DEAS
Data Economy Alp Strategy

Data Economy Under the Strategy
for the Alps to Promote Competitiveness
and New Business in the Alpine Area

Ljubljana, August 2022

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Interreg Alpine Space Deas

City of Ljubljana

Ljubljana, August 2022

Texts:
Rok Fazarinc, Matevž Pesek, Ram Dušič Hren, Željko Gudžulić, Monika Cvetkov

Photos:
Jasna Klančišar

Schemes and images:
Željko Gudžulić

Editing, proofreading, design, English translation, web edition, prepress, and print:
Matformat, d. o. o.

Official website of the project:
https://www.alpine-space.eu/projects/deas/en/home

DEAS website – City of Ljubljana:
https://www.ljubljana.si/sl/moja-ljubljana/evropska-sredstva-za-ljubljano/projekt-deas/

DEAS website - TPLJ:
https://www.tp-lj.si/sl/projekti/deas-podatkovna-ekonomija-kot-vir-sodelovanja-konkurencnosti-in-novih-storitev-na-obmocju-alp-2020-02-24

Leading partner of the DEAS project:
Regione del Veneto-Direzione ICT e Agenda Digitale Complesso Vega – Palazzo Lybra Via Pacinotti, 4 - 30175 MARGHERA (Venezia), tel. 041 2792202 ictagendadigitale@regione.veneto.it, Manola Tegon manola.tegon@regione.veneto.it

Communication responsible partner
Chamber of Commerce of Treviso-Belluno, Piazza Borsa, 3/b – 31100 TREVISO, tel. +39 437955140 progetti.territoriali@tb.camcom.itm, Elena Zambelli, progetti.territoriali@tb.camcom.it

Project partners
Bwcon GmbH (DE), Dominik Stricker, stricker@bwcon.de
Constance Town (DE), Eberhard Baier, eberhard.baier@konstanz.de
City of Vercelli (IT), Marco Tanese, marco.tanese@comune.vercelli.it
CSI - Piemonte (IT), Anna Cavallo, dati.piemonte@csi.it
Grand E-Nov (FR), Jean Jacques Bernardini, jj.bernardini@grandenov.fr
Styrian Business Promotion Agency SFG (AT) Susanne Urschler, networking@sfg.at
Business Upper Austria BIZ-UP (AT), Robert Stubenrauch, robert.stubenrauch@biz-up.at
City of Lyon - Urban Data LUBA (FR), Mathilde Colin, mathilde.colin@tuba-lyon.com
Municipality of Ljubljana (SI), mag. Željko Gudžulić, zeljko.gudzulic@ljubljana.si
Tehnološki park Ljubljana (SI), Dr. Monika Cvetkov, monika.cvetkov@tp-lj.si

Associated partners from Slovenia
Jožef Stefan Institute – SRIP PMiS, Dr. Nevenka Cukjati, nevenka.cukjati@ijs.si
Ministry of Public Administration, mag. Aleš Veršič, ales.versic@gov.si

Project duration: 1 October 2019 - 30 June 2022

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INTRODUCTION

The role of the Municipality of Ljubljana (hereafter MOL) in the DEAS project (DATA ECONOMY ALPS STRATEGY – DEAS) will be cooperation with various technological partners and experts in the field of hydrology, environment, mobility and open data. Furthermore, we will cooperate in planning the establishment of measuring points and evaluation data that we will collect from various capture devices supplied by the funds foreseen as part of the project. We will establish their operation on the broader pilot area of the MOL and publish the values on open data platforms.

The purpose of the DEAS project defines the following activities:
- digitization of public services,
- identification of open data and related open data with which we can develop new and more efficient services,
- obtaining new data by installing different types of sensors,
- publishing on open data platforms,
- development of a data economy strategy.

As part of the project, we will set up a test system for monitoring watercourses, evaluating and displaying the value of water level data of waters threatening the wider MOL area.

There are currently eleven water metering stations operating in the MOL area or in neighbouring municipalities, which are managed and under the jurisdiction of the Environment Agency of the Republic of Slovenia. Their data are "open" and available online. MOL will set up an additional 17 independent automatic stations on a test basis for accurate monitoring of the water level of watercourses to more easily predict the occurrence of high waters that threaten the broader area of MOL with flooding. We will publish data values on open data platforms.

By establishing a network of low-cost water level gauges and a combination of this data and data from the national ARSO network, we will get the following:
- an additional 17 automatic stations for measuring the water level of smaller watercourses will supplement with data the measuring points of the state network of measuring instruments under the control of ARSO and enable the establishment of a more comprehensive system for analyzing and monitoring hydrological data - this way we will obtain a more accurate map of the flood risk in the area of MOL;
- the possibility of more precise management of the locks on the Ljubljanica River at Ambrožev trg and Gruber's Canal,
- the possibility of timely and more reliable notification of citizens, intervention services and companies in areas where floods may occur.

DEAS PROJECT

In the data economy era, the most valuable resource is no longer oil but data. The data economy is also crucial for developing the Alpine region and overcoming its challenges. The 80 million people in the Alpine area have specific needs for timely and high-quality services. To provide these services, open data and linked open data (in nad. OD/LOD) can be used - as a source of available information and a resource for services provided by the public sector and companies.

