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Monitoring Ireland's Forests Using Pixels & Point Clouds

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Remote Sensing & Coillte's Forest Inventory

- Remote sensing has become a central component for the monitoring of Coillte's Estate:
 - Stand mapping
 - Change Detection
 - Rapid Damage Assessment (e.g. forest fires, wind damage)
 - Estimating variables (e.g. height, volume, stems etc.)
- Remote sensing provides a cost-effective, standardised, synoptic view of our forests
- Applications are fully underpinned by open-source software



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Coillte's Open-Source Geospatial Swiss-Army Knife





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Coillte's LiDAR-based Inventory

- Since 2015, Coillte has commissioned annual large-scale, LiDAR surveys
- Total LiDAR Capture 180,000 ha
- Specifications:
 - 4 points / sq. m.
 - $\pm 14 \text{ deg from nadir}$
- Equivalent to 6 TB data
- Plan to Capture \pm 330,000 ha by 2021



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Point Cloud Applications

- Production of key products: DTM, DSM, CHM
- Estimation of Yield Class (forest productivity)
- Stand Mapping
- Image Segmentation and Area-based Estimation
- ... Single Tree based modelling



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LiDAR features

- Point cloud processing is computationally intensive
- High Volume Data, High I/O operations
- Flight-lines are retiled and processed
- Software: PDAL, SPDlib & liblas
- Infrastructure: ICHEC HPC (fionn now kay)



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Map Mint

- Web-based EO data viewer to disseminate LiDAR products
- Based on Zoo WPS Kernel & OGC services
- Provide efficient access to
 - LiDAR products
 - Sentinel-2
 - RapidEye/PlanetScope
- Along with Web Processing Services using R,GDAL & OTB



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Coillte MapMint WPS



Image Credit: Nicolas Bozon

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Coillte MapMint R-WPS





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Coillte MapMint R-WPS





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EO Applications in forestry

- · Coillte's inventory relies heavily on EO data
- Workflows are fully developed using FOSS4G
- Zoo Project & MapMint integral for the rapid deployment of EO data & products



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Thank You

