



NASA via Wikipedia

# Towards automated high-resolution burned area mapping of complex small scale fires in the UK with PLANET data

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Philip Platt via Wikipedia

**NERC NCEO EOCIS Programme with the following partners**



Rutherford Appleton Laboratory



**PML** | Plymouth Marine Laboratory



THE UNIVERSITY OF EDINBURGH



## The UK has a wildfire problem – several Govt. Departments



EARTH OBSERVATION CLIMATE  
INFORMATION SERVICE

Canford Heath-2022



Dartford-2022



London-2022



Winter Hill-2018



## Objectives

A fully automated, Near Real Time (NRT) and Non-Time Critical (archive), burned area map service for the UK

- **Daily temporal resolution** – because fires in the UK do not burn for weeks (at the moment)
- **Sufficient spatial resolution** – so that boundaries between buildings and other objects are clear
- **Triggered by alerts from various sources** – because one detection alert system is not sufficient
- **Cloud based** – IT solutions can be stood up 24/7 and outputs created
- **Tailored and controllable** - Users can upload areas of interest

# Previous work


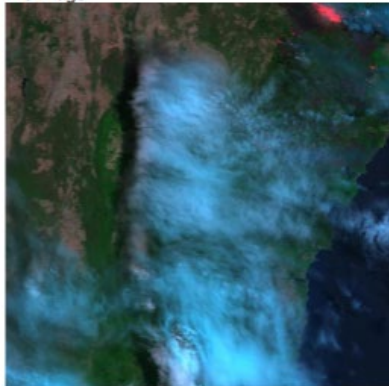
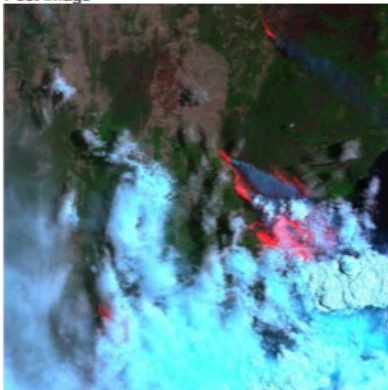
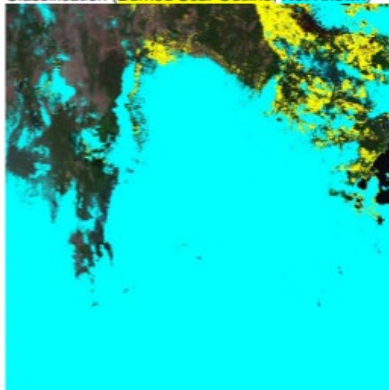
## ESA funded project in Australia:

Sentinel 2 data (10m resolution)

A number of Machine Learning solutions investigated

Evaluated against ground reference polygons from several sources



ID: S2A_20191221_S2A_20191231_T55HGA_R030		Time interval: 10		Major Biome: Forest	
Tile Location		Pre-image			
					
Post-image		Classification (Burned Scar Outline, Not Known)			
					
Pre-image: Cloud/Shadow Y Thin Cirrus Y Smoke haze Y Pre-image burns Y Active burning Y		Post-image: Cloud/Shadow Y Thin Cirrus Y Smoke haze Y Active burning Y			
Strengths: Complex image with lots of cloud, shadows and haze. Pre-burned area, hotspots.		Limitations: Maybe some small commission around the edges of the clouds/shadows, but could be burned also.			
Contains: Agriculture, open lands, coasts, ocean.					
Interesting observations for publicity: Complex burning scenarios. Apocalyptic scenes.					