Although several local initiatives are already using OD/LOD in different sectors in the Alpine area, there is no uniform impact on the entire region, and practical solutions still need to be provided. The DEAS project aims to improve the value of using OD/LOD for public services and businesses and will focus on strategic sectors of the Alpine area, such as environment, tourism and mobility. With the DEAS project, we will encourage the public and private sectors to create new and user-oriented services.

Image 1
DEAS Project - Partners

The applicant and coordinator of the DEAS project are **Regione Veneto** from Italy. The partners in the project are from the member states of the European Union: Slovenia (City Municipality of Ljubljana - MOL, Tehnološki Park Ljubljana d.o.o.), Italy (Chamber of Commerce of Treviso-Belluno, City of Vercelli, CSI - Piemonte), Austria (Styrian Business Promotion Agency SFG, Business Upper Austria BIZ-UP), Germany (Bwcon GmbH, City of Constance), France (Grand E-Nov, City of Lyon Urban Data TUBA).

MAIN OBJECTIVES AND ACTIVITIES

The purpose of the DEAS project is to increase the value of exploiting the available OD/LOD for innovations, increasing the Alpine area's competitiveness and accelerating its digitalization. These activities will contribute to the fulfillment of the Alpine Strategy on the Data Economy and strengthen cooperation between public and private actors operating in the field of the Data Economy, especially with OD/LOD. The main objective is to exploit their potential for innovation and growth and thereby contribute to implementing S3 and related local development plans.

EXPECTED RESULTS

The DEAS project will support the implementation of e-government strategies to effectively promote new services that better meet the needs of citizens, visitors, tourists and entrepreneurs. Intermediary organizations will better understand and take advantage of the opportunities of the data economy to support the private sector in using OD/LOD. The project will help 160 SMEs and start-ups to make greater use of available OD/LOD to develop new services, access new markets and meet the needs of their customers. The concrete results of the project include the development of the methodology of the Alps area for the exploitation of OD/LOD, establishing a suitable platform and preparing a DEAS strategy to promote greater availability of relevant OD/LOD and their exploitation. DEAS includes all quadruple helix actors - science, politics, industry and society - in its co-creation processes.

IMPLEMENTATION DEADLINES AND FINANCING SCHEME

It is a two-step application process with the following deadlines:
- December 12, 2018 – submission of the Statement of Intent: the lead partner prepared and submitted a draft project proposal, in which he provided general information about the content of the project, the planned partnership and other essential information; declarations of the partners are not yet necessary at this stage,
- March 2019: selection of proposals to be invited to finalize the project proposal;
- June 5, 2019: deadline for submitting project proposals,
- October 1, 2019 – confirmation of the project and start of the implementation of activities,
- June 30, 2022 – end of the project.

The co-financing rate is 85% for all eligible costs, including services, hardware purchases, and similar. The budget of the entire DEAS project amounts to EUR 2,253,540.00, and the value of eligible funds amounts to EUR 1,915,509.00. For MOL, we have planned funds based on the defined activities in the amount of EUR 149,900.00, including VAT, or EUR 126,650.00. We allocated the planned funds to cover the labour costs of MOL employees, various external experts and other project-related expenses, such as the costs of organization and co-organization of different promotional events, test-pilot activities, procurement of hardware and software, ...

Due to the epidemiological situation of COVID-19, the project was extended by two months and lasted just under three years.

ESTABLISHMENT OF 16 MEASURING POINTS IN THE WIDER AREA OF MOL

According to the damage potential Municipality of Ljubljana area is ranked first in terms of flood risk in the Republic of Slovenia, people's health, critical infrastructure, cultural monuments and other criteria (Flood Risk Reduction Plan 2017-2021 (NZPO SI), Government of the Republic of Slovenia, prepared Ministry of Environment and Space).

During past flooding or high-water events, we established that the network of ARSO water measuring stations needed to allow insight into the hydrological and hydraulic conditions of the watercourses, which threaten the urban areas of the MOL. Before the implementation of the Bober project, which ARSO led, data on the flows of critical watercourses for the city's flood safety were relatively poor, or rather, it was possible to determine the flood risk assessment mainly based on experience and analyzes of previous flood events.

The lack of relevant data on the temporal development of water levels and flows were most critical in the areas along the Ljubljanica from Špica (the division of the Barjanska Ljubljanica into the Mestna Ljubljanica and Gruberjev Kokop) to the south-eastern, southern and south-western borders of the MOL in Barje, on the entire Mali Graben and part of the Gradaščica from Kozarij to the mouth of the Ljubljanica, in the Glinščica basin downstream of the western bypass, the area along the Gameljščica and the area along the right tributaries of the Ljubljanica (Dobrunjščica and Bizoviški potok).

After the implementation of the BOBER project, the accessibility of data has significantly improved. Also, some new (key) water measuring stations were established (for example, Gradaščica – Bokalci), but there are still areas of "grey spots" where data is not available (Barjanska Ljubljanica, Glinščica, Gameljščica, Dobrunjščica). As part of the DEAS project, colleagues from the Department for Protection and Rescue and external expert Rok Fazarinec from the company IZVO-R prepared a list of the installation of independent water metering stations (measuring points) on the broader area of the Municipality of Ljubljana. They evaluated them with importance from I to III. The locations are proposed to observe the levels of relevant watercourses in the operation of already built and planned facilities for controlling the water regime (sluices, dams, reservoirs) at low and medium flows and, above all, to prevent the risk of flooding.

