



GISification of Business Processes for Greater Effectiveness

Marko Maric, Vladimir Stojanovic

July 9, 2019
San Diego Convention Center
2019 ESRI User Conference

NIS.EU

GISification

Improving business processes by using GIS data and GIS functionalities

Bringing GIS to many different business stakeholders

GISification case – NIS (The Petroleum Industry of Serbia)



From a small web app used for data vizualization on the map
to

A system that integrates different processes in one place
making them easier and more efficient

23

active users of GIS ODEON application in **2011**

370

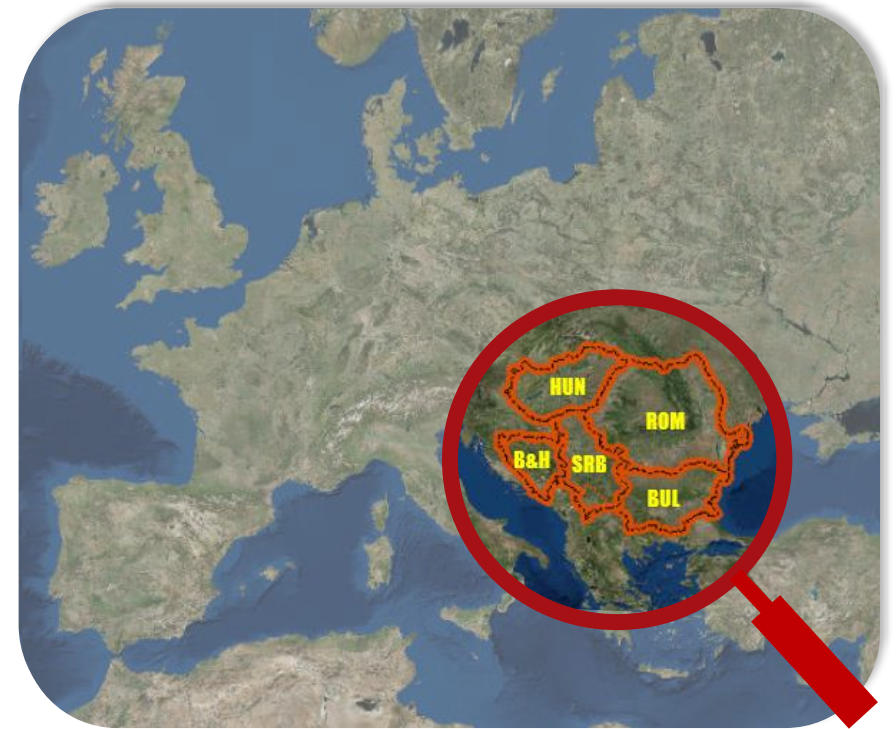
active users of GIS ODEON application in **2019**

NIS – The Petroleum Industry of Serbia

One of the largest, vertically integrated energy companies in Southeastern Europe and one of the most successful companies in Serbia



Immovable property of the Company includes over 25,000 assets - land parcels, buildings, production facilities, wells, pipelines, utilities, tanks, office space, apartments etc.



The Company operates and has real estate/assets in Serbia, Romania, Bulgaria, Hungary and Bosnia & Herzegovina

GIS ODEON – Enterprise Web App for Real Property Management

2009

Shift in ownership (change of the majority shareholder) revealed that 99% of the company real estate didn't have registered ownership rights in the official real estate registry (Real Estate Cadastre)

Department for real property management



Managing real property rights registration

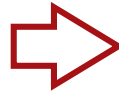


Customized intranet web GIS application for registered users

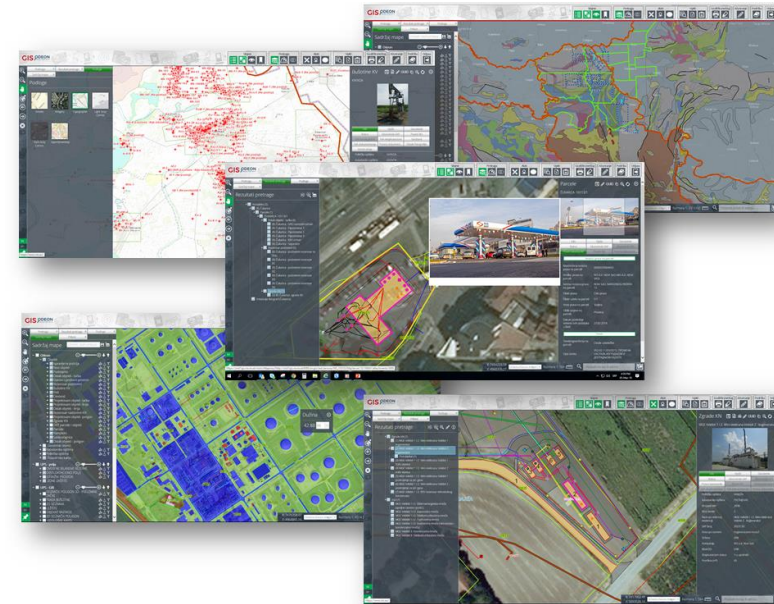
Insight into the exact location of each real estate on the map

Insight into the actual cadastral status of each real estate

Insight into legal documentation (permits, official title deeds)



GIS ODEON
Unified Digital Registry of Immovable Assets



Expected number of app users (2010)

50

25 – Department for real property management - 25
25-30 others – Upstream, Downstream, Corporate Center - 345

370

Current number of active app users

Development of GIS ODEON App Functionalities

2010

Idea and initiative for GIS

2011

GIS ODEON web app created

Development of new functionalities

2012

-
2019



2011



2013



2018

Development of functionalities led to a wider usage of the app

Wider usage of app opened up the possibility for its usage in other business processes

App usage in other business processes lead to a need for new functionalities

GIS ODEON – Structure

Web App – GIS ODEON

Full insight into the company's real property +
Editing alphanumerical DB / photos / scanned docs



GIS Servers



ArcMap & ArcGIS Pro

Creating and editing entities in the geodatabase

ArcGIS Server
GIS Portal

DB Server

Alphanumerical DB

Geodatabase

ArcGIS Server
GIS ODEON

Alphanumerical DB

Geodetic data

Cadastral data

Accounting data

Legal data

Technical data

...