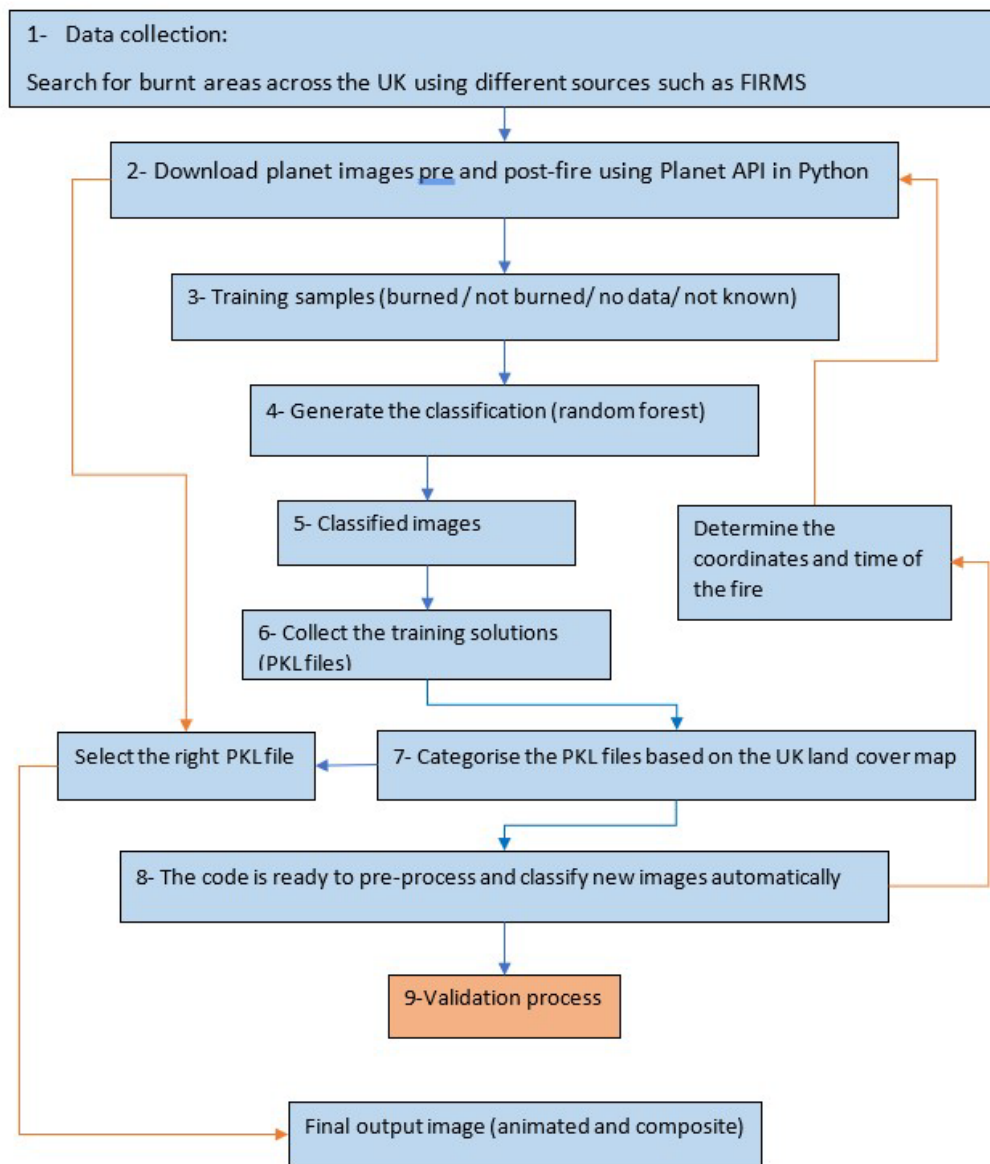
# Why use Planet data for UK burned area mapping?



- **High Spatial Resolution:** Planet's satellites provide high-resolution imagery, allowing for detailed mapping of habitats affected by wildfire.
- **Frequent Updates:** Unlike Sentinel-2, Planet's constellation of satellites captures imagery frequently, often daily or even multiple times per day (we see up to 3 per day in the UK), ensuring that wildfire mapping data is kept up-to-date. This is useful for monitoring dynamic wildfires as UK wildfires are relatively short-lived.
- **Multi-Spectral Imaging:** Planet's satellites capture imagery in multiple spectral bands, including visible, near-infrared, and shortwave infrared