The proposal for additional independent automatic stations for measuring the water level of watercourses is given to establish a comprehensive system of observing hydrological parameters on the broader area of the MOL by supplementing the ARSO measuring points and measuring points on already built facilities and facilities that are about to be implemented.

Below we provide the following:
- integral map of flood risk with classes Q10, Q100 and Q500 on the broader area of the MOL (Figure 2), data source: *Atlas voda*,
- flood risk warning map on the broader area of the MOL (Figure 3), data source: Atlas voda,
- a list of proposed independent automatic stations with a general description of the purpose with a description, location proposal, importance and priority of placement, which depends on the significance of the data concerning the measurement goals and feasibility. (Table 1)

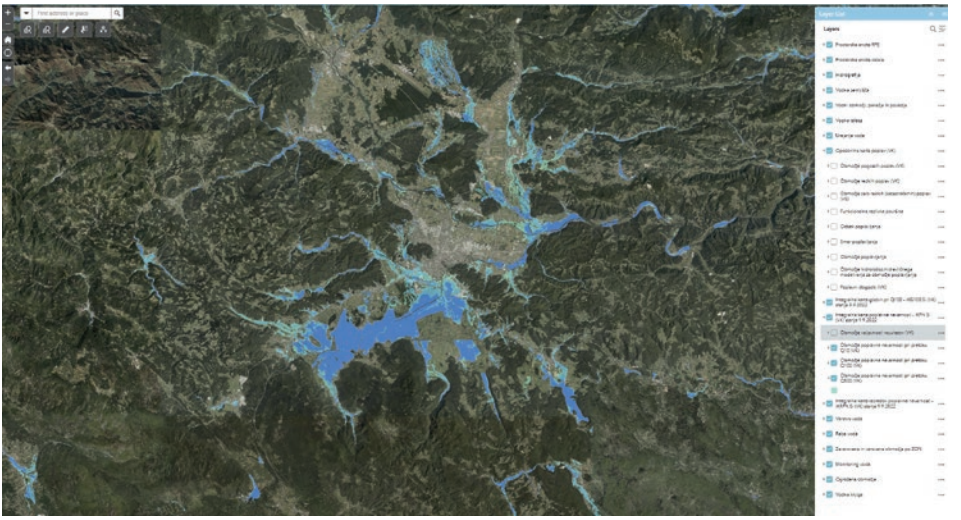


Image 2
Integral flood hazard map with classes Q10, Q100 and Q500 in the wider area- of MOL

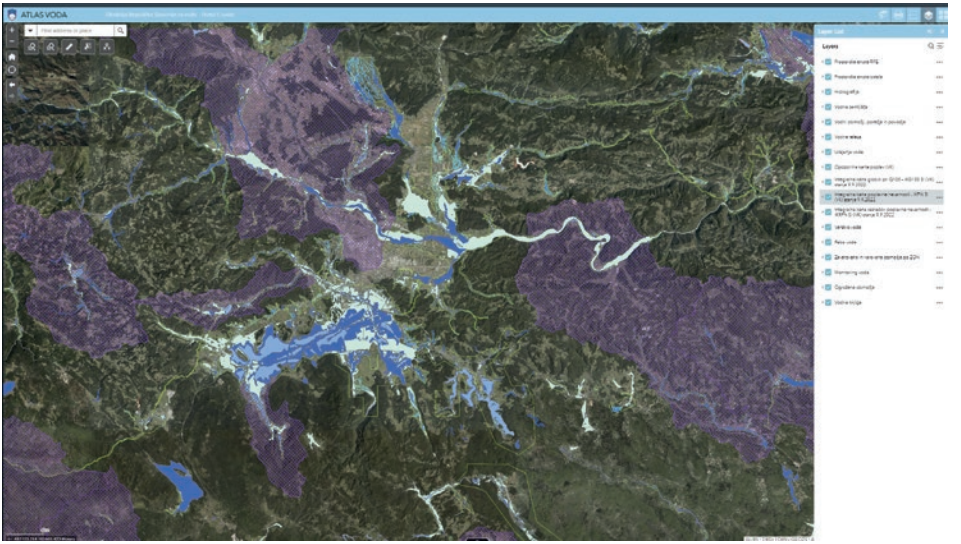


Image 3
Integral and flood hazard warning map in wider area of MOL

Table 1

u2012 with a list of proposed stand-alone automatic stations in the wider MOL area with a general description