Geodatabase

Geometry – a set of attributes
related to location

Exploitational status of assets

Photos and scanned
documentation

GIS ODEON – Key Improvements – Advanced Query Builder

2018 – Advanced Query Builder Module *The Game Changer*

A large amount of data needed for everyday business processes was stored in the alphanumeric DB

For combining different types of data from both databases – SQL literacy was needed+knowing the structure of the databases

Enabled easy creating of a whole list of assets that fulfill the requested criteria

No SQL literacy needed
No knowledge of DB structure needed

Useful tool that dramatically increases efficiency

New possibilities for using GIS data
(new business processes involved)

4 steps module:

1. Choose the feature class/es

2. Define the query criteria

3. Choose the output attributes

4. Execute – get the output

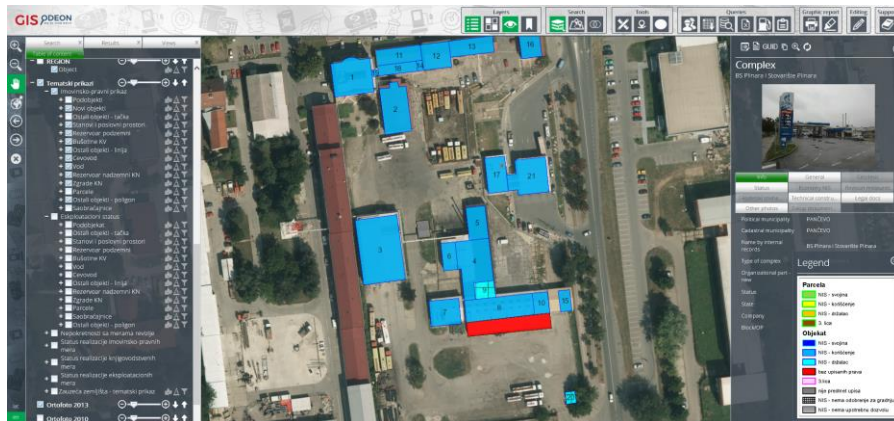
Output :

Excel table

Map

GIS ODEON – Key Improvements – Thematic Views

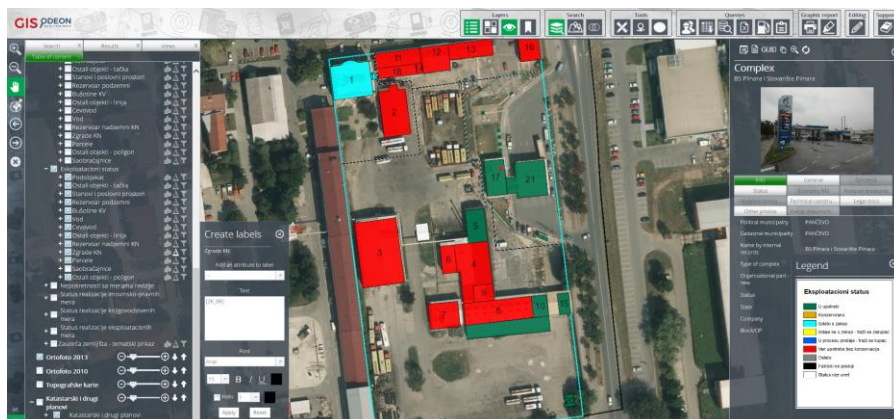
Current legal status of real estates – type of registered rights
(ownership, right of use, lease, without registered rights)



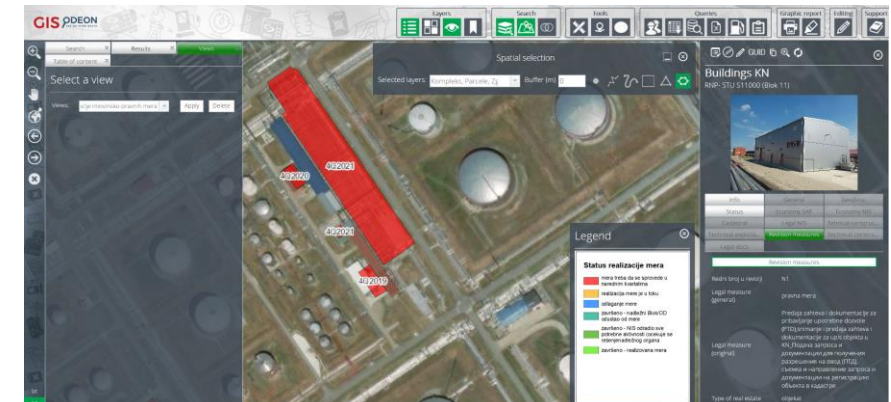
Assets with different types of corrective measures – defined in audit (legal, exploitative, accounting)



Current exploitative status of real estates/facilities –
(in use, conserved, leased to 3rd party, out of use)



Current status of implementation of corrective measures
on assets (not started yet, in progress, finished)



GISification of Business Processes in NIS (2011 – 2019)

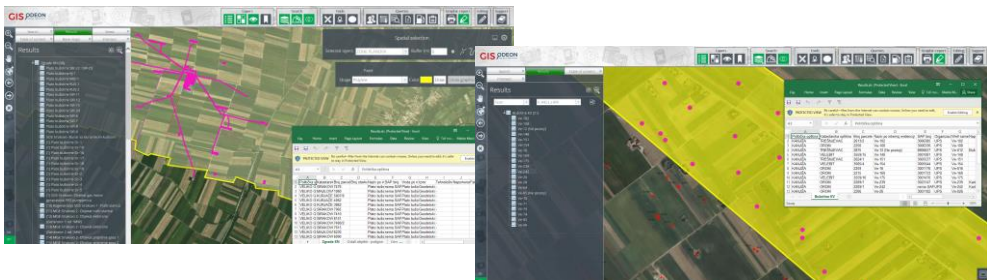


GISification of Business Processes – Real Property Management

Efficient Analysis for decision making – using GIS tools for combining different data types for different purposes