# Project Method Flowchart

## Training & Operational Elements



EARTH OBSERVATION CLIMATE  
INFORMATION SERVICE

Training file  
selected based  
on land cover  
assessment

Validation  
against EFFIS &  
agency  
reference data

# UK land cover map and training site locations

Training areas from  
0.3km<sup>2</sup> to 15km<sup>2</sup>

## Classes burned:

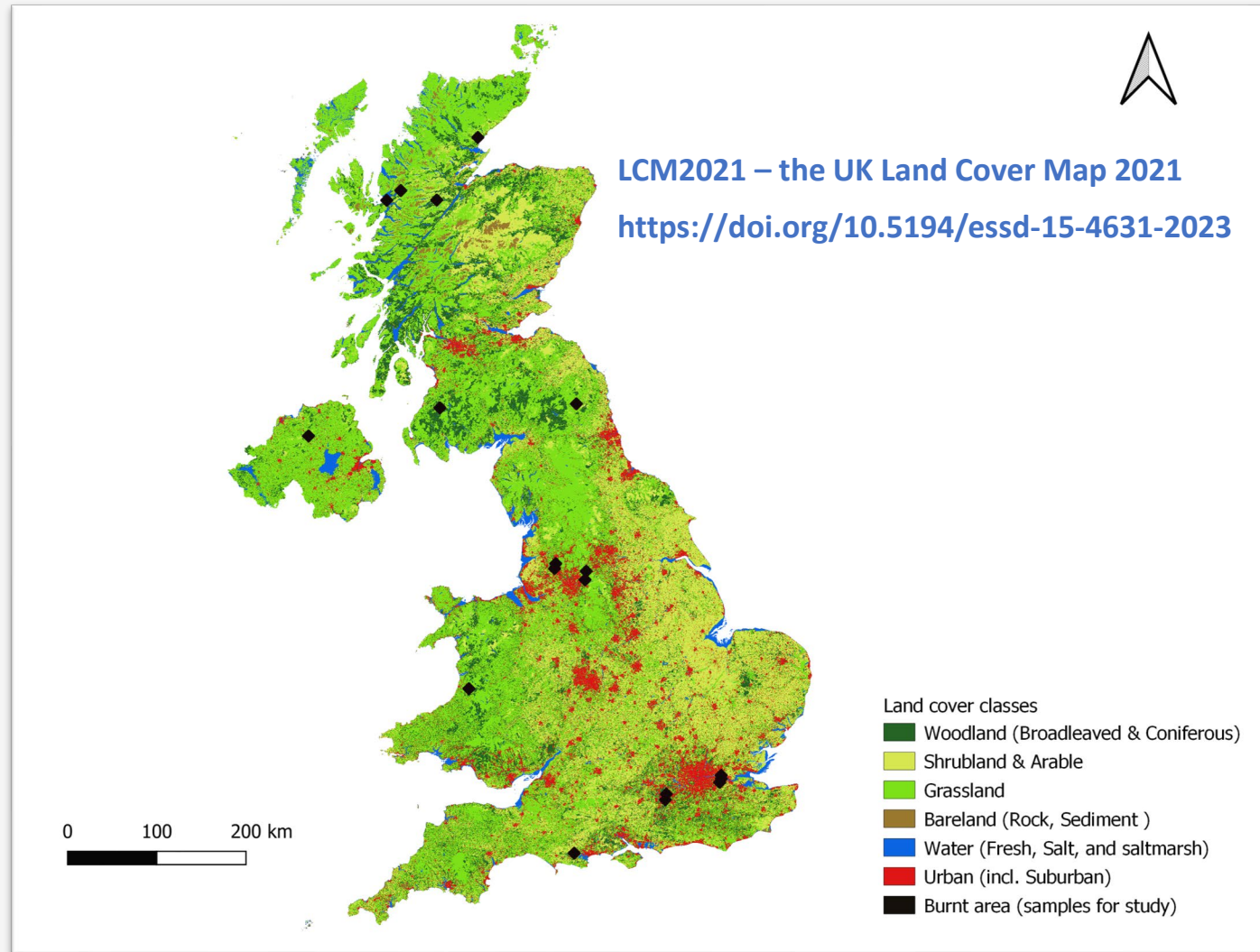
Woodland  
Shrubland  
Arable  
Grassland  
Urban