The area of Barjanska Ljubljanica					
No.	Location	Watercourse	Goal	Priority	Footnote
1	Podpeč - bridge	Ljubljanica	Determination of the hydraulic properties of the central Barje	II	Outside of City of Ljubljana
2	Lipe – water bridge	Ljubljanica	Determination of the danger of the Lip and the area on the Črnovaška cesta, as well as the hydraulic properties of Barje	I	
3	Highway - bridge - Southern part	Ljubljanica	Determining the danger of the area along Ižanska cesta, Ilovice and hydraulic roads. properties of Ljubljanica	I	
4	Špica (by the Veslaškem klubu)	Ljubljanica	Determining the danger of the area along Ižanska cesta, Ilovica and the hydraulic properties of the Ljubljanica	I	
5	Lipe, bridge on road by the Črna vas	Iška	Determination of the danger of the Ilovica, Galjevica area and the hydraulic properties of the Ljubljanica	II	
6	Brest 110 - bridge	Iška	Determination of the danger of Lip and the area south of the Črnovaška cesta	II	Outside of City of Ljubljana
6a	Tlake - bridge	Iška	Determination of the danger of Lip and the area south of the Črnovaška ceta	II	Outside of City of Ljubljana
7	Črna vas – bridge over Farjevec	Farjevec	Determining the danger of the area south of Črnovaška cesta and along Ižanska cesta	III	
8	Črna vas – Volarju	Volar	Determination of pop. the danger of the area south of Črnovaška cesta and along Ižanska cesta	I	
9	Hauptmace - bridge	Ižica	Provisions of the general threats to Hauptmanc and settlements east of the Ižanska cesta	I	
10	Ižanska cesta – bridge over Ižica	Ižica	Provisions of the general hazards along the Ižanska road and hydraulic properties	II	Addendum to measuring point no. 3
11	Jarek, Mihov Štradon, north and south layout, containment	Jarek na Mihovem stradonu	Flood control of the Ilovice area	I	
The area of Mali graben					
12	Dolgi most - brv	Mali graben	Supplementing ARSO MOP measurement sites	III	After implementation of DPN measures
The area of Glinščice					
13	Contaiment - Podutik	Glinščica	Control of the height of the water level of Glinščica	I	

14	Contaiment - Brdo (TPLJ)	Glinščica	Control of the operation of the Brdo retainer	I	It already worked in the test
15	Bizjakova ulica - bridge	Glinščica	Control of the operation of the Brdo retainer	I	Measuring site established in another project
16	Koseški bajer	potok	Monitoring of the lake formation of Koseški bajer	II	
17	Koseze	pritok Pržanca	Stream condition monitoring		Irrelevant
The area of Sava					
18	Brod nad jezom	Sava	Flood control of the Sava in Tacno	III	
The area of Gameljščica					
19	Srednje Gameljne	Gameljščica	Determining the flood risk of Gameljne and determining the flows of the Gameljščica	I	In the forest
20	Spodnje Gameljne	Gameljščica	Determining the flood risk of Gameljne and determining the flows of the Gameljščica	I	19 and 20 connected stations
The area of mestna Ljubljanica in Gruberjev prekop					
21	Contaiment - Ambrožev trg	Mestna Ljubljanica	Hydraulic properties of the Ljubljanica - optimal operation of the sluices	III	
22	Fabjanijev most	Mestna Ljubljanica	Hydraulic properties of the Ljubljanica - optimal operation of the sluices	III	Paired with no. 21
23	Brv na Roški	Gruberjev prekop	Hydraulic properties of the Ljubljanica - optimal operation of the sluices	III	During the reconstruction
24	Zapornica - podslapje	Gruberjev prekop	Hydraulic properties of the Ljubljanica - optimal operation of the sluices	III	Paired with no. 23
The area of spodnji tok Ljubljanice					
25	Fužine nad jezom - footbridge	Ljubljanica	Hydraulic properties of the Ljubljanica	III	
26	Fužine pod jezom - bridge	Ljubljanica	Hydraulic properties of the Ljubljanica	III	Paired with no. 25
27	Vevče nad jezom - papirnica	Ljubljanica	Hydraulic properties of the Ljubljanica, flood safety Vevč	III	
28	Vevče pod jezom - bridge	Ljubljanica	Hydraulic properties of the Ljubljanica, flood safety Vevč	III	Paired with no. 26
29	Sostro - bridge	Dobrunjščica	Flooding of areas along Dobrunjščica	I	
30	Podgrad - bridge	Besnica	Flooding of the underpass along the railway line	II	

Based on geodetic field data for the locations of independent automatic water level monitoring stations, we prepared characteristic (representative) data on the measured levels of watercourses.

We prepared data for 17 measuring points at 16 locations based on field measurements and the results of hydrological studies and hydraulic models ready for the MOL area in the recent past.

Barjanska Ljubljanica area

In the area of Barjanska Ljubljanica, we realized 9 out of 11 proposed measuring points.

At the Mihov Štradon location, we established two measuring points, one on the south and the other on the north side of the dam.

LJUBLJANICA, PODPEČ, BRIDGE

The purpose and method of setting up the measuring point
We established the measuring site intending to determine the level drop and the energy of the Ljubljanica River for improved modelling of the hydraulics of the Ljubljana Marsh and optimization of the upper boundary condition. When analyzing the data, it will be necessary to take into account that the Ljubljanica river flows over the road from Notranje Gorice to Podpeč near Notranje Gorice.

Location of measuring point and priority of placement
The measuring device is placed on the concrete bridge over Ljubljanica in settlement of Podpeč on the downstream side.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (SI-D96/TM)	
N 92947.007 E 454990.995	
https://goo.gl/maps/sbnDL8zMwB2uWWLK6	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	290.48
Altitude points of establishment at the edge of steel construction – angle of the rapper	290.54
Water level – bottom angle	280.00
Difference between angle sensor and angle of bottom	10.48
Mean flow	286.1
Large flow	289.20
High water flow	289.20
Q10	
Q100	290.00
Q500	
Sensor Type	Ames

Image 4 LJUBLJANICA, PODPEČ – 01

Image 5 LJUBLJANICA, PODPEČ – 02

Image 6 LJUBLJANICA, PODPEČ – 03

LJUBLJANICA, VODOVODNI MOST (WATER BRIDGE), BREST, LIPE

The purpose and method of setting up the measuring point
We set up the measuring point to determine the level and energy of the Ljubljanica River to create more accurate maps of the flood risk and the actual danger of the area along **Črnovaška** Road, as the existing data are from 1933 and 2010.