Spatial relations/intersections

List of geographically connected assets + visualization on map



Example: company assets affected by new urban development plans

Advanced query builder

Results can be shown as a list with attributes and/or marked places on map

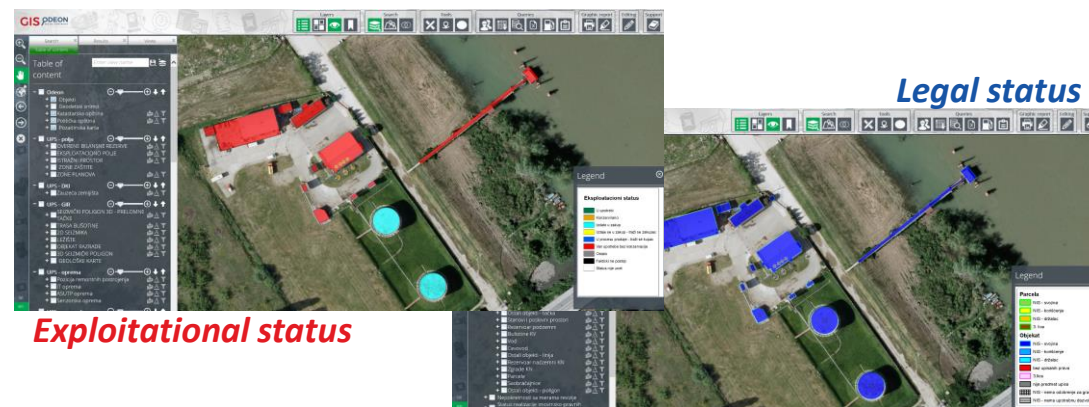


Example:

Land parcels in a particular municipality that are out of use, with area larger than 5000m2, with registered ownership rights in the name of the company

Thematic views

Easy identification of “hot spots”



Example: Unused assets with registered ownership rights
→ these assets can be sold or leased

Ability to efficiently do things that could not be done without GIS tools

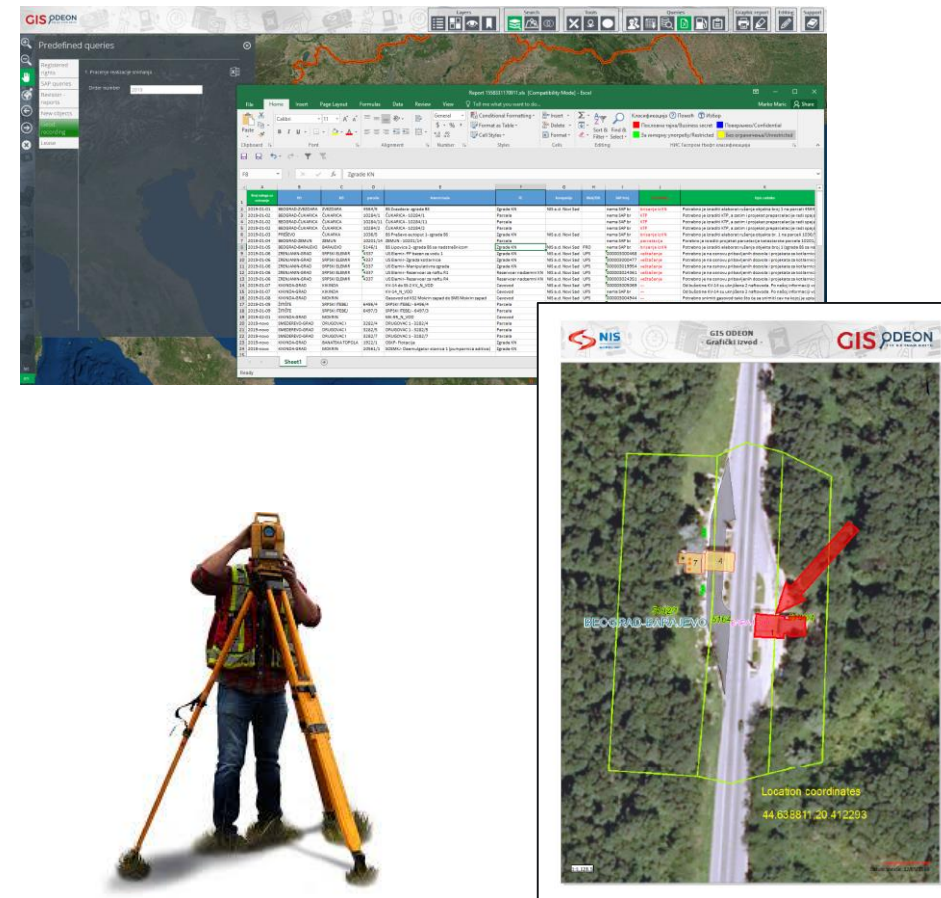
GISification of Business Processes – Land Surveying Management

Managing land surveying for:

- Property formations - parcel subdivisions/reallotments *(before new constructions)*
- Surveying for mapping newly constructed buildings, pipelines, facilities
- Surveying for the removal of demolished buildings from cadastral records

Efficient land surveying management using GIS ODEON app

- Online assignment of tasks/work orders for land surveying *(where, what asset, what kind of activity)* – effective communication
- Land surveying information is affixed to each related asset in GIS ODEON app
- Easy access and overview of current status of all ongoing tasks
- Overview of financial costs of surveys – budget management



Effective communication within company –
time saving

GISification of Business Processes – Reporting on the legal status of an asset

Supporting tool for legal analysis and report creation

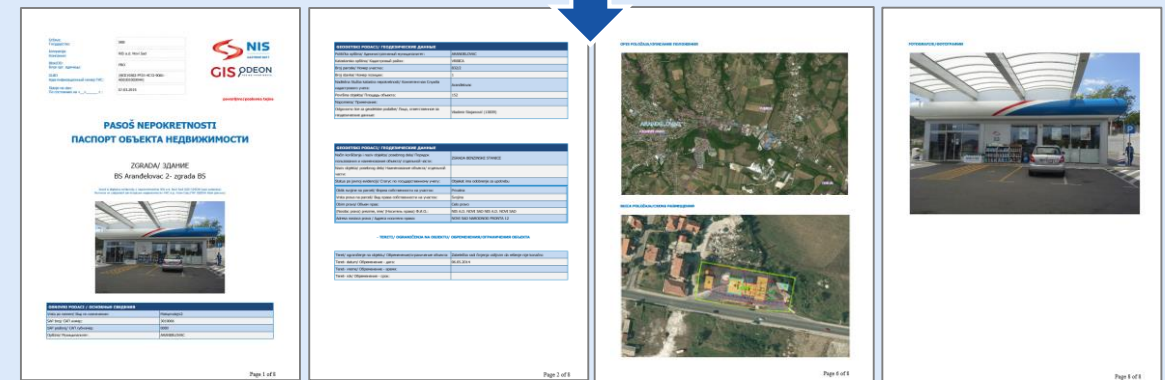
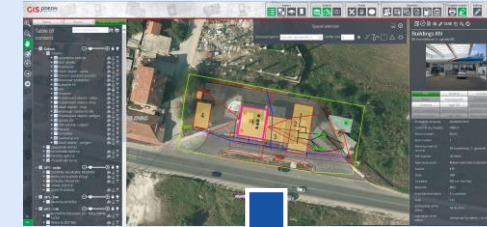
- Analysis of current legal status for a particular asset – registered rights in official real estate registry, permits, contracts related to asset etc.
- Mandatory reports during construction planning
- Eliminating legal risks before starting the construction

