

Earth Observation (EO) for Forestry, Woodland, Hedgerows and Trees

Earth Observation has been used successfully for monitoring forests at coarse scales globally for decades. Trees have structure and scale that can be detected using EO with optical data providing current services but radar offering more potential. Lidar is the ideal solution but high cost. This document highlights three examples and indicates their ease of adoption.

Operational Service: OS Landscape Features Layer: Hedgerows



Uses high resolution aerial imagery and height information with machine learning to automatically capture hedges for input into the Ordnance Survey Landscape Features Layer. Updated regularly and accessible to farmers through Rural Payments service. England Only.



Method used is operational and well understood. However not all hedges are identified using method e.g. if hedges are underneath trees.

££

Would need effort from OS to expand product for Wales coverage and then a continuous license fee to continue to use the product once established. To provide access to farmers would need in house effort to integrate datasets into existing and/or new online services.

Research Service: Forest Monitoring



Uses Sentinel-2 Analysis Ready Data (ARD) summer mosaics to identify woodland change as part of the National Forest Inventory (NFI) programme of work. This includes detecting wind blow of trees, planting or felling of trees. Updated annually with GB coverage.



Method used is clear but complex and has varying levels of success and accuracy depending on the change detected e.g. wind blow of individual trees difficult to detect due to spatial resolution of satellite data. Sentinel-1 ARD techniques will improve accuracy when methods are established.

££

Service already has a remit and capability over Wales but dependent on ARD availability. Storage and processing costs medium but high if Wales wide ARD has to be generated for this purpose only, and not generically provided.

Commercial Service: Tree Species Mapping



Uses time series Sentinel-1 and Sentinel-2 ARD to map the spatial distribution and abundance of tree species within forested areas. Products available to buy as a service.



Method used is clear but complex. Success rate of the service across different scales is uncertain e.g. likely to work best for mature large stands of single species and unlikely to work for small areas of mixed saplings or seedlings.

££

Service cost is likely dependent on scale of coverage. Some effort and in house testing required to determine accuracy at regional and national scale against intended use.

Policy Areas

Species detection / Compliance / CAP / Operations / Agri and Environmental Stats / Reporting / Future agricultural scheme monitoring and compliance / National Forest indicator / benefits monitoring

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Complexity

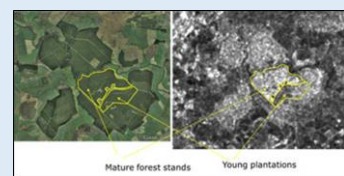
- Possible; needs research
- Clear method but complex
- Clear method and straightforward

Resource

- £££ High
- ££ Medium
- £ Low



Example of hedgerow layer in OS Landscape Features Layer



Using Sentinel-1 time series to detect growth stage of a plantation.



Ash tree abundance from Sentinel-2 using Rezatec's service.