Location of measuring point, the priority of placement
The measuring device is placed on the steel water bridge over the Ljubljanica in location Brest pri Lipah. The location of the measuring device is on the downstream side in the first quarter of the bridge.

KEY PARAMETERS AT THE MEASURING POINT

SENSOR COORDINATES (SI-D96/TM)	
N 95822.098 E 458904.175	
https://goo.gl/maps/sootPjLs1FbY3Fyd8	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	289.10
Altitude points of establishment at the edge of steel construction – angle of the rapper	289.18
Water level – bottom angle	280.00
Difference between angle sensor and angle of bottom	9.10
Mean flow	286
Large flow	287
High water flow	287.6
Q10	288
Q100	289.15
Q500	
Sensor Type	Ames

Image 7 LJUBLJANICA, WATER BRIDGE, BREST, LIPE - 01

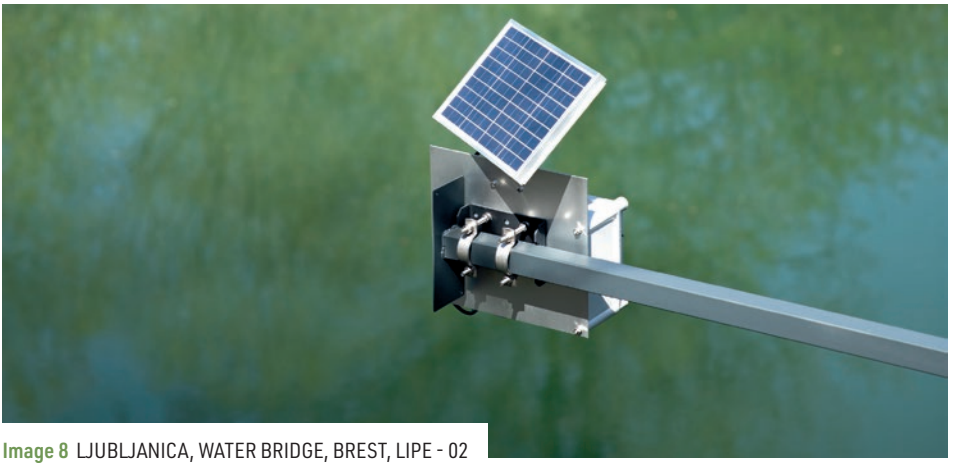


Image 8 LJUBLJANICA, WATER BRIDGE, BREST, LIPE - 02

Image 9 LJUBLJANICA, WATER BRIDGE, BREST, LIPE - 03

LJUBLJANICA RIVER, HIGHWAY, SOUTHERN ROAD RING

The purpose and method of setting up the measuring point
We established the measuring point to determine the level and energy of the Ljubljanica River for the production of more accurate maps of the flood risk and the actual danger of the area of Ilovica, Galjevica and Rakova Jelša. We also wanted to be able to control the sluice gates at Ambrožev trg (Ambrožev Square) and Gruberjev prekop.

Location of measuring point, a priority of placement
The measuring device is attached downstream to the AB structure, outside the influence of the supports (concrete columns).

KEY PARAMETERS AT THE MEASURING POINT

SENSOR COORDINATES (SI-D96/TM)	
N 98307.286 E 461909.124	
https://goo.gl/maps/qSvVjT4TrmdubZZd6	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	292.04
Altitude points of establishment at the edge of steel construction – angle of the rapper	291.73
Water level – bottom angle	280.00
Difference between angle sensor and angle of bottom	14.54
Mean flow	285.90
Large flow	287.00
High water flow	288.50
Q10	287.71
Q100	288.35
Q500	288.78
Sensor Type	Ames

Image 10 LJUBLJANICA, HIGHWAY, SOUTHERN ROAD RING - 01

Image 11 LJUBLJANICA, HIGHWAY, SOUTHERN ROAD RING - 02

Image 12 LJUBLJANICA, HIGHWAY, SOUTHERN ROAD RING - 03

LJUBLJANICA, LIVADA, MOST (BRIDGE)

The purpose and method of setting up the measuring point
We set up the measuring point to determine the level and energy of the Ljubljanica River at Livada. It was impossible to find a suitable place on Špica to produce more accurate flood risk maps. The same also applied to the actual dangers of Ilovica, Galjevica and Rakova Jelša and the management of the sluice gates on Ambrožev trg and Gruberjev prekop (Ditch). The location is suitable due to its quiet location concerning the Mali graben flow and the division of the Ljubljanica River at Livada. The area is one of the keys to recognizing the dynamics of Ljubljanica. The data from this measuring site will be supplemented by the data from the planned station at the bridge on Hladnikova Road, which will be implemented as part of the Gradaščica project.