## Labelling:

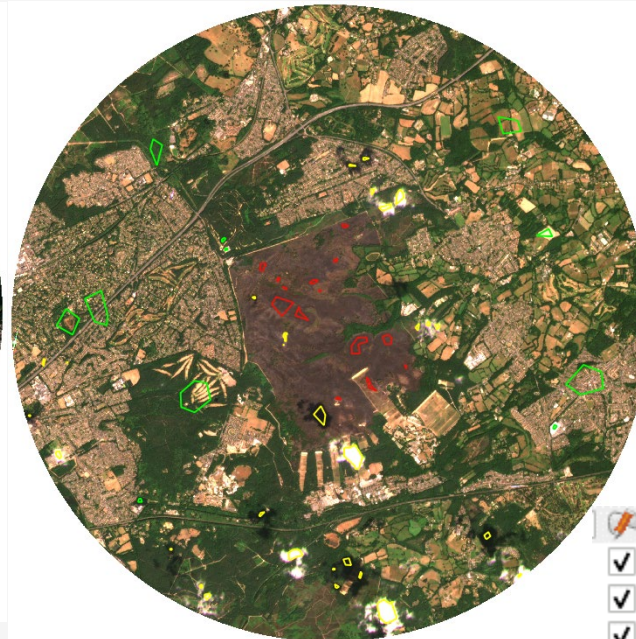
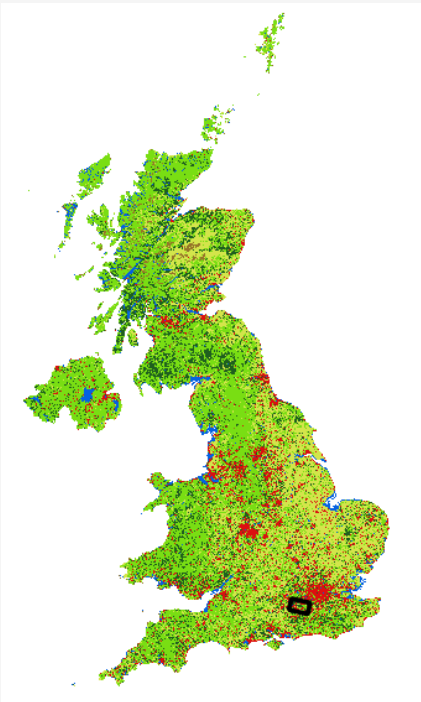
Cloud, Shadows, Haze,  
Smoke into a  
Not Known class

Burned area

Not-burned area



# TRAINING



	<b>training [56]</b>
<input checked="" type="checkbox"/>	Burned [14]
<input checked="" type="checkbox"/>	No-data [0]
<input checked="" type="checkbox"/>	Not burned [11]
<input checked="" type="checkbox"/>	Not known [30]

