

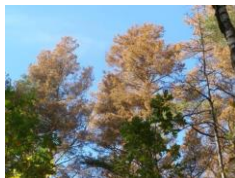
# Drying out conifers classification employing TripleSat satellite data

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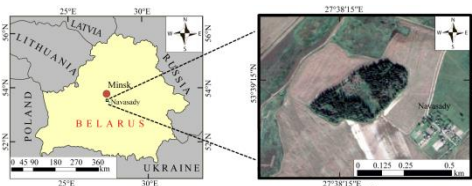
## 1. Aim of the study

The aim of the study was to determine the green-attack stage detection potential of 4-band RGBNIR very high resolution (0.8 m) TripleSat data in combination with a priori airborne spectrometer's data in the range of 400-900 nm .

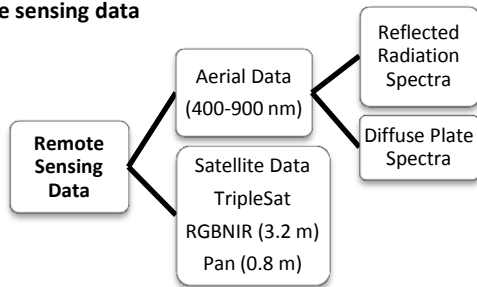


## 2. Study area

Forest site in Minsk region (53°39'15"N, 27°38'25"E) of area 0.1 km<sup>2</sup> containing mainly spruce (*Picea Abies*) was chosen as a test area.



## 3. Remote sensing data



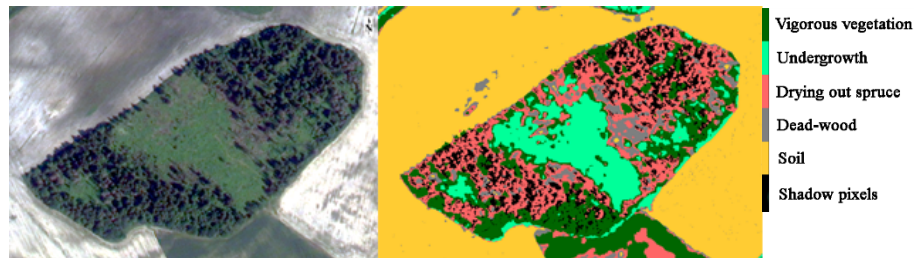
## 4. Methods

Spectral reflectance and remote sensing indices were evaluated for airborne data. Aerial data was classified employing LDA algorithm with training data set formed using airborne imagery.

Radiometric correction, PAN- and HSV sharpening of TripleSat image were performed, also remote sensing indices were evaluated for each pixel. Reference sites that had been correctly classified on the basis of airborne data were used in training data set formation of the TripleSat image and subsequent supervised LDA classification.

## 5. Results and discussion

The quality of classification for airborne data for the surface types was achieved by its comparison with visual recognition of 5 types of underlying surface using airborne imagery ("drying out spruce", "dead-wood", "vigorous spruce", "undergrowth", "soil"). The accuracy of determining the stages of drying out in an airborne experiment is: "vigorous vegetation" - 74%, "drying out needles" - 27%, "dead wood" - 48%.

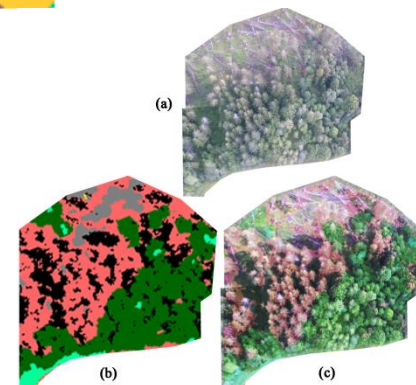


Pan sharpened TripleSat image and result of LDA classification

There is a clear distinction between deciduous trees, which are included in the "vigorous vegetation" class, and spruces, which are included in the "drying out spruce" class. Insufficient accuracy of classification of the stages of spruce drying out is associated with inaccuracies in georeferencing, small sizes of the objects under study and also blur due to aircraft movement.

## 6. Summary

- The majority (about 90%) of the forest area under study is in the drying stage (this fact is consistent with the forest pathologist expertise)
- Airborne spectrometers are suitable for distinguishing the stages of drying out of spruce
- Future studies should use an unmanned aerial vehicle with a lower speed of movement, high quality photographic images of forest area, and detailed data from forest pathological services on the presence of forest diseases.



Mosaic of airborne frames (a); result of classification of the TripleSat image (b); classification results layer overlaid on the mosaic of territory (with some transparency) (c).