Location of measuring point, a priority of placement
The measuring device is attached to the concrete bridge over the Ljubljanica River on Hladnikova Road. The positioning of the sensor is on the upstream side in the middle of the bridge.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (COORDINATES IN SI-D96/TM)	
N 95822.098 E 458904.175	
https://goo.gl/maps/sootPjLs1FbY3Fyd8	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	290.43
Altitude points of establishment at the edge of steel construction – angle of the rapper	290.67
Water level – bottom angle	277.50
Difference between angle sensor and angle of bottom	12.93
Mean flow	285.85
Large flow	287.00
High water flow	288.00
Q10	287.50
Q100	288.14
Q500	288.57
Sensor Type	Ames

Image 13 LJUBLJANICA, LIVADA, BRIDGE - 01

Image 14 LJUBLJANICA, LIVADA, BRIDGE - 02

Image 15 LJUBLJANICA, LIVADA, BRIDGE - 03

IŠKA, LIPE, THE BRIDGE ON THE ČRNOVAŠKA ROAD (INN KOLIŠČE)

The purpose and method of setting up the measuring point
We set up the measuring point to determine the level of the Iška River in its ascending and descending branches. When the Ljubljanica River rises and floods the area south of the Črnovaška road, Iška begins to flow south.

Location of measuring point, a priority of placement
The measuring device is attached to the concrete bridge in Lipe, near the Kolišče inn. The location of the measuring point is on the downstream side, in the middle of the bridge.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (COORDINATES IN SI-D96/TM)	
N 95446.999 E 459008.817	
https://goo.gl/maps/PUrfHB46rxYoEuGd8	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	288.65
Altitude points of establishment at the edge of steel construction – angle of the rapper	288.66
Water level – bottom angle	280.00
Difference between angle sensor and angle of bottom	3.65
Mean flow	286
Large flow	287
High water flow	287.5
Q10	288
Q100	289.15
Q500	
Sensor Type	Revivo

Image 16 IŠKA, THE BRIDGE ON THE ČRNOVAŠKA ROAD, LIPE (KOLIŠČE INN) - 01

Image 17 IŠKA, THE BRIDGE ON THE ČRNOVAŠKA ROAD, LIPE (KOLIŠČE INN) - 02

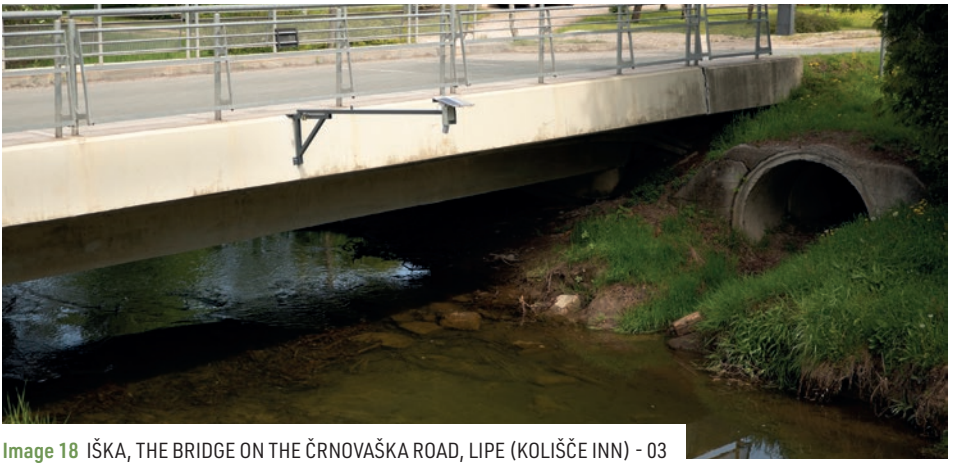


Image 18 IŠKA, THE BRIDGE ON THE ČRNOVAŠKA ROAD, LIPE (KOLIŠČE INN) - 03

IŠKA, TOMIŠELJ, THE BRIDGE OUTSIDE THE SETTLEMENT

The purpose and method of setting up the measuring point
The measuring point was set up because, with increased flows, the Iška overflows the right (eastern) bank and flows towards the area between Ižanska and Črnovaška Road, where the possibility of outflow towards Ljubljanica River is significantly less. Above the bridge, the river Iška stops at high tide. The hydraulic parameters for the analysis are determined with the help of the location data on the water bridge (Ljubljanica) and the VP Iška vas on Iška. The installation at Tomišelj is an alternative to the facility in Brest and Tlake.

Location of measuring point, a priority of placement
The measuring device is placed on the bridge, which is located outside the MOL in settlement of Tomišelj. The sensor placement is on the downstream side in the middle of the bridge.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (COORDINATES IN SI-D96/TM)	
N 95822.098 E 458904.175	
https://goo.gl/maps/vEEP18AJi3apZQty6	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	296.88
Altitude points of establishment at the edge of steel construction – angle of the rapper	296.88
Water level – bottom angle	293.12
The difference between the angle of the sensor and the angle of the bottom	3.76
Mean flow	293.3
Large flow	293.00
High water flow	295.00
Q10	
Q100	
Q500	
Sensor Type	Revivo

Image 19 IŠKA, TOMIŠELJ, BRIDGE, OUTSIDE THE SETTLEMENT - 01 STAKE - 01

Image 20 IŠKA, TOMIŠELJ, BRIDGE, OUTSIDE THE SETTLEMENT – 02 STAKE - 02

VOLAR, BIZOVIŠKI ŠTRADON

The purpose and method of setting up the measuring point
Under normal hydrological conditions, the Volar stream is under the dam condition. With increased flows, the high waters of Iška spring from the location of Iška vršaj and Ižica (to a lesser extent) overflow into the area between Ižanska Road and Črnovaška Road. At the same time, a dammed surface is created on the southern side, which can be some 10 cm higher than the surface of the Ljubljanica River in this area. Level measurement will determine the level difference between the south and northern sides of Črnovaška Road. The difference in water level between the north and south sides arises mainly in the rising branch of the flood wave when tributaries from the southern periphery fill the Marshes. The difference decreases with the rise of the Ljubljanica, which is delayed.

