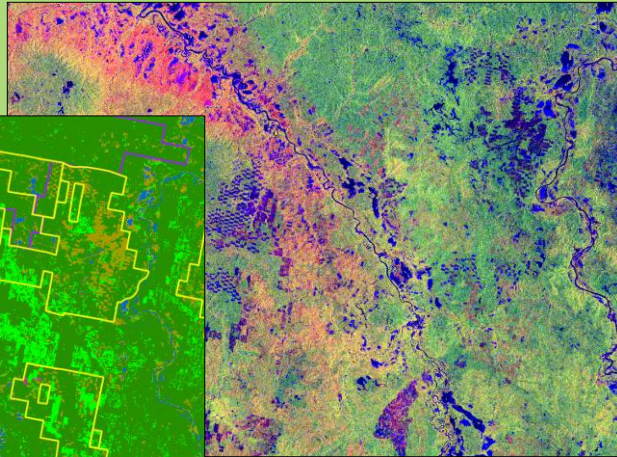
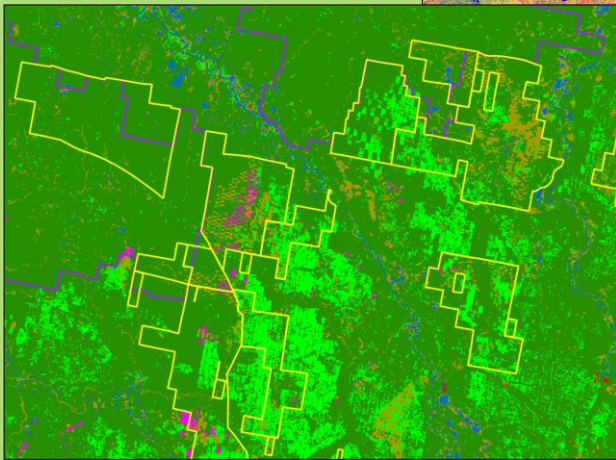
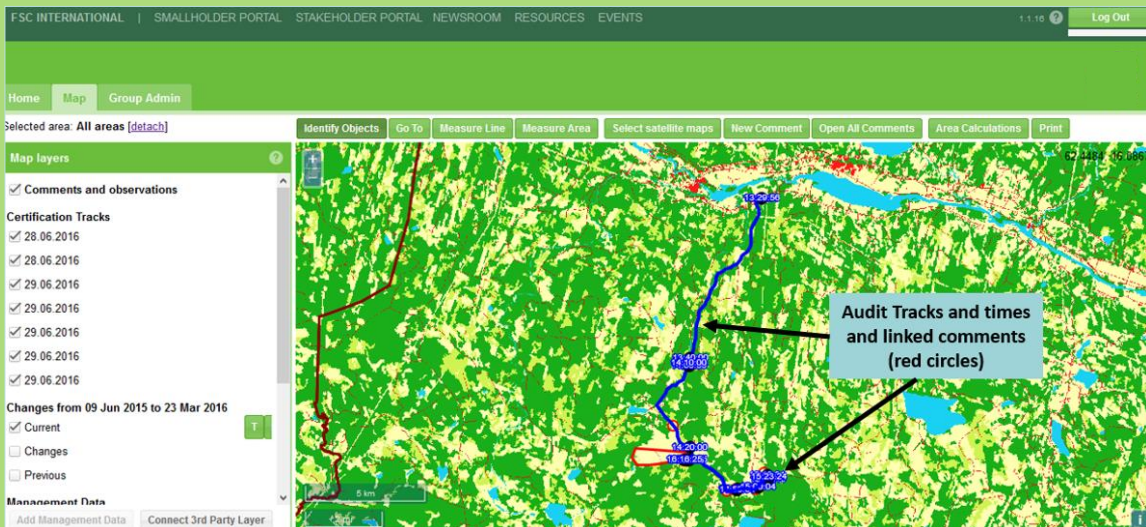