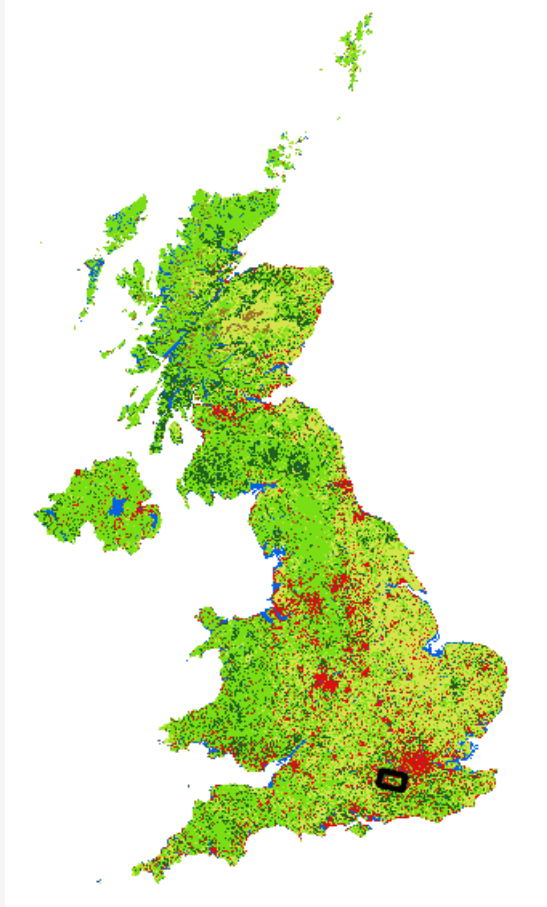


# BA Mapping Result 1

**Pre**



**Post**

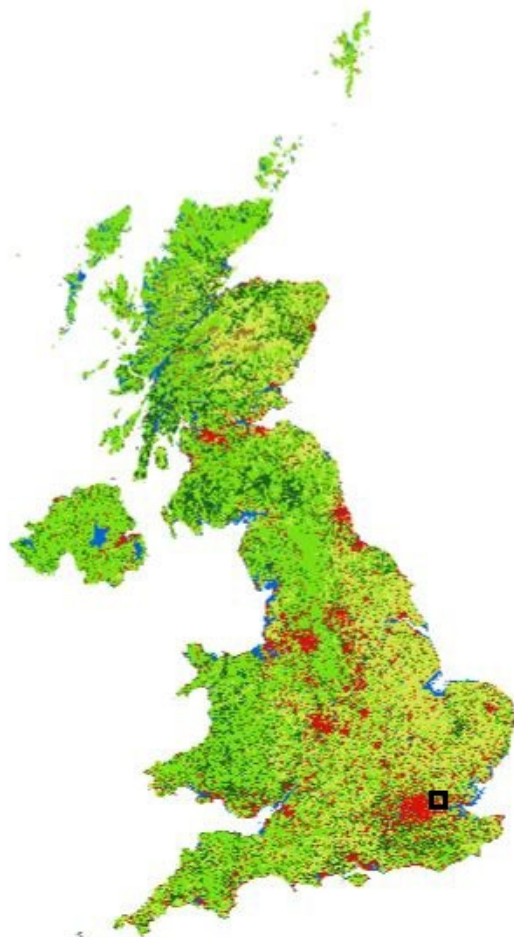


# BA Mapping Result 2

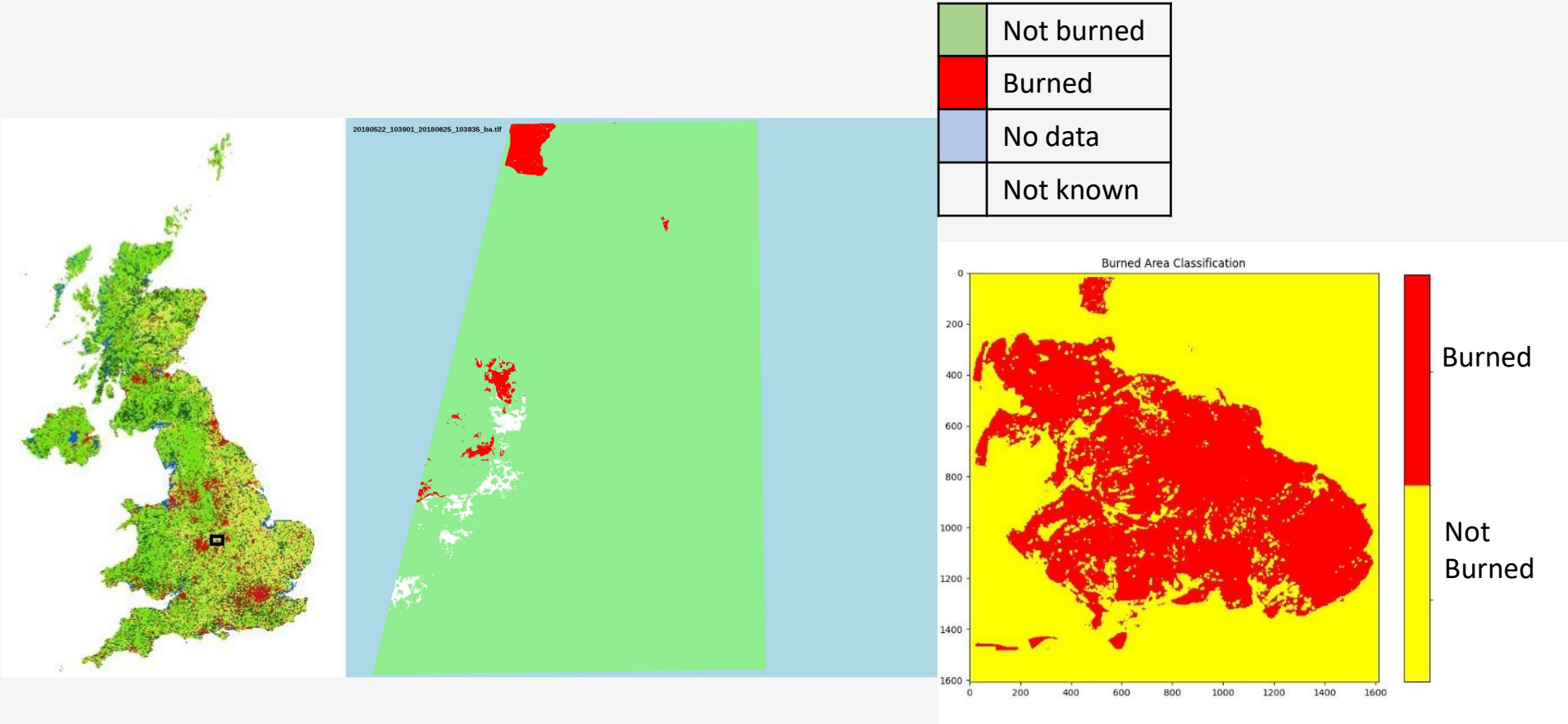
**Pre**



**Post**

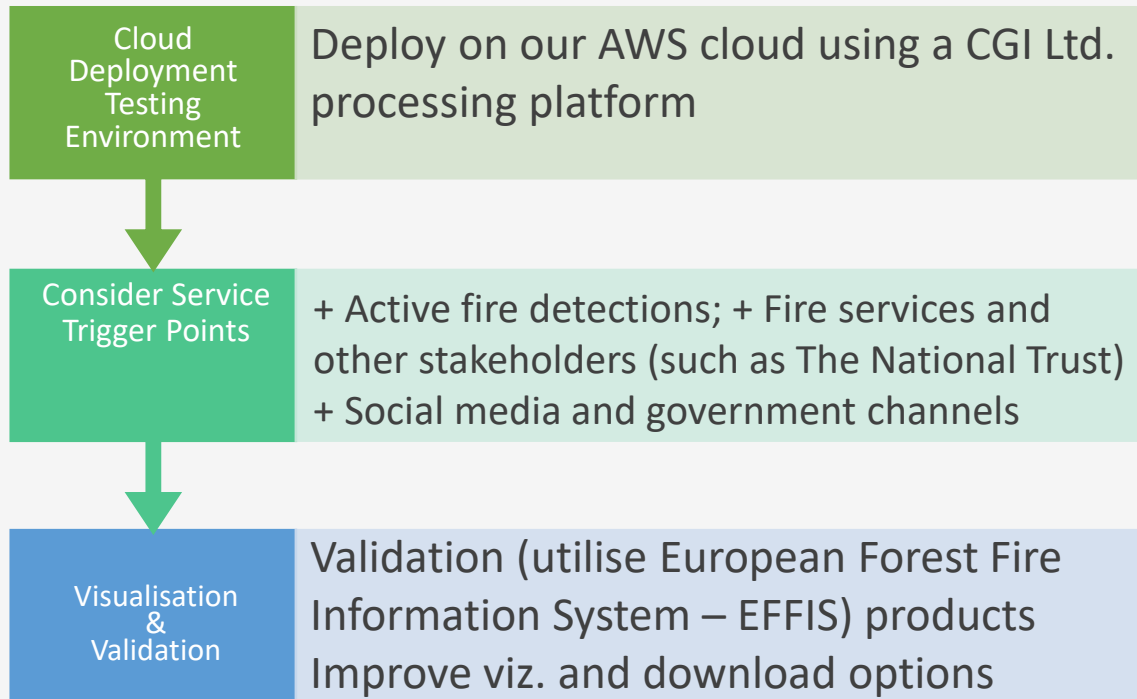


# BA Mapping Result – Temporal evolution of a UK wildfire





# SERVICE CONCEPT – NEXT STEPS



Insert Name | Add email address  
| Add University/Institution



# THANK YOU



Smoke from the wildfire at Cannich can be seen from space (Nasa worldview/PA)



Source: WEST YORKSHIRE FIRE AND RESCUE SERVICE