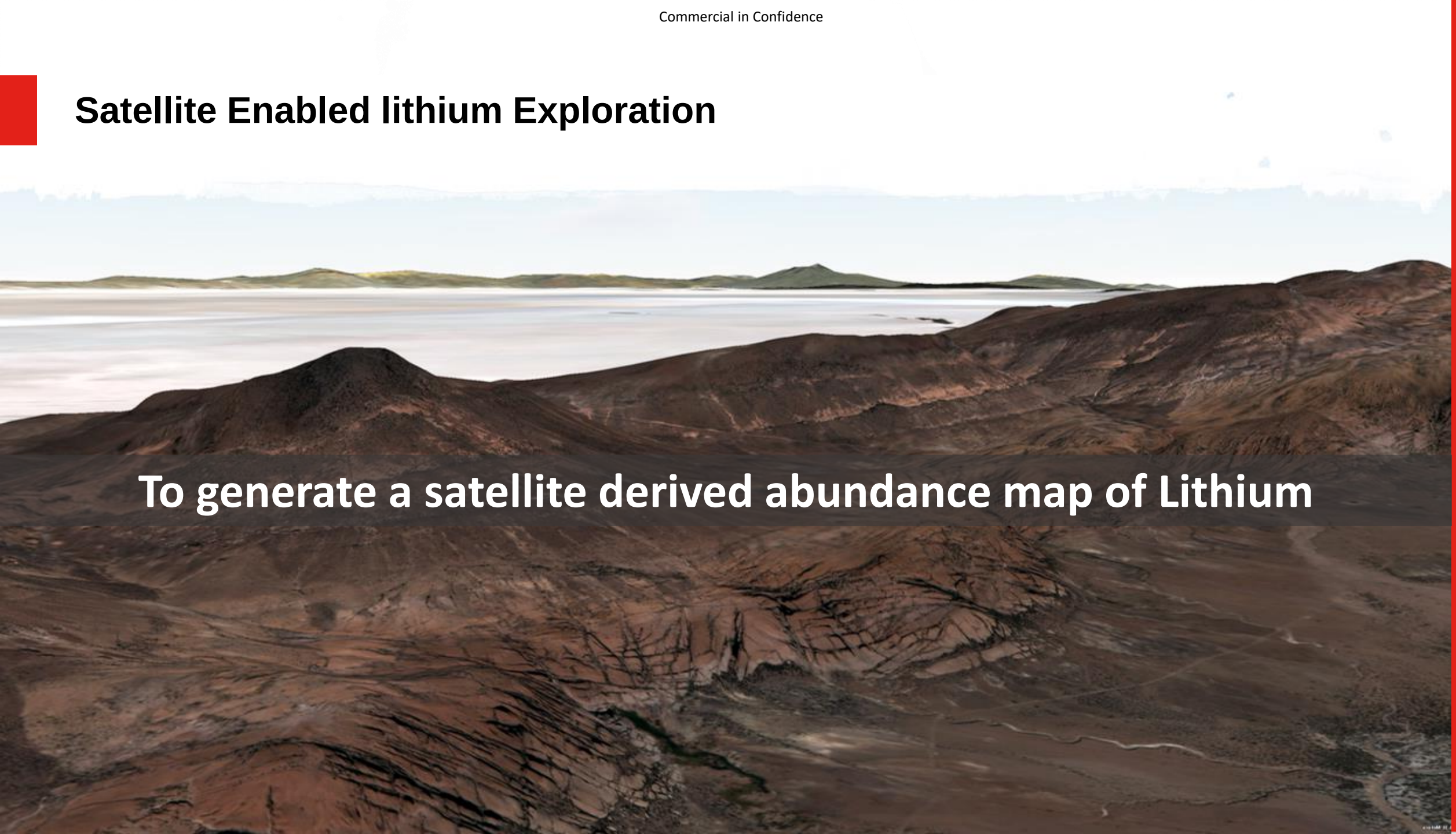
# Prospectivity map



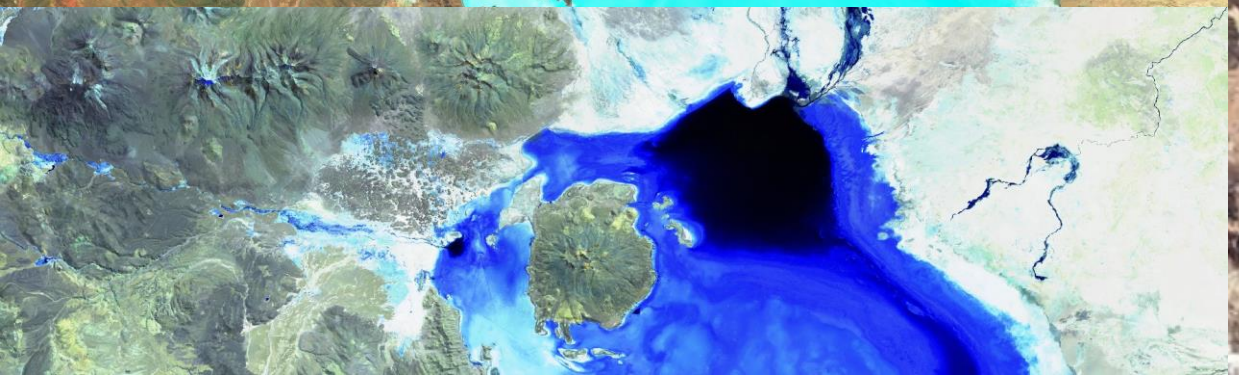

**1 sqkm probability of Li occurrence**



# Satellite Enabled lithium Exploration



**To generate a satellite derived abundance map of Lithium**




SATELLITE ENABLED LITHIUM EXPLORATION TOOL
HOME
ABOUT
SATELLITE IMAGERY OVERLAY ▼

# Socio-environmental Considerations

**Sustainable extraction of lithium is key**

# Thank you

**Contact:**
The Extractive Industries Team
Extractives@sa.catapult.org.uk

We work with Innovate UK

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