TransparentForests



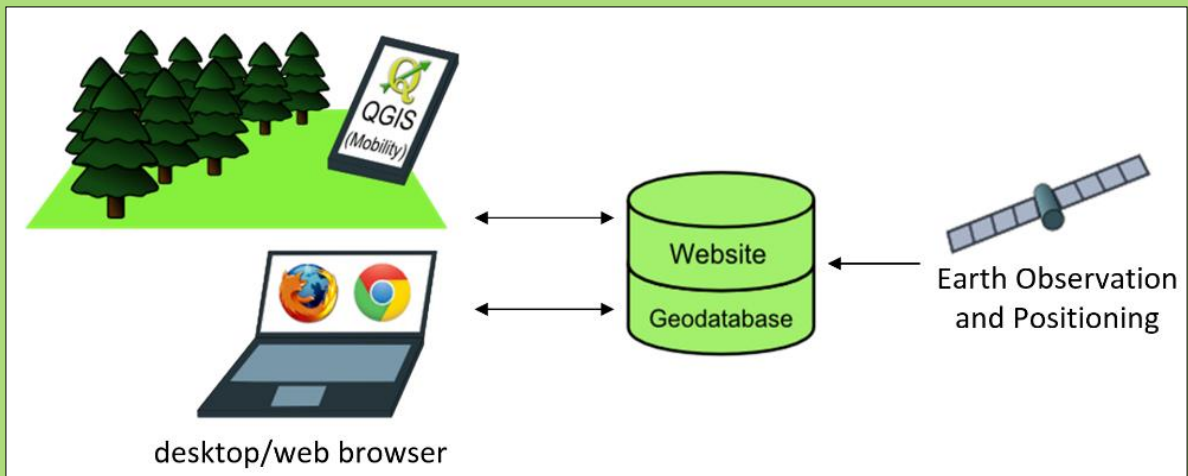
Mapping
and
Monitoring

Measuring
and
Analysing



Sharing and Communicating

TransparentForests is a web-based **forest certification service** providing date-stamped, independent and customised Land Cover/Change Maps using freely available Earth Observation data. The Land Cover/Change Maps are integrated into a purpose-built GIS environment allowing sharing of information and uploading of geo-referenced comments, observations and evidence from the ground.



TransparentForests has been developed in partnership with the European Space Agency (ESA) as a service to support forest certification. It has been validated and successfully by large timber companies and NGOs, while being developed according to stringent ESA standards and tested in the field with a number of large forestry companies.

Land Cover/Change Maps – The service generates Land Cover/Change Maps with the following characteristics: independent, defined accuracy and land cover classes, date specific, comparable across dates and regions, change maps which identify changes between any two specific dates.

User Interface – The TransparentForests user interface has the following functionalities:

- **Analytics** – allows users to review maps, upload and identify boundaries, calculate areas, review management information, define levels of access for shared information and generate standardised reports.
- **Communications** – allows sharing of geo-referenced comments, observations and evidence. This allows aggregation and dissemination of information beyond land cover and land cover change to support risk assessment and mitigation.

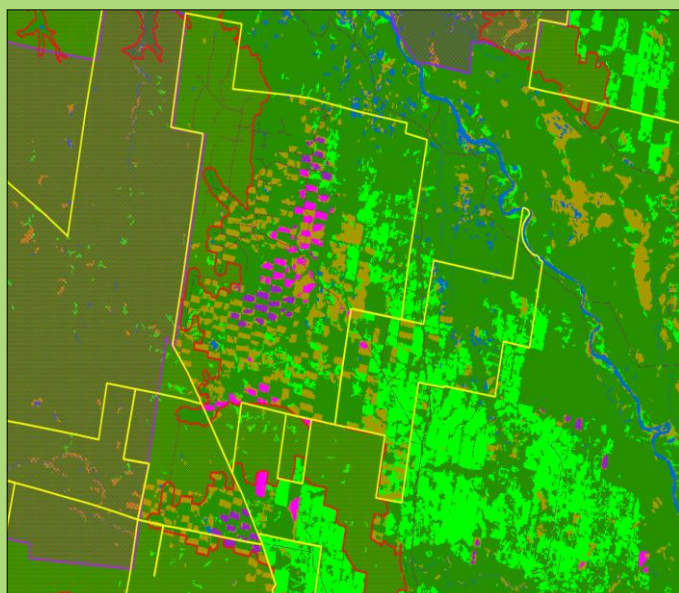
Why Earth Observation?



Today, tens of satellites circle the Earth on a regular basis, taking images of the ground with resolutions of down to a few meters. Most of the satellites used in TransparentForests are equipped with a radar sensor which is able to monitor the land cover even under cloud cover and without the sun's light. This is an important feature particularly for boreal and tropical regions. TransparentForests maximises the use of spaceborne freely available radar and optical data at resolutions of 10 and 20m, hence ensuring regular monitoring with high level of detail.

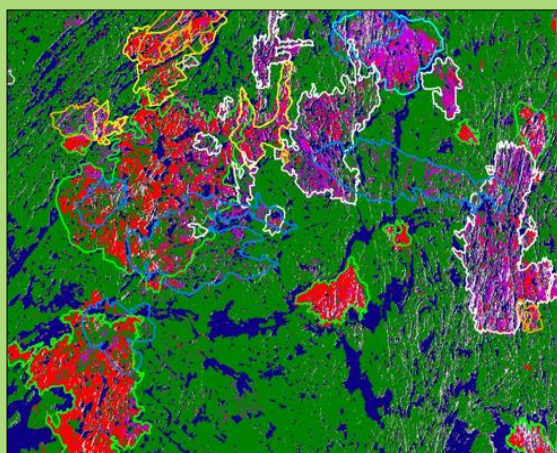
Standard Map Products

Standard Map Products are based on the synergistic use of free data from Sentinel-1 (Synthetic Aperture Radar, 20m), Sentinel-2 (optical, 10m), and Landsat-8 (optical, 30m). Images from these satellites are available globally on a regular basis and are used to generate the Land Cover/Change Maps. Given the often fast and significant spatio-temporal land cover dynamics, a multi-sensor, multi-temporal approach allows TransparentForests to obtain a high level of detail and to capture and date changes.

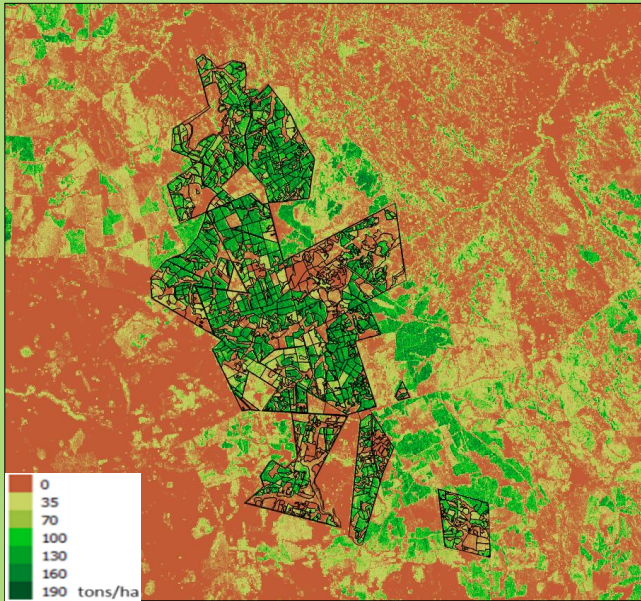


This is a Standard Map Product of a boreal forest in Russia in winter 2015. The images are drawn from Sentinel-1A time series acquired every 12 days, right through the boreal night and complemented with two Landsat-8 images acquired during the summer 2015. Within this map it is possible to identify Natural forest, Forest regeneration, Water, Bare soil, Clearfell 2007-08, Clearfell 2008-09, Clearfell 2009-10, forest boundaries (yellow), intact landscape boundaries (red). The map can include up to 8 land classes which have been defined to support forest certification.

With 85% of the total forest losses, fire is the dominant cause of damage. Radar signals can penetrate smoke and so maps generated through TransparentForests can rapidly quantify the extent and severity of burnt areas. The Standard Map Product to the right has been generated from a time-series of freely available Synthetic Aperture Radar data (20m) showing burnt area damages from recent (red) and older (purple) fires. Water is shown in blue and forest in green.



Premium Map Products

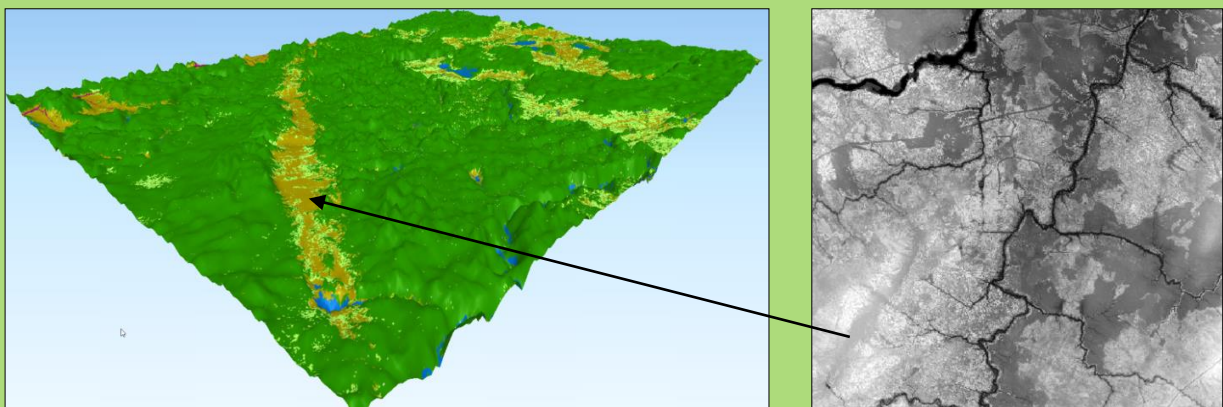


Current practice to estimate timber volume involves assimilating data from a number of sample plots including tree height and stem diameter along with other relevant information. This data is extrapolated within forest models to provide an estimate of total timber volume. This is a time consuming and costly exercise and so timber volume data is not regularly updated.

The Premium Map Product on the left shows a plantation in South Africa and the timber volume by compartment estimated using spaceborne ALOS-2 data.

In single species forest plantations, TransparentForests provides timber volume estimations using commercial spaceborne (low frequency) Synthetic Aperture Radar data, such as ALOS-2. By applying semi-empirical models, this method allows remote, lower cost, accurate and regular estimates of timber volume and other biophysical data.

Very detailed maps at resolutions down to 0.5m can be generated and viewed within the TransparentForests platform to provide enhanced detail for particular areas. For example, in higher latitudes, windstorms are responsible for about 4% of total forest losses. TransparentForests provides key information such as area losses, terrain and vegetation height to support timber loss estimation.

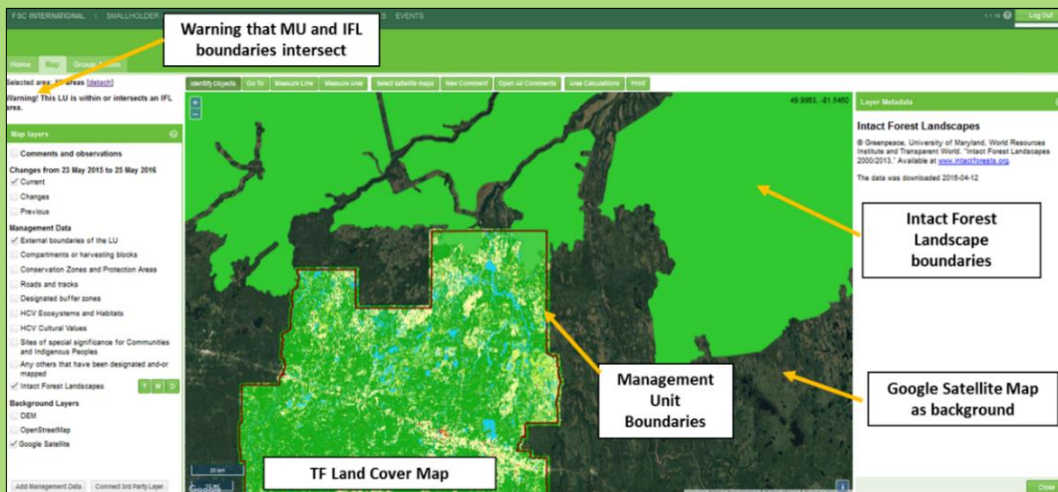


The Premium Map Product on the left illustrates a 3D wind-blow damage map generated using commercial spaceborne stereo-optical images (0.5m resolution), while the Product on the right shows the corresponding Digital Surface Model (darker areas indicating lower elevation and lighter areas indicating higher elevation). These two layers provide the exact area of the loss and the height of terrain and vegetation.

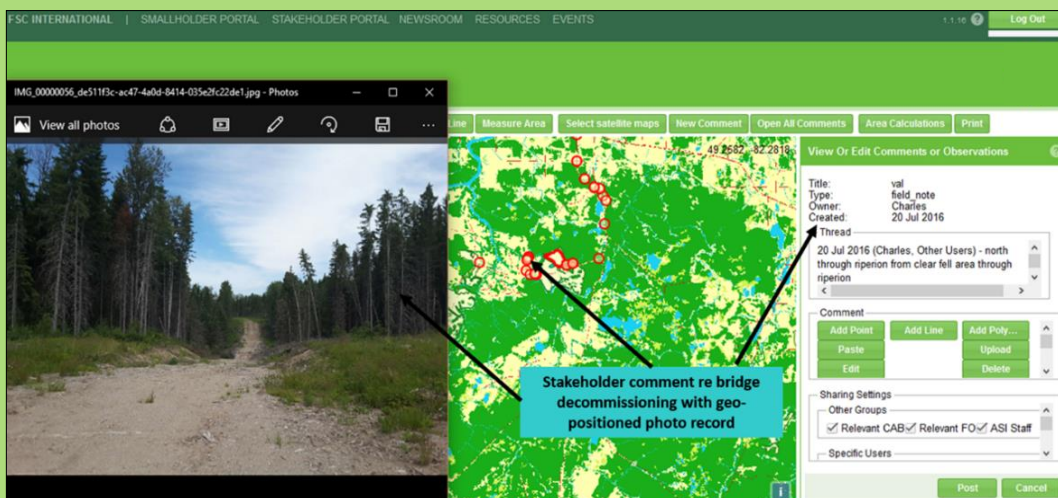
Purpose-built User Interface

TransparentForests provides easy access to Land Cover/Change Maps and related functionality through web, mobile and desktop-based interfaces.

- **TFWeb** is a WebGIS application, accessed through the user's web browser which allows users, amongst other things, to view Land Cover/Change Maps and background maps, to upload management data (e.g. harvesting blocks), or to run queries (e.g. measuring area), grant access to others to view data and make comments. These functionalities support monitoring, due-diligence, site visit activities and analytics. Users can also interface with the TransparentForests service directly from their own GIS environment via **TFDesktop**.



- **TFMobile** provides an interface for fieldwork and is compatible with generally available tablet and smartphone operating systems. It allows users to visualise their position in the context of Land Cover/Change Maps, forest management data, comments, notes and other related data. It also provides a simple interface for capturing and geo-referencing field information (e.g. photos or observations). TFMobile is able to work without an internet connection while operating in the field. It caches any required data before leaving for the field and synchronises any edits / new field data again on returning.



Users are additionally able to view background images/maps including but not limited to:

- TransparentForests colour composite images generated from current satellite time-series data;
- Google Maps, OpenStreetMap, and Bing Maps for orientation purposes;
- Global Forest Watch containing a global forest cover dataset based on Landsat images;
- Intact Forest Landscape defining the declared intact forests to be protected.