Enabled analysis (for each asset) of:

- Spatial relations
(complex → parcel → building → part of the building/office; apartment)
- Legal status of real estate (ownership rights)
- Current exploitative and accounting status
- Current and planned activities related to the change of legal, exploitative and accounting status

Real estate asset “passport” – generated in GIS ODEON app

- Automatically generated document for printing or sending via e-mail
- Contains legal, accounting, exploitative, lease and general data + automatically generated visualization of asset on the map
- Enables experts to get the full picture of a particular real estate for analysis and report writing purposes



Time savings – over 450 hours per year/2 working months
for having all of the necessary information in one document

GISification of Business Processes – Lease Management

Unused company real estate – to be leased or sold



Thematic view on map:

- What is for lease
- What is already leased

E-mail notification of expiring lease contract



E-mail warning to a responsible employee for the expiring lease contract

Alerts:

30 days, 15 days, 1 day before lease contract termination

Predefined queries for the list of active leases



Reports in .xlsx format directly from database for further analysis and reporting
(enabled by advanced query builder)

Complete management of leased assets through GIS ODEON

- Data related to contracts (lease amount, period of lease, type of lease, other details)
- Data related to appraisals – before leasing
- Scanned contracts and supporting documentation

Automatic building of work order for appraisal through GIS ODEON

- Automation of a process and standardized output

The screenshots display various forms and data tables within the GIS ODEON application. The first form is for creating an appraisal order, the second shows a map with a data table, the third shows additional information forms, and the fourth shows a photograph of a building.

Time savings – over 900 hours per year/5 working months
for automation of the process

GISification of Business Processes – Real Estate Audit

Process of real estate audit

- Analysis of each real estate asset and its current status from three perspectives (*accounting, legal and exploitational*)
- Each year – 6-8 months
- Goal - effective usage of company real estate

GIS ODEON Survey

Customized mobile GIS app for data collection in the field



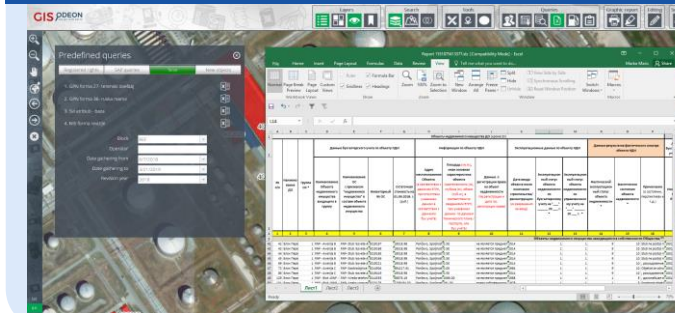
Data collection in the field:

- Location check for the asset (does it still exist in the field?)
- Current exploitational status of the asset (is it in use, conserved, rented to 3rd parties, temporarily out of use,...?)
- State of asset – in good condition, in bad condition, reparation needed,...
- Photograph of asset

Connected to GIS ODEON database – enabled online data aquisition and editing in the field

When creating a new entry in the field, depending on the position of mobile device, the app recognizes the parcel where the operator stands and automatically records it in the attribute for parcel number.

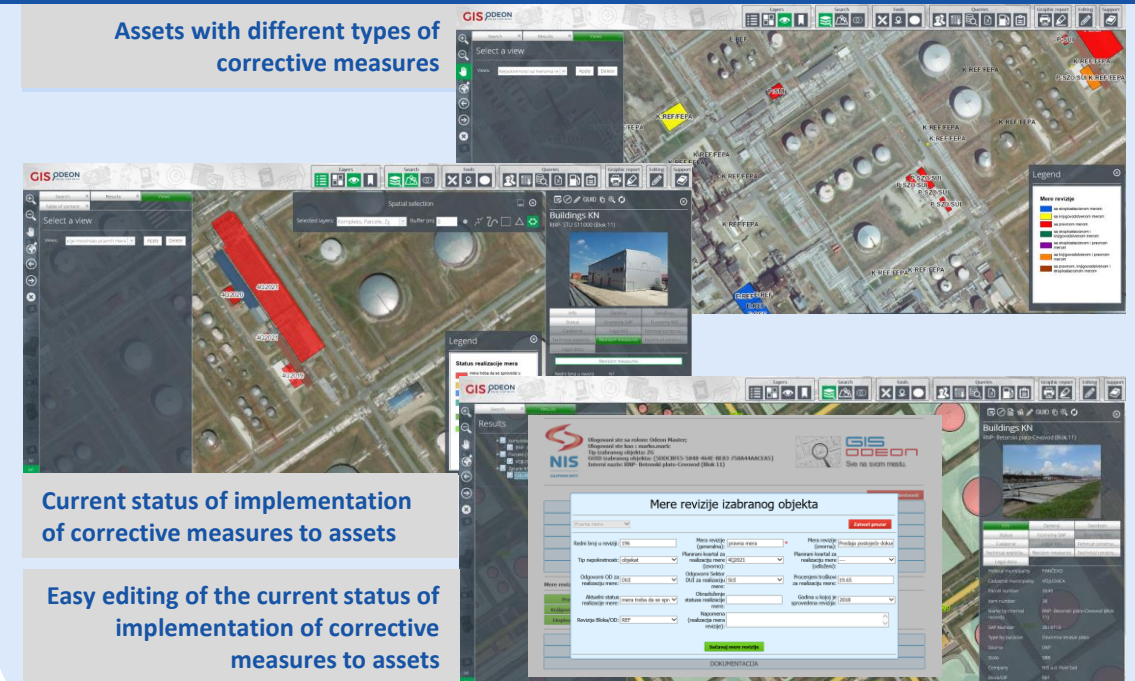
Keeping track of audit progress through the web app



Predefined queries in web app for reporting on audit progress (aquired data, date of aquisition, operator,...)

Monitoring the implementation of corrective measures

Assets with different types of corrective measures



Current status of implementation of corrective measures to assets

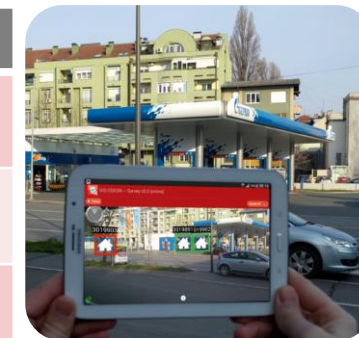
Easy editing of the current status of implementation of corrective measures to assets

GISification – Real Estate Audit (Efficiency improvement)

Financial savings

By using the mobile app “GIS ODEON Survey” instead of “pen&paper”

Activity	How are the savings achieved?	Average annual savings
Undeveloped parcel - identification on the spot	A user can see the shape of each parcel on the map and his/her current position in the mobile app – alternatively, an external land surveyor would have to be hired	\$5,300
Savings for transportation	Efficient work means more surveyed entities per day – less time spent driving back and forth – fuel savings	\$7,272
Saved working hours for survey	Efficient work means completing the job earlier – savings for engaging work force	\$45,448
		Total: \$58,000



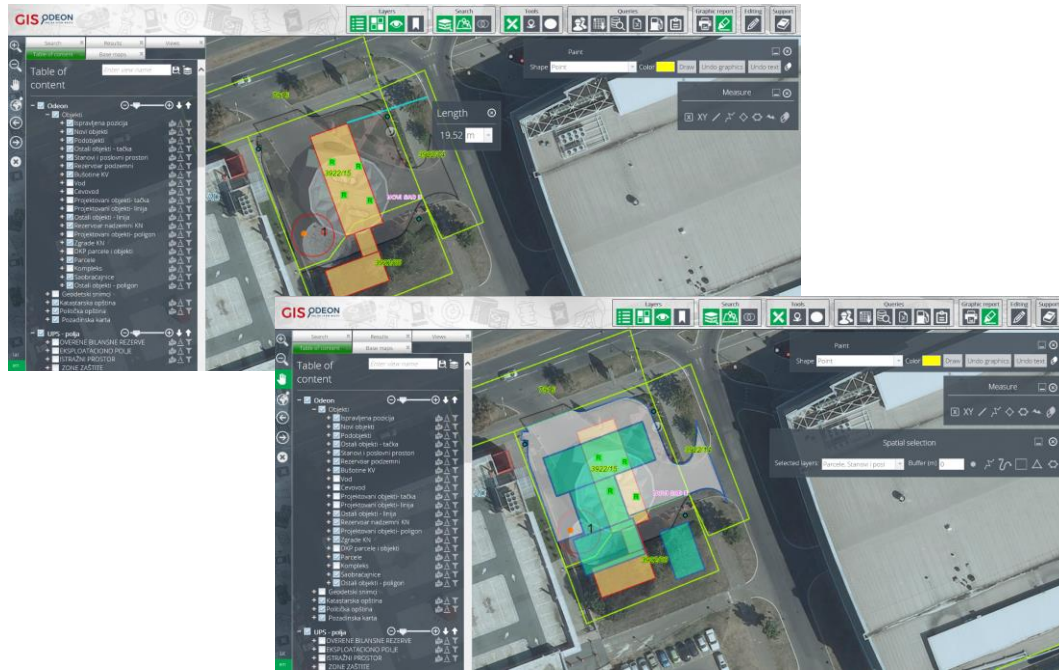
Time savings

Data check and preparation for real estate audit	
Average time needed for checking and preparation of data for 1 asset in the list of assets for real estate audit	10min
Average number of assets in a real estate audit	5750
Time needed for checking and preparation of data for all assets in the list of assets for a real estate audit	958h
Total time needed with GIS ODEON App by using predefined queries per audit	40h
Total saved time per year	918h
over 5 working months	

Mobile app GIS ODEON Survey – real estate audit	
Average number of surveyed entities per day without the mobile app – „pen & paper“	42
Average number of surveyed entities per day using GIS ODEON Survey mobile app	85
Average annual number of assets/items per audit:	5750
Average time needed for collecting data per audit with / without the mobile app:	541h/1095h
Total saved time per year	554h
over 3 working months	

GISification of Business Processes – Managing New Construction Planning

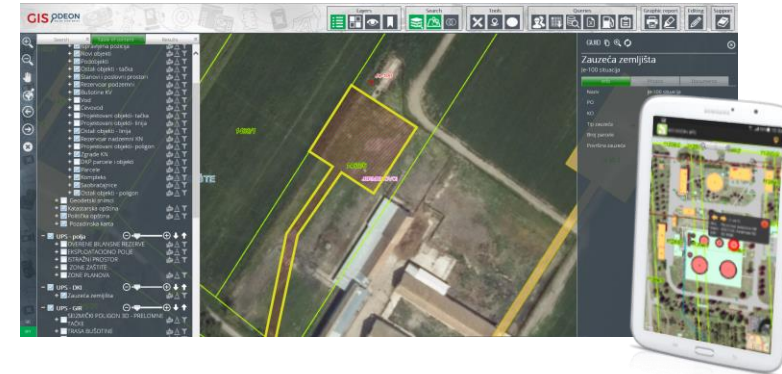
Projected positions of new facilities



App enables a quick insight into:

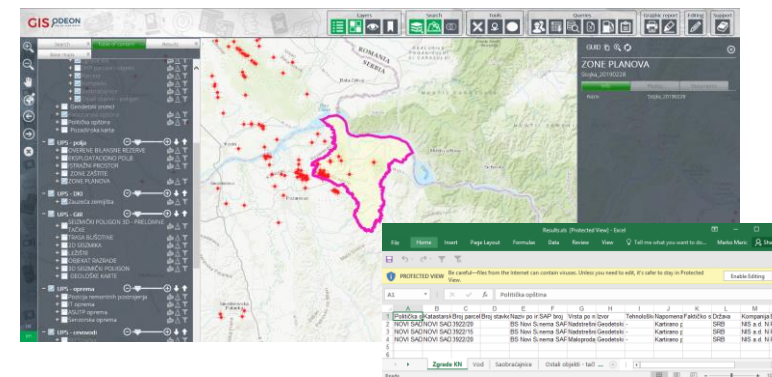
- Legal status – ownership rights
- Position in relation to surrounding areas
- Distances and areas

Temporary lease of land for well reparation /overhaul



Easy identification of temporarily leased piece of parcel in the field by Mobile app GIS ODEON UPS

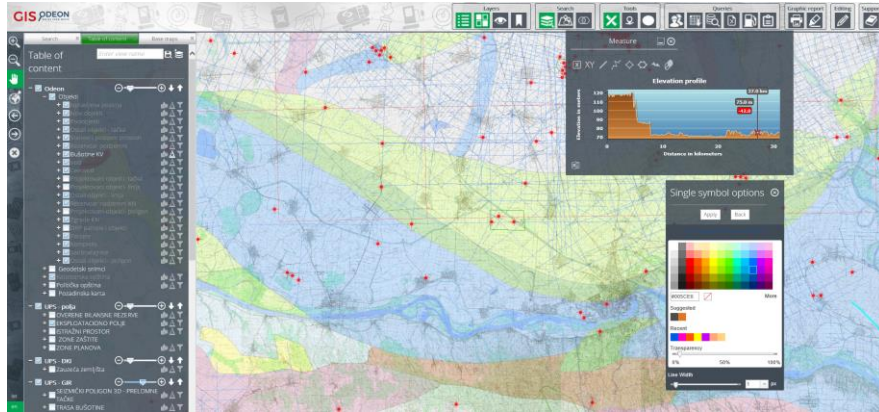
Urban planning zones and affected company real estate



By spatial intersecting, a user can get a quick insight into affected assets on map or in an Excel table

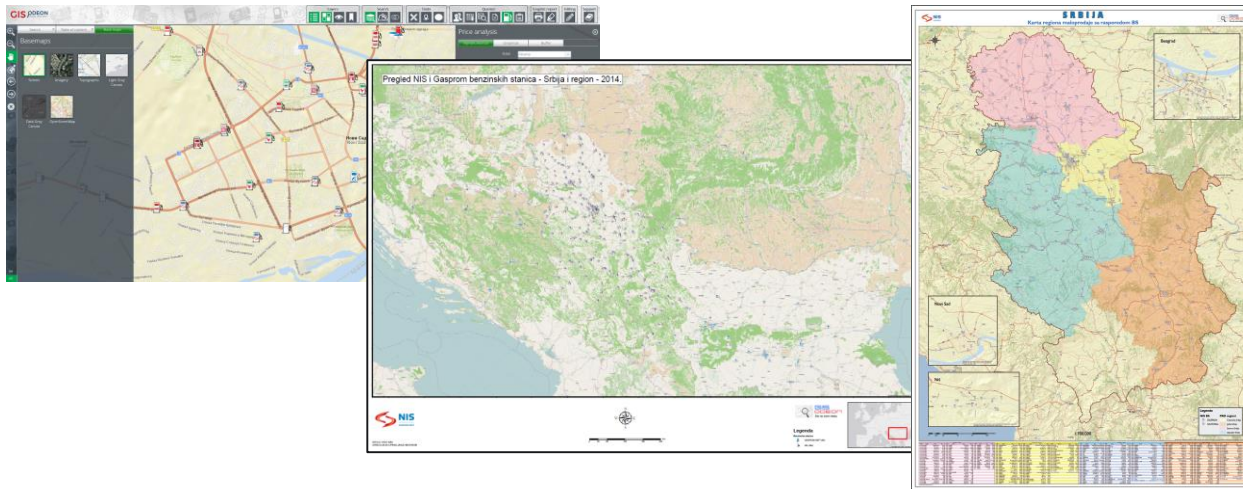
GISification of Business Processes – Map Making

Geological Maps for Project Designing



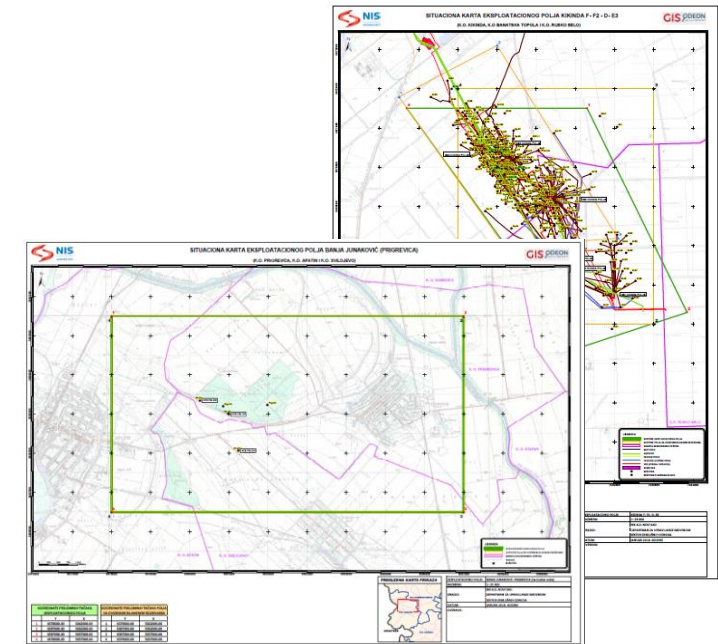
Geological data can be combined with the GIS ODEON data for efficient planning of field activities

Fuel Station Maps for further development of network



Creating maps of exploitational fields for reporting to the Ministry of Mining

ArcMap / ArcGIS Pro

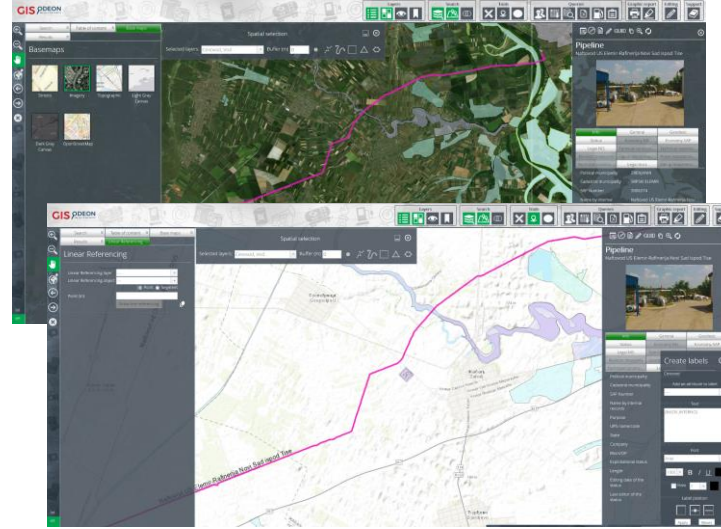


Over 150 maps per year

GISification of Business Processes – New Directions (ongoing projects)

Pipeline maintenance management

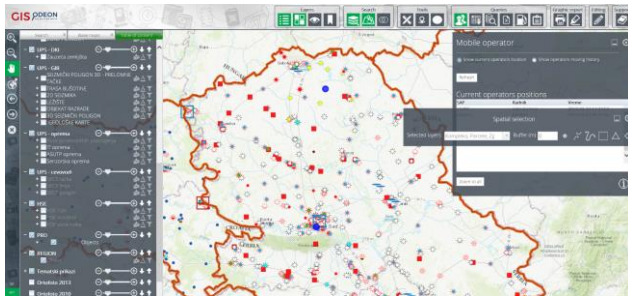
- Technical data related to pipelines (diameter, material, date of construction, last reconstruction date, responsible maintenance operator etc.) and special feature classes for pipeline maintenance
- Locations of perforations with related attributes – for pipeline maintenance and risk assesment



Tax Filing Support

- GIS data of company real estates are used for tax filing
- Data related to taxes can be visualized on map and are available to GIS ODEON users.
- Increased efficiency of the company Tax Department, with time savings and readily updated information from GIS ODEON

Web services of GIS ODEON for other business applications – usage of spatial data (asset locations) for increasing operational efficiency



Ongoing projects for increasing operational efficiency where GIS ODEON data is used:

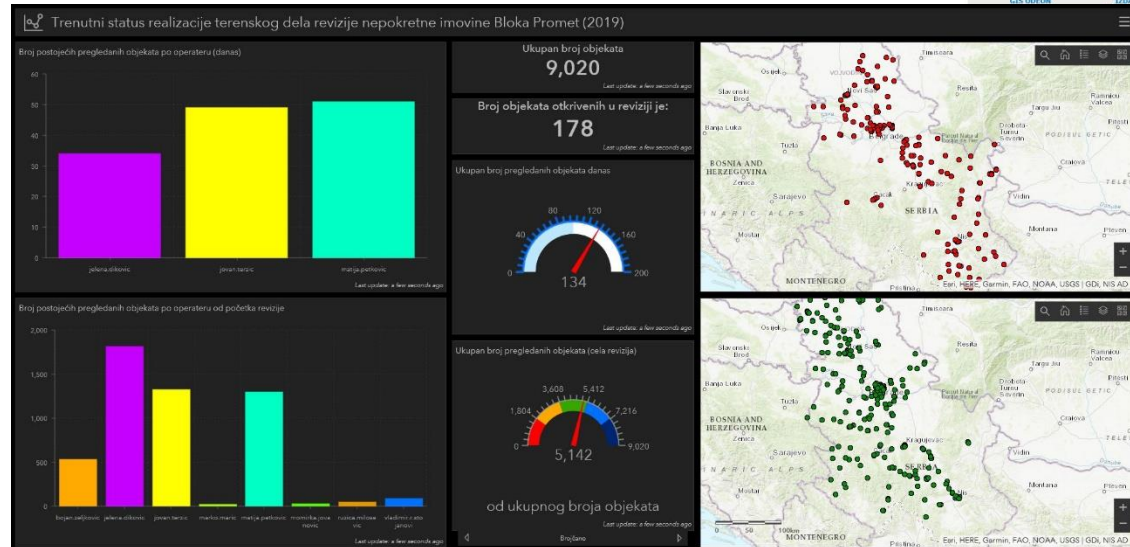
- Fleet Management
- Mobile Operator
- Maximo - Asset Management
- SCADA



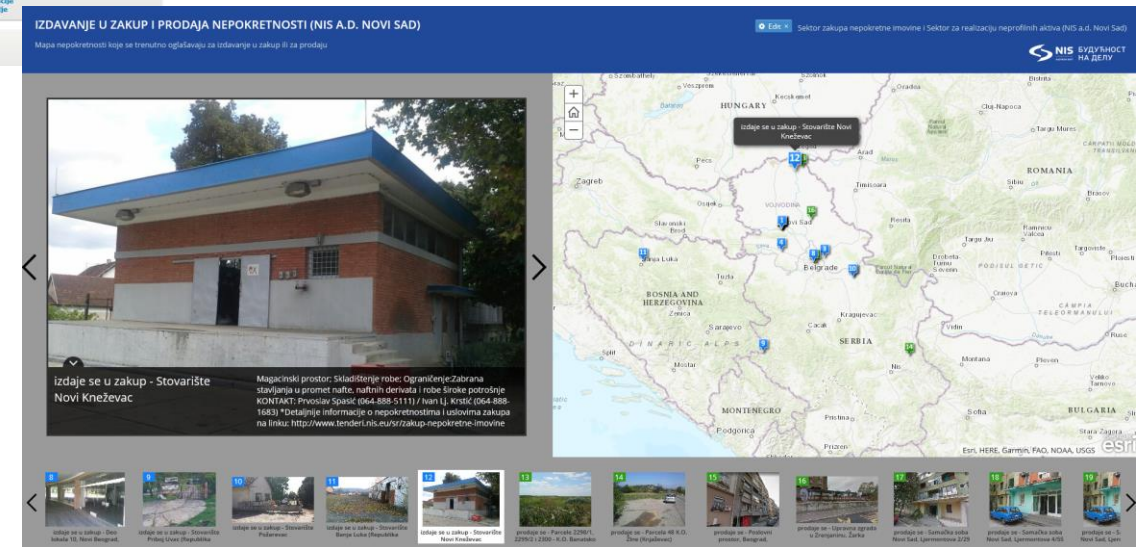
GIS ODEON – Portal (Active since 2019)



Dashboard for current state of real estate audit



Internal story map of real estates for lease or sale



Quick insight into progress of fieldwork related to real estate audit:

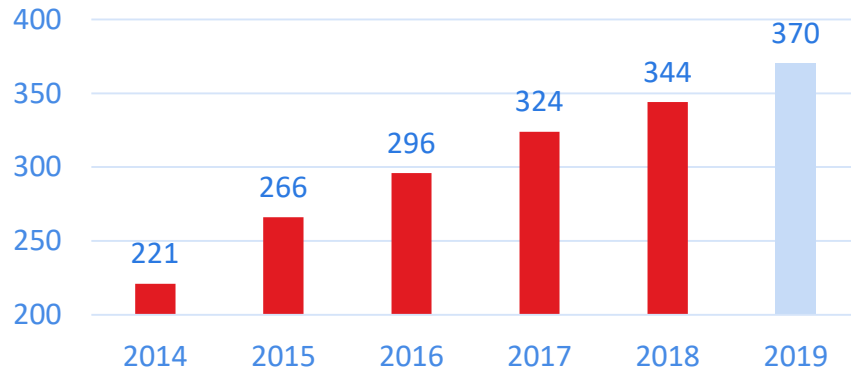
- Currently active operators in the field
- Number of surveyed assets per day
- Total number of surveyed assets
- Percentage of surveyed assets out of the total number of assets included in audit

Web app made through Web app builder on the Portal:

- Quick overview of Company real estate currently for sale or lease
- For advertising purposes
- The plan is to make it open for the public (outside of the Company) in the future

Development of functionalities resulted in a wider usage of the app

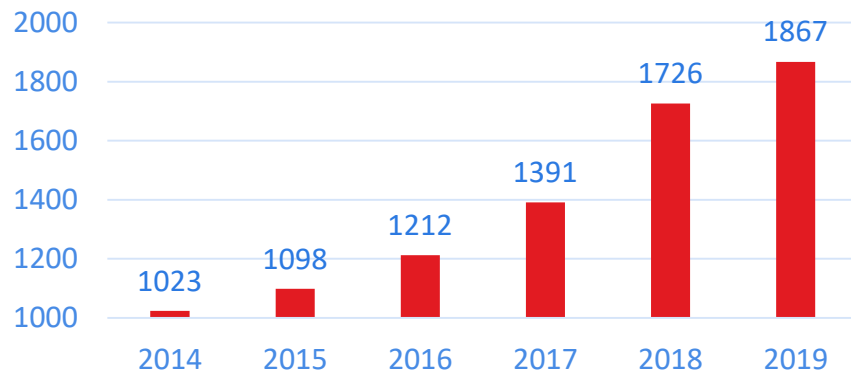
Increase in the number of active users of application



Time spent by users working with the app in 2018

5178 h

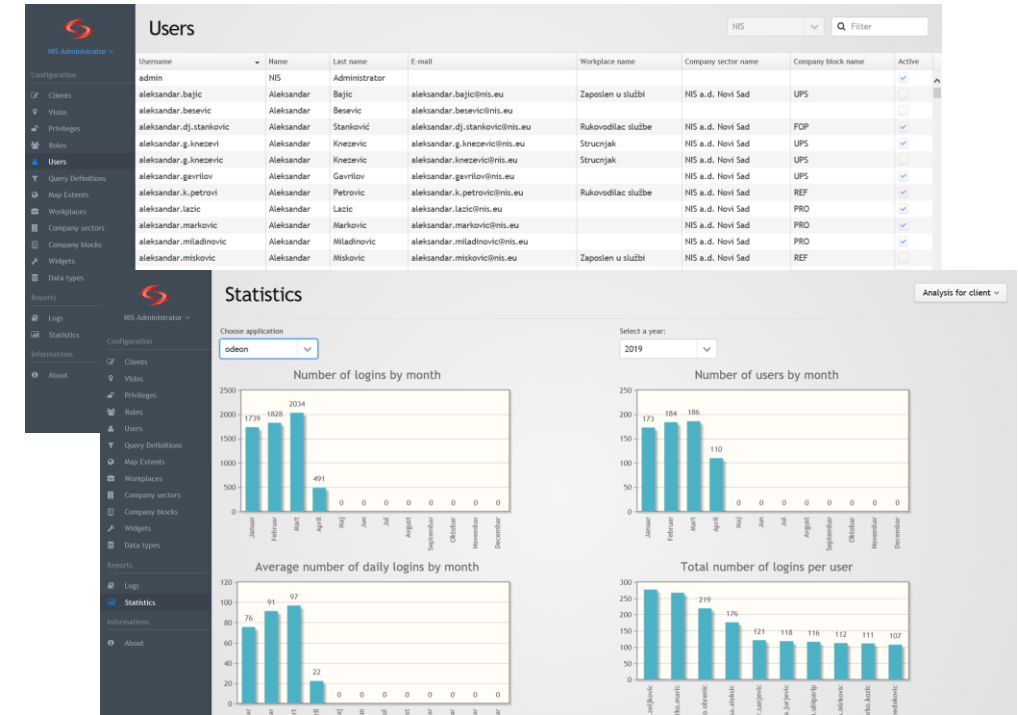
Increase in the number of average monthly logins



Average number of logins per day in 2019

97

User Management Application



- For efficient management of given roles, user rights and statistics related to the usage of the app
- Information needed for advocating GIS benefits and further development

Looking into the future

What's next ?



Engine – *GIS software*

Fuel – *GIS data*

Captain – *GIS experts*



Implementing current ongoing projects



Improving data quality



Improving GIS skills of users



Keeping the course – focus on business needs



Keeping pace with new developments in GIS technology

The way to achieving success with GISification

Challenges

- ✓ Involvement of potential stakeholders (non-GIS people) in GIS development/adaptation to their needs
- ✓ Understanding different business processes and finding the optimal solution for them
- ✓ Reacting to changes during the process of development and implementation
- ✓ Support “from above” – a strong sponsor aware of all benefits that GIS can bring
- ✓ Quantifying and advocating benefits of GISification to the senior management (non-GIS people)

Conclusion – Keeping GISification on its course

GISification path



Don't forget to

- ✓ Keep building your GIS team
- ✓ Stay focused on user goals/give them a vision - "How could GIS improve your business process?"
- ✓ „Bring GIS to users, not users to GIS“
(adapt GIS to the existing workflows, rather than adapting workflows to GIS)

THANK YOU FOR YOUR ATTENTION!

www.nis.eu

*marko.maric@nis.eu
vladimir.r.stojanovic@nis.eu*

NIS.EU