Main tasks and deadlines of the Research Plan

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Projekt ID: 2019-2.1.11-TÉT-2020-00171

Investigation of the characteristics of surface shapes in rural environment based on point clouds and remote sensing data

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▶ Research exchanges:

- August-September 2022 to China for 10 days, budget for each person (visa, travel, accommodation, insurance, vaccination)

- May-June 2023 to Hungary 5 Chinese researchers max. for two weeks.

▶ Other activities:

- Lecture at a Chinese conference

- Preparation of a research report publication

- Research report, translation costs of articles

▶ Organizing a workshop for the Chinese Partner

▶ Project website operation

Monitoring indicators

Monitoring Indicator	Target Date	Target Number
Public dissemination of project results in Hungarian forums	2023.12.31.	3
Public dissemination of project results in international forums	2023.12.31.	2
Number of publications published in Hungary as a result of the project	2023.12.31.	4
Number of international publications presenting the results of the project	2023.12.31.	2
Number of employees involved in the project in Hungary	2023.12.31.	6
Number of researchers and developers involved in the project in Hungary	2023.12.31.	5
Number of PhD students involved in the project in Hungary	2023.12.31.	1
Number of postdoctoral fellows involved in the project in Hungary	2023.12.31.	5

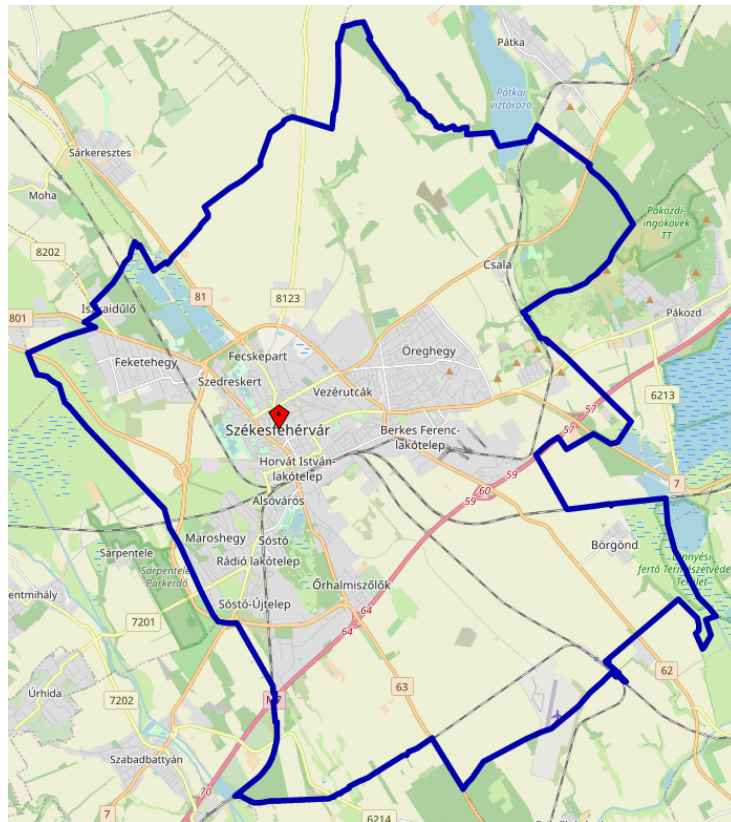# Public dissemination of project results in international forums

▶ Target value: 2

▶ Conferences:

- Chinese Conference (August-September 2022)

- GeoCad Conference – Alba Iulia, Romania (May 2022 or 2023)

- Other international conferences: Salzburg GI Forum

Number of international publications presenting the results of the project

▶ Target value: 2

▶ Publications:

- Publication of the Beijing Conference (2022)
- RevCAD Journal of Geodesy and Cadastre - Alba Iulia (2023)
- Articles in common with the Chinese Partner (2022-2023)
- Other publications:?

Demonstration Area

▶ Administrative area of Székesfehérvár (144 km²)

▶ Existing data:

    a) LANDSAT

    b) WorldView-2

    c) LIDAR

    d) Aerial photos, orthophotos

    e) Hyperspectral data

    f) Corine data

    g) Surveying maps

▶ Free downloadable data:

    a) ESA Archive (WorldView 1-4, Radarsat-2, SPOT 1-7, Landsat-8, etc.)

    b) Sentinel1-2

    c) Openstreet Map

    d) Etc.

https://earth.esa.int/eogateway/search?text=&category=Data&filter=agriculture&sortby=NEWEST_FIRST

Task of the Hungarian research group: Forecasting and monitoring the quality of the rural eco-environment

- Digital terrain modeling, classification of surface shapes (Dr. Gábor Nagy, Attila Varga)
- Land use analyzes (Dr. habil Tamás Jancsó, Dr. Péter Udvardy)
- Data integration and visualisation in a GIS system (Dr. Andrea Pődör, Nagyné Dr. Éva Hajnal) - QGIS
- LAI mapping with remote sensing methods. Analysis of agricultural areas using hyperspectral satellite images.
- (Dr. habil Tamás Jancsó)

Task of the Chinese research group: Forecasting and monitoring the quality of the rural eco-environment

- ▶ Data collection from remote sensing, attribute data and existing maps
- ▶ Studying of rural eco-environmental products using quantitative inversion and validation techniques
- ▶ Making of vegetation index maps using Chinese satellite images.
- ▶ Inversion of agricultural land surface vegetation LAI parameters
- ▶ Multi source remote sensing monitoring technology of agricultural surface water content
- ▶ Use of results: common publications, conference lectures, reports, recommendations for local authorities

Tasks of achieving the first milestone

▶ 1.   Data collection from remote sensing, attribute data and existing maps:

  a) a. WorldView II, RADSARSAT-2, Landsat, Lidar 3D point cloud data and Sunflower 8 satellite data from the demonstration;

  b) b. GIS spatial information data(included large scale land use classification map) from the demonstration;

  c) c. Crop Phenology data in the demonstration area;

  d) d. Soil texture data in the demonstration area.

▶ 2.   Studying of rural eco-environmental products using quantitative inversion and validation techniques. Available datasets are: Relevant Chinese satellite image data, basic elements of agricultural environment such as land use, topography and other series of professional maps and background data.

▶ 3.   Making of vegetation index maps using Chinese and Hungarian satellite images.

Tasks of achieving the second milestone

4.   Modelling of different and cover categories and surfaces can affect the rural and agricultural environment directly and the quality of daily life. The fine classification technology of cultivated land based on the texture features of time series. Multi spectral imaging and multi feature fusion of Lidar data.

5.   Inversion of agricultural land surface vegetation LAI parameters with remote sensing monitoring technology.

6.   Analysis of agricultural areas using hyperspectral satellite images.

7.   3D classification of objects of rural environment and crop lands including:

    a.   Basic processing, automatic segmentation, vegetation analysis and visualization technology of LIDAR point cloud data

    b.   Three dimensional image reconstruction and feature extraction technology based on 3D point cloud data

    c.   Multi scale segmentation, classification and change detection technology based on 3D point cloud data

8.   Multi source remote sensing monitoring technology of agricultural surface water content.

9.   Making of GIS data modelling and visualization of eco-environmental spatial data, thematic maps and reports

10.   Technical personnel training: publication of the results organizing educational seminar.

11.   Use of results: common publications, conference lectures, reports, recommendations for local authorities.