

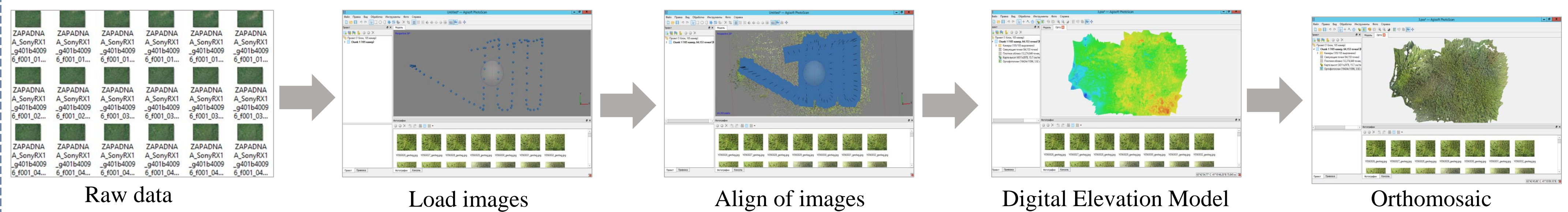
# Development of methodology for automated determination of forest parameters based on data from unmanned aerial vehicles

Roman Aleshko, Vladimir Berezovsky, Ksenia Shoshina, Irina Vasendina, Roman Vorontsov, Tatyana Desyatova  
Center for Artificial Intelligence and Big Data Analysis  
Northern (Arctic) Federal University, Arkhangelsk, Russian Federation

## Abstract

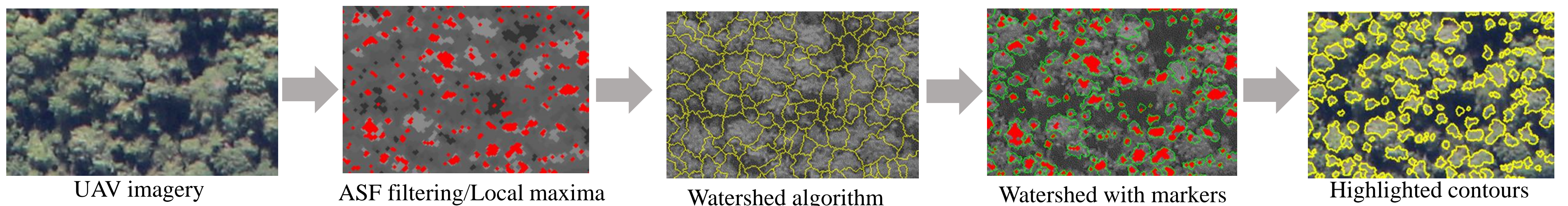
This poster presents a scientific study on the use of aerial photographs obtained by unmanned aerial vehicle (UAV), for the automated collection of data on forest resources in the taiga forests of the European North of Russia. On the example of the trial plot, a technique is described for automated allocation of crown contours, calculation of the trunk diameter and timber stock in the forest area. The methodology used morphological methods for processing digital images, geographic information tools for representing and processing spatial information, as well as the results of statistical observations of leading scientists in the field of forestry. The results have been verified in the field in several plots. The technique is applicable to automate the process of thematic interpretation of orthorectified aerial photographs with a spatial resolution of five to ten centimeters per pixel. The experiments presented in the article were carried out on images of forests in the north of the European part of Russia. The research results are used for regular automated updating of information on forest resources.