Location of measuring point, a priority of placement
The measuring device is attached to the upstream (southern) side of the AB bridge at the site of the central pillar of the fence.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (COORDINATES IN SI-D96/TM)	
N 97122.449 E 462253.571	
https://goo.gl/maps/9tmmZhyfWgXnEaWi7	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	289.35
Altitude points of establishment at the edge of steel construction – angle of the rapper	289.28
Water level – bottom angle	285.72
Difference between angle sensor and angle of bottom	3.63
Mean flow	286.80
Large flow	287.50
High water flow	288.20
Q10	287.80
Q100	288.45
Q500	288.90
Sensor Type	Revivo

Image 21 VOLAR, BIZOVIŠKI ŠTRADON – 01

Image 22 VOLAR, BIZOVIŠKI ŠTRADON – 02

Image 23 VOLAR, BIZOVIŠKI ŠTRADON – 03

IŽICA, HAUPTMANCE, MOST (BRIDGE)

The purpose and method of setting up the measuring point
We set up the measuring point to collect data on the water level in the Hauptmance area and the hydraulic drop from Ižica to Peruzzijeva Road. Since during floods, a significant part of the water of Ižica and Želimeljščica flows north through the flood zone (hamlet of Hauptmance), determining the flow is very difficult, or it is necessary to take into account the entire flood flow east of the Ižanska Road.

Location of measuring point, a priority of placement
Since the Črnovaška Road is under renovation and the bridge over Ižica on the road to Hauptmance is currently being renovated, we have temporarily set up the measuring point 30 meters lower along the Ižanska Road. The measuring device is attached to the upstream side of the first quarter of the bridge.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (COORDINATES IN SI-D96/TM)	
N 95822.098 E 458904.175	
https://goo.gl/maps/sootPjLs1FbY3Fyd8	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	289,12
Altitude points of establishment at the edge of steel construction – angle of the rapper	289,22
Water level – bottom angle	285,40
Difference between angle sensor and angle of bottom	3,72
Mean flow	286,10
Large flow	287,70
High water flow	288,70
Q10	287,84
Q100	288,85
Q500	
Sensor Type	Revivo

Image 24 IŽICA, HAUPTMANCE, BRIDGE - 01

Image 25 IŽICA, HAUPTMANCE, BRIDGE – 02

Image 26 IŽICA, HAUPTMANCE, BRIDGE - 03

IŽICA, BRIDGE ON IŽANSKA ROAD, KAROLINKE, MOST (BRIDGE)

The purpose and method of setting up the measuring point
The purpose of the measurements is to collect data on the water level in the area south of the Southern Ring Road (similar data to the data of the measuring site described in No. 3). This is essential for the planning of anti-flood protection of residential buildings east of Ižica and Ižanska Road and south of the Southern Ring Road, as well as for the operation of the sluice gate at Jarek J1.

Location of measuring point, a priority of placement
Bridge over Ižica on Ižanska Road south of the intersection with Highway. The location of the measuring point is on the upstream side of the AB side of the bridge.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (COORDINATES IN SI-D96/TM)	
N 97987.368 E 462104.530	
https://goo.gl/maps/cvznVr2UpxvBtgwV9	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	289.97
Altitude points of establishment at the edge of steel construction – angle of the rapper	290.10
Water level – bottom angle	284.00
Difference between angle sensor and angle of bottom	5.97
Mean flow	285.90
Large flow	287.00
High water flow	287.5
Q10	287.71
Q100	288.35
Q500	288.78
Sensor Type	Ames

Image 27
IŽICA, BRIDGE ON IŽANSKA ROAD, KAROLINKA, BRIDGE - 01

Image 28
IŽICA, BRIDGE ON IŽANSKA ROAD, KAROLINKA, BRIDGE - 02

JAREK, MIHOV ŠTRADON, NORTH AND SOUTH PLACEMENT, RETAINER

The purpose and method of setting up the measuring point
The purpose of the measurements is to collect data on the water level in the Ilovice area north of the Southern Ring Road (similar data to the data of the measuring site described in No. 4). The information is essential for planning the anti-flood protection of residential buildings north of the Southern Ring Road and east of Ižanska Road, and for the operation of the dam in such a way that it does not cause adverse impacts south of the Southern Ring Road.

Location of measuring point, a priority of placement
The measuring devices (north and south) are attached to each side of the AB frame of the river lock facility.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (COORDINATES IN SI-D96/TM)	
N 98044.708 E 462497.834 (North) N 98047.980 E 462500.787 (South)	
https://goo.gl/maps/j9D8XorrqoYJicDd6	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	289.76 (S) 289.25 (J)
Altitude points of establishment at the edge of steel construction – angle of the rapper	289.26 (S) 289.09 (J)
Water level – bottom angle	287.5 (S and J)
Difference between angle sensor and angle of bottom	4.01 (S) 3.50 (J)
Mean flow	286.25 (S and J)
Large flow	287 (S and J)
High water flow	287.5 (S and J)
Q10	
Q100	
Q500	
Sensor Type	AMES

Image 29
JAREK, MIHOV ŠTRADON,
NORTH AND SOUTH
PLACEMENT,
RETAINER - 01

Image 30
JAREK, MIHOV ŠTRADON,
NORTH AND SOUTH
PLACEMENT,
RETAINER - 02

Glinščica area

In the area of Glinščica, we implemented 2 of the five proposed measuring points.

GLINŠČICA, PODUTIK, RETAINER

The purpose and method of setting up the measuring point
By measuring the depths and flows at the outlet from the reservoir at Glinščica, it is possible to manage the retention at Brdo more precisely.

Location of measuring point, a priority of placement
The measuring device is placed against the right-side wall next to the underflow of the outlet facility. It is also set as close as possible to the overflow threshold at the end of the underflow.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (COORDINATES IN SI-D96/TM)	
N 103982.662 E 457855.659	
https://goo.gl/maps/soXiHWdb2pWU6V3LA	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	307.41
Altitude points of establishment at the edge of steel construction – angle of the rapper	306.72
Water level – bottom angle	296.41
Difference between angle sensor and angle of bottom	4.12
Mean flow	298.73
Large flow	304.7
High water flow	305
Q10	
Q100	
Q500	
Sensor Type	Revivo

Image 31
GLINŠČICA, PODUTIK,
RETAINER - 01

Image 32
GLINŠČICA, PODUTIK,
RETAINER - 02

GLINŠČICA, TPL – BRDNIKOVA, RETAINER

The purpose and method of setting up the measuring point
The measurement of depth at high flows reflects the operation (retention) of the barrier and meshing of the rakes at the inlet. With the usual arrangement and shape of the rakes, the measured level would mainly show the holding space filling during increased flows. Due to the crushing of the rakes, we cannot control the retention, and the retention space is filled at the beginning of the rising branch of the flood wave. The passage of the peak would be without retention, or Glinščica would overflow Pot Roberta Blinca. The measuring device is placed in the middle of the inlet profile.

Location of measuring point, a priority of placement
The measuring device is placed in the middle of the inflow profile, i.e., upstream of the rakes at the inflow into the impoundment facility.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (COORDINATES IN SI-D96/TM)	
N 101581.239 E 458288.404	
https://goo.gl/maps/EHX3bmPU8QvXyaeV8	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	300.53
Altitude points of establishment at the edge of steel construction – angle of the rapper	300.85
Water level – bottom angle	296.41
Difference between angle sensor and angle of bottom	4.12
Mean flow	298.21
Large flow	298.71
High water flow	299.31
Q10	
Q100	
Q500	
Sensor Type	Ames

Image 33 GLINŠČICA, TPL - BRDNIKOVA, RETAINER - 01

Image 34 GLINŠČICA, TPL - BRDNIKOVA, RETAINER – 02

Image 35 GLINŠČICA, TPL - BRDNIKOVA, RETAINER – 03

Gameljščica area

In the area of Glinščica, we realized 2 of the two proposed measuring points.

GAMELJŠČICA, CENTRAL GAMELJNE, BRIDGE IN THE FOREST

The purpose and method of setting up the measuring point
The measuring site is intended to monitor the level of the Gameljščica in the area of Srednje Gameljne, which is more exposed to flooding caused by the flooding of the location of the left bank upstream of the dam.

Location of the measurement site, placement priority and sensor type
The measuring device is attached to the railing of the bridge. The placement of the sensor is on the upstream side in the middle of the bridge.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (COORDINATES IN SI-D96/TM)	
N 109834.25 E 461255.30	
https://goo.gl/maps/UDA4bJ8RY9sEGFXv7	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	309.39
Altitude points of establishment at the edge of steel construction – angle of the rapper	309.03
Water level – bottom angle	306.83
The difference between theangle of the sensor and the angleof the bottom	2.56
Mean flow	307.3
Large flow	308.5
High water flow	308.7
Q10	308.47
Q100	309.16
Q500	309.49
Sensor Type	Ames

Image 36 SREDNJE GAMELJNE, BRIDGE IN THE FOREST - 01

Image 37 SREDNJE GAMELJNE, BRIDGE IN THE FOREST - 02

Image 38 SREDNJE GAMELJNE, BRIDGE IN THE FOREST - 03

GAMELJŠČICA, SPODNJE GAMELJNE, MOST (BRIDGE)

The purpose and method of setting up the measuring point
The measuring point is intended to measure the entire flow of Gameljščica. The flow curve will have approximately the characteristics of the critical depth (the border between calm and rapid flow), but this is the only profile through which the entire flow of the Gameljščica flows.

Location of measuring point, a priority of placement
The measuring device is attached to the railing and edge of the bridge on the upstream side.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (COORDINATES IN SI-D96/TM)	
N 109292.58 E 461647.27	
https://goo.gl/maps/euLYRypuVqBXXzui7	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	303.28
Altitude points of establishment at the edge of steel construction – angle of the rapper	302.83
Water level – bottom angle	298.14
Difference between angle sensor and angle of bottom	5.14
Mean flow	298.5
Large flow	299.5
High water flow	299.8
Q10	299.59
Q100	300.29
Q500	300.70
Sensor Type	Ames

Image 39 SPODNJE GAMELJNE, BRIDGE - 01

Image 40 SPODNJE GAMELJNE, BRIDGE - 02

Area of the lower course of Ljubljanica

In the lower reaches of Ljubljanica River, we realized 2 of the six proposed measuring points.

DOBRUNJŠČICA, SOSTRO, MOST (BRIDGE)

The purpