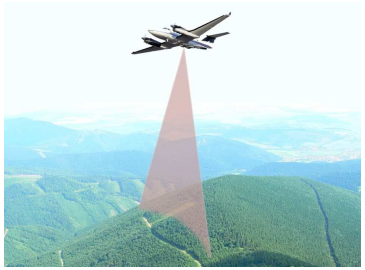

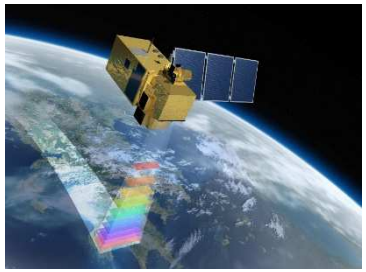

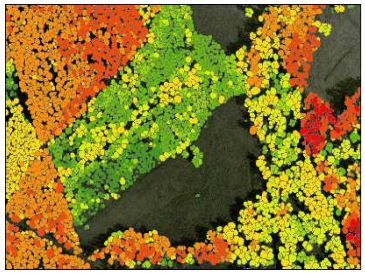

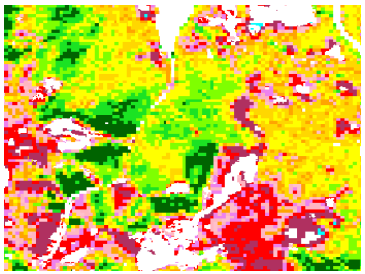

Using of GIS and RS for forest mapping, monitoring and mensuration in Slovakia

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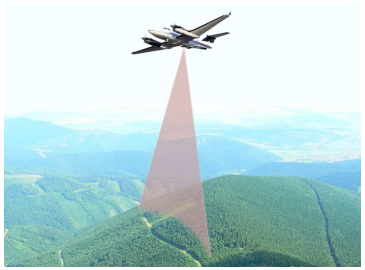
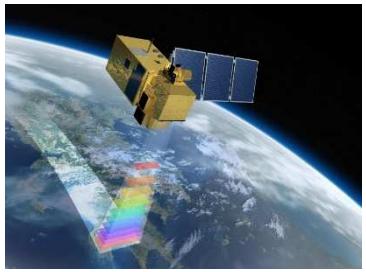
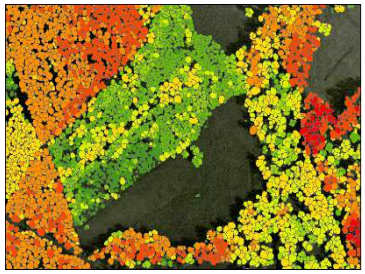
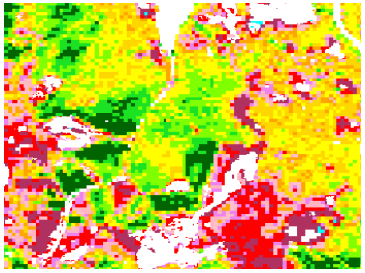
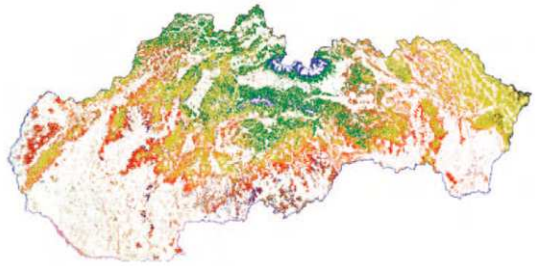


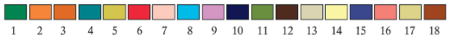






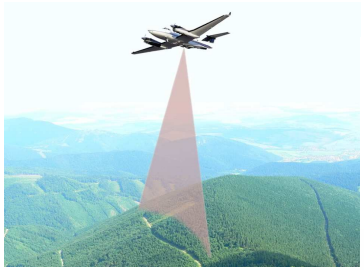


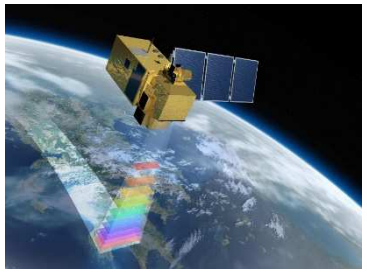
Forest cover and real distribution of tree species in Slovakia (Forests cover about 41 %)