## Data Preprocessing

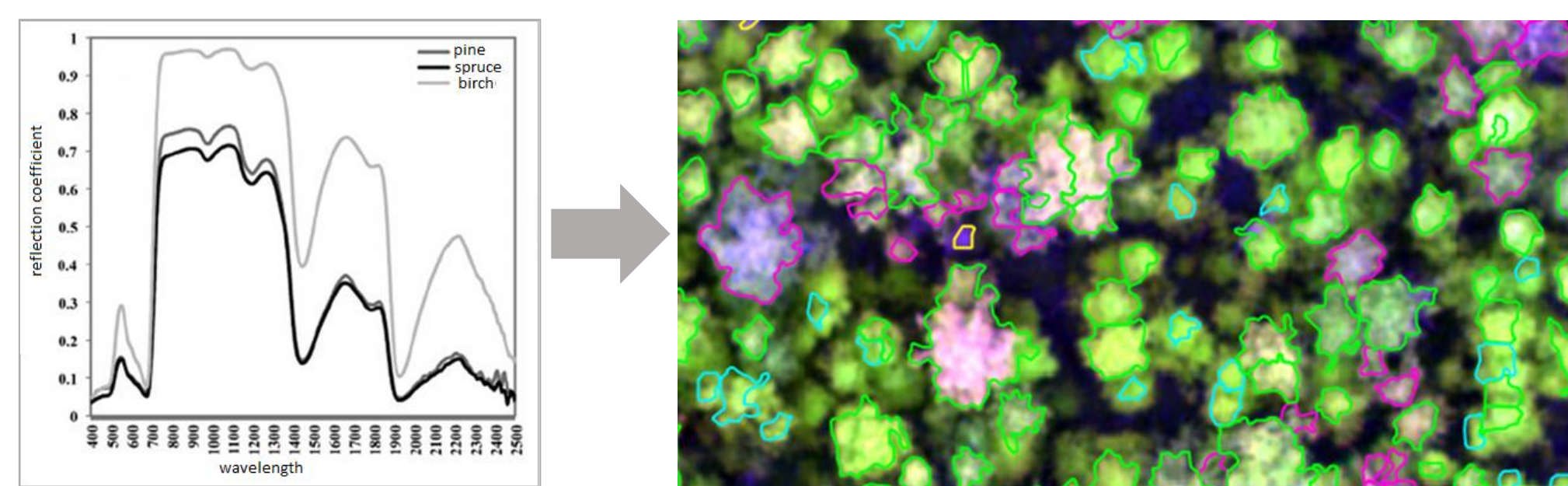


## Methodology

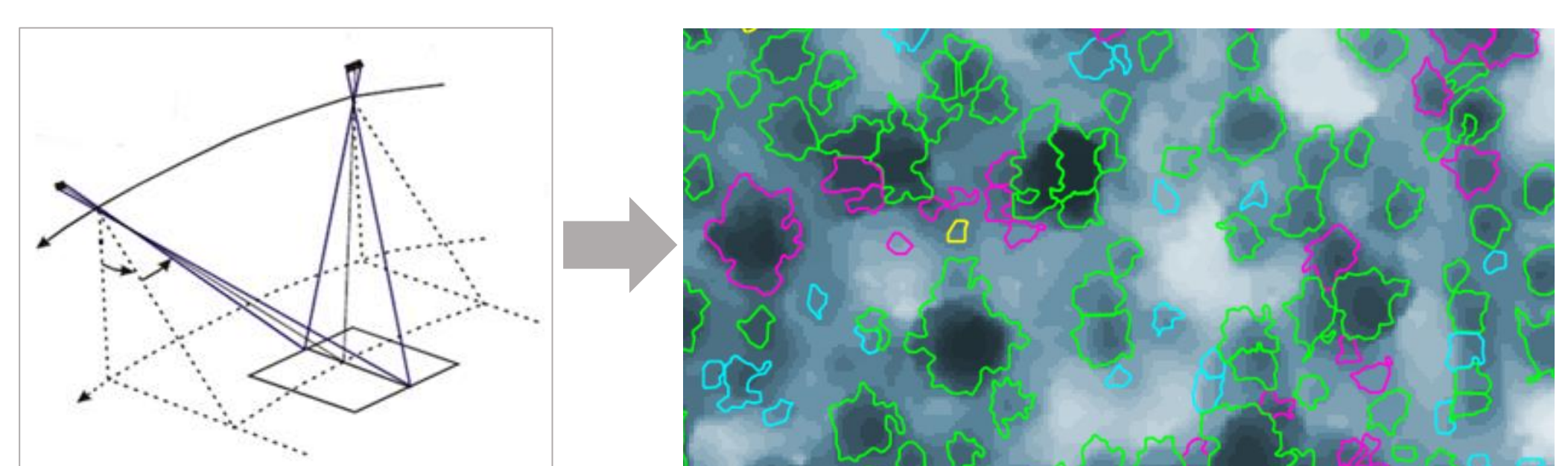
### Highlighting of contours



### Identification of species

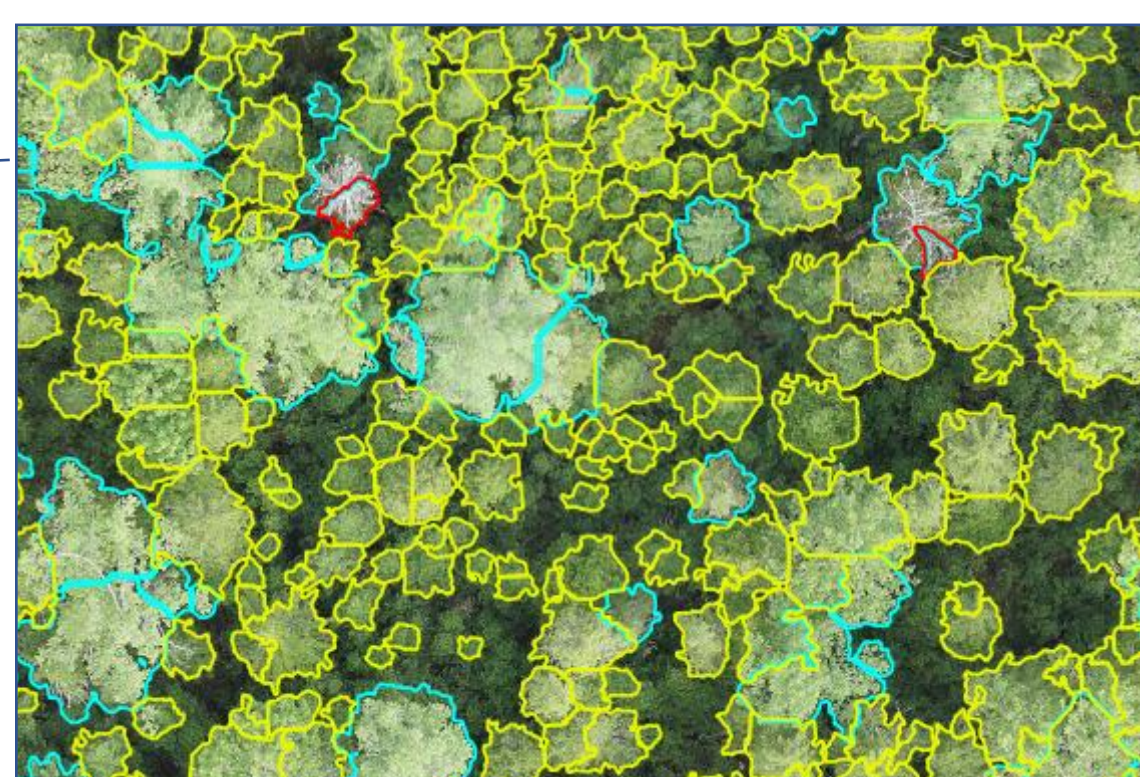


### Identification of heights



## Results

### Cartographic Data



### Attributive Data

	NIRmean	REDmean	poroda	htmax	dbh	v
1	30613.90127020...	61143.83516166...	hvoinie	2.000...	0	0
2	28547.86407342...	60598.41709007...	hvoinie	17.00...	20.000	0.241
3	25902.29144411...	57476.89938953...	hvoinie	22.00...	28.000	0.588
4	20810.13802635...	53416.28032309...	suhostoi	27.00...	37.000	1.184
5	18161.90970447...	51580.82986516...	suhostoi	17.00...	20.000	0.226
6	20081.56692782...	49786.47209028...	suhostoi	22.00...	28.000	0.563
7	33094.89829101...	48926.24873046...	hvoinie	19.00...	22.000	0.324
8	40561.75126238...	48153.97508574...	listvennitsa	25.00...	33.000	0.818
9	23004.41167346...	47523.83680932...	suhostoi	15.00...	16.000	0.131
10	40376.56910792...	46959.58268802...	listvennitsa	24.00...	31.000	0.7