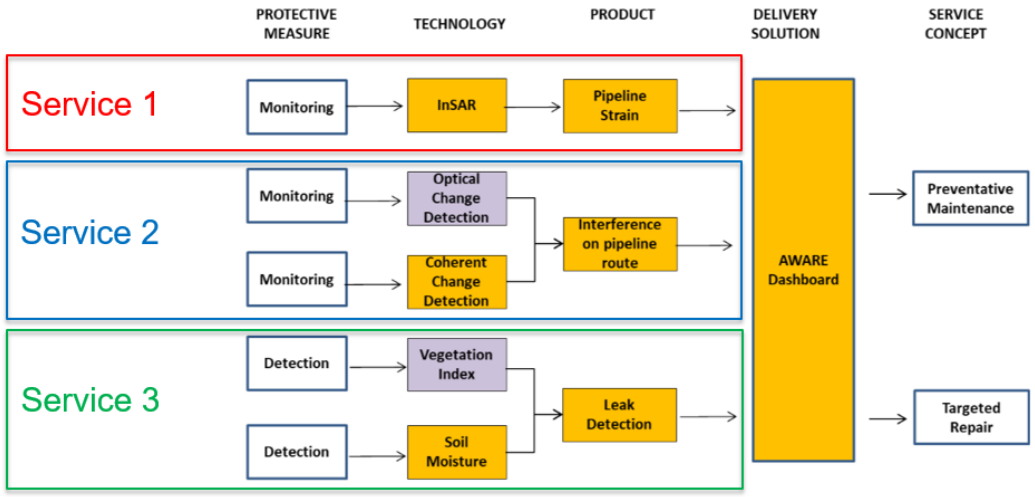
Space for clean and safe management of Pipelines Water Leakage using satellite data to provide new services

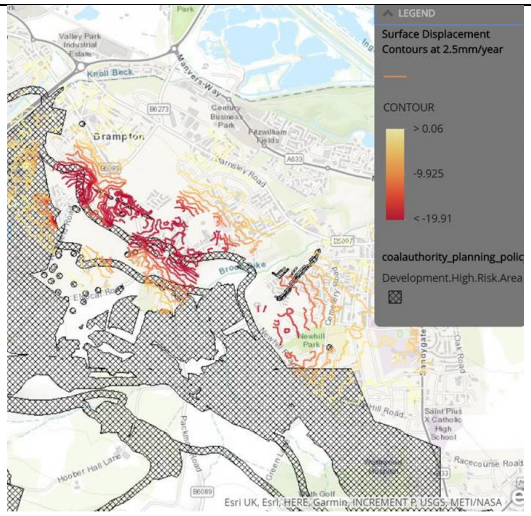
- **Aim**: this project funded by the European Space Agency (ESA) focuses in the development of **three complimentary new space-enabled services in the water sector**, to support a more robust, repeatable, accurate and independently verifiable performance metrics in relation to clean water leakage, by developing measures that predict water leaks, detect water leaks and highlight areas of possible water pipeline interference.
- **Outcomes**: The three-space technology based proposed services are as follows:
    - Service 1 A predictive analysis of water pipeline structural health
    - Service 2 Early warning related to water pipeline interference
    - Service 3 Near-real time situational awareness of network water leaks



- **Value proposition**: The proposed services aim to deliver better informed and effective protective services than are available today by:
    - Providing water companies a service into their operational framework for managing their strategic water leak reduction targets at or above 15% by 2025 (OFWAT).
    - Allowing focused infrastructure upgrades based on greatest needs prioritisation, hence better management of maintenance cost and capital investments.
- **Use case for Water Utility Services with EO technologies**:
    - **Non-invasive**: all information is produced remotely using satellite imagery avoiding disruptions on site.
    - **Multiple asset monitoring**: covering very large areas with a single satellite image.
    - **Repeatability and coverage rates**: with currently daily revisit rates, but likely approaching every 2 to 3 hours (for SAR and optical) in the next few years.
    - **Precision**: by detecting very small, potentially invisible motions or anomalies as critical early warning indicator.

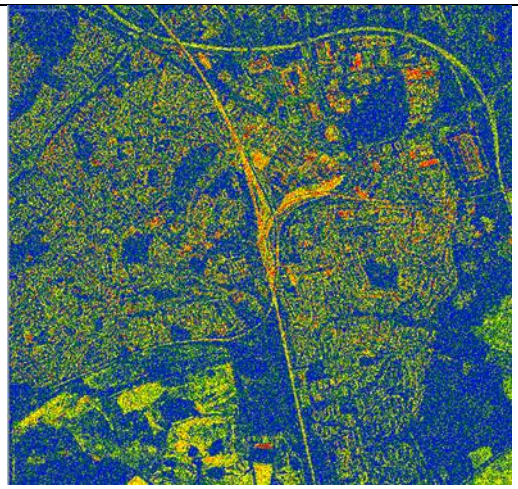
The three proposed services are illustrated in the figures below showing actual case study examples by the participating companies.

Service 1 A predictive analysis of water pipeline structural health



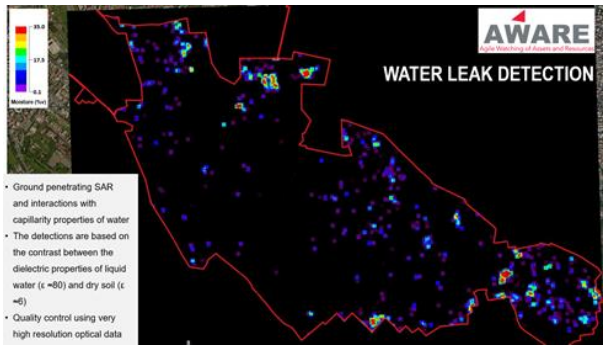
Ground motion gradients for pipeline strain calculations with underlying coal mines seams.

Service 2 Early warning related to water pipeline interference

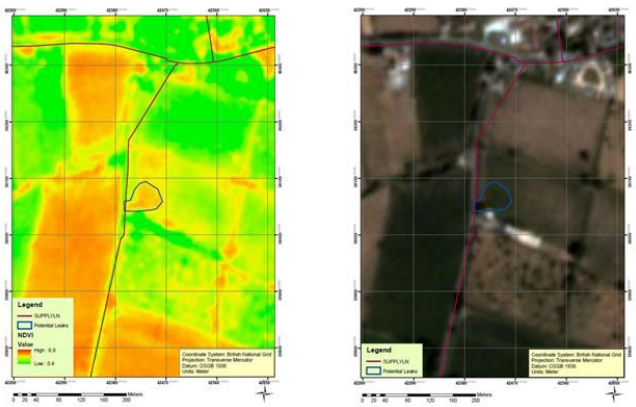


Change Detection Map

Service 3 - near-real time situational awareness of network water leaks and flow rate.



Soil moisture dataset derived from L-band ALOS2 analysis.



Leak site identified by NDVI analysis (left) and indicated on map (right).