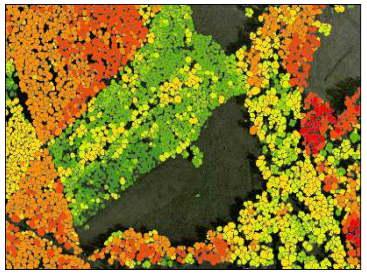


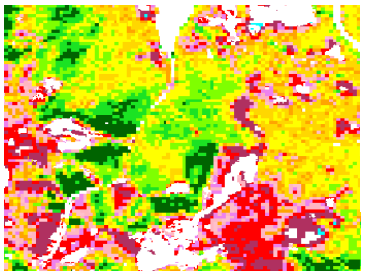
1 – Spruce, 2 – Fir, 3 – Pine, 4 – Larch, 5 – Beech, 6 – Oak, 7 – Hornbeam, 8 – Alder, 9 – Poplar, 10 – Turkey oak, 11 – Robinia, 12 – Maple, 13 – Ash, 14 – European mountain ash, 15 – Dwarf pine, 16 – Mixed stands with prevalence of broadleaved, 17 – Mixed stands with prevalence of coniferous, 18 – Birch

National Forest Centre is responsible for forest monitoring in whole area in Slovakia





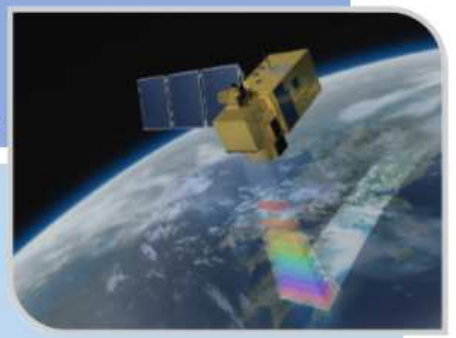




National Forest Centre concept of forest monitoring based on Remote Sensing

To obtain recent and precise information, important for efficiency management of landscape
(agriculture, forestry, urbanism, tourism,...)

Traditionally, this process is performed based on data from field measurements and remote sensing



Local and Regional Monitoring

Aerial Level

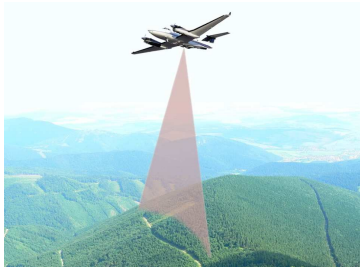
Area
1/10 area of Slovakia each year
RSE data source:
Airborne photogrammetric camera (Leica RCD30)
Airborne laser scanner (Leica ALS70-CM)
RSE data processing:
ERDAS, Leica, Trimble, Terrasolid Ltd., ESRI
RSE data analysing:
National Forest Centre
Outputs:
DTM, DSM, nDSM
Forest mapping
Contactless forest monitoring

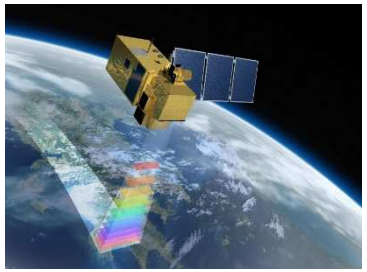
Satellite Level

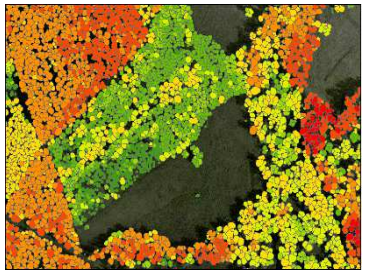
Area:
Whole area of Slovakia each year
RSE data source:
Landsat, MODIS
Sentinel (coming)
RSE data processing and analysing:
ERDAS, Trimble, ESRI
Outputs:
Classification of forest health
Change od forest state
Web map service
http://www.nlcsk.org/stales
http://www.nlcsk.sk/satlesys

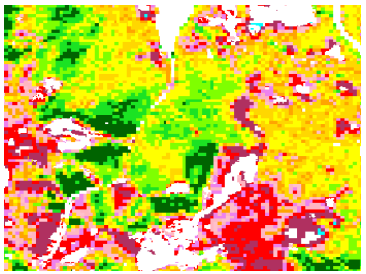
National and Global Monitoring

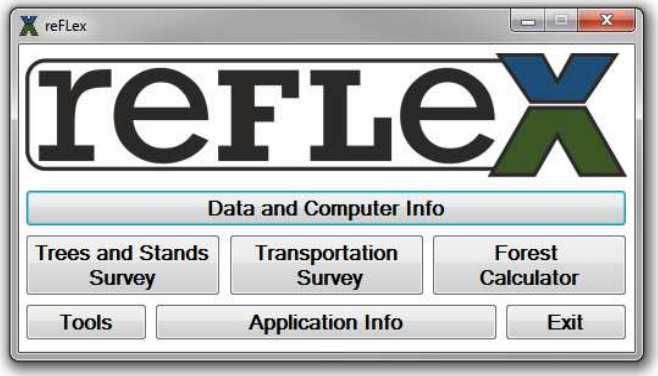
reFLeX
A geoscience software designed for forestry
©sackov & juris

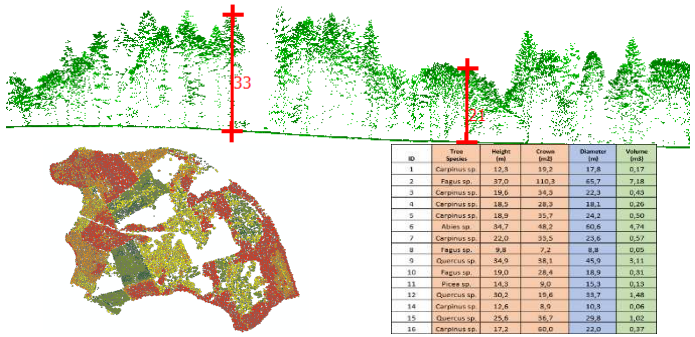












ID	Tree Species	Height (m)	Crown (m2)	Diameter (m)	Volume (m3)
1	Carpinus sp.	12,3	15,2	17,8	0,17
2	Fagus sp.	37,0	110,3	65,7	7,18
3	Carpinus sp.	19,6	34,3	22,3	0,43
4	Carpinus sp.	18,9	28,3	18,1	0,26
5	Carpinus sp.	18,9	35,7	24,2	0,30
6	Abies sp.	34,7	48,2	60,6	4,74
7	Carpinus sp.	22,0	33,5	23,6	0,57
8	Fagus sp.	9,8	7,2	8,8	0,05
9	Quercus sp.	34,9	58,1	45,9	5,11
10	Fagus sp.	19,0	28,4	18,9	0,31
11	Picea sp.	14,3	9,0	15,3	0,13
12	Quercus sp.	30,2	15,6	33,7	1,48
14	Carpinus sp.	12,6	8,9	10,3	0,06
15	Quercus sp.	25,6	36,7	29,8	1,02
16	Carpinus sp.	17,2	60,0	22,0	0,37

Main Purpose
Forest monitoring based on LiDAR data

Input format
Point Cloud: *.las 1.n Vector Layer: *.shp

Various Modules

Information module

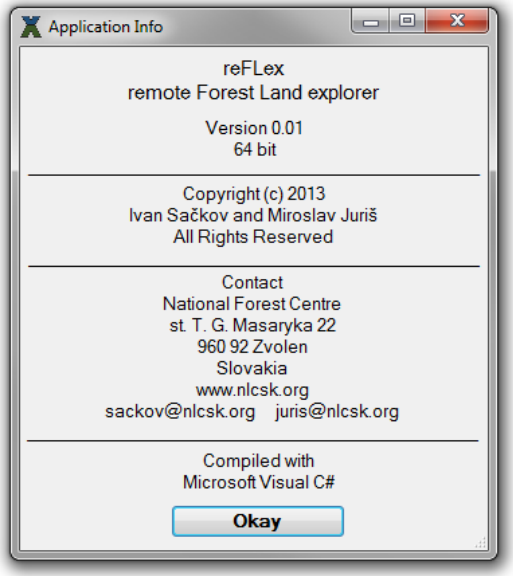
- **Module: Data and Computer Info**

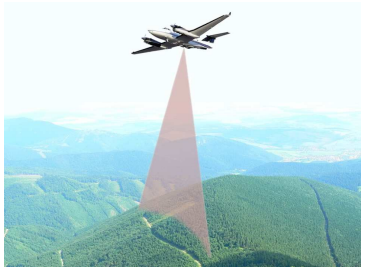
Analytic modules

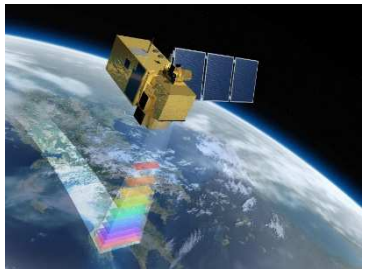
- **Module: Tree and Stand Survey**
  - Sub-module: Height
  - Sub-module: Top and Crown of Tree
  - Sub-module: Forest Cover
- **Module: Forest Calculator**
  - Sub-module: Volume calculator

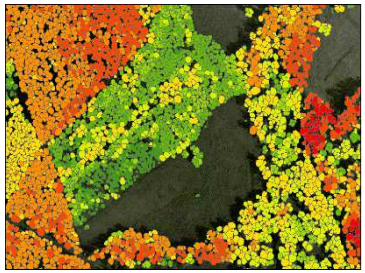
Tools modules

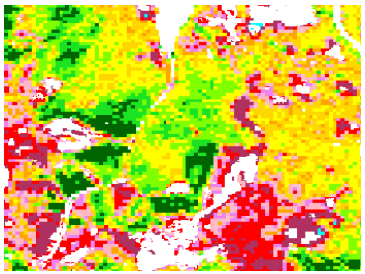
- **Module: Tools**
  - Sub-module: Export *.las file to *.shp file
  - Sub-module: Clip *.las file
  - Sub-module: Remove outliers in the *.las file
  - Sub-module: Viewer *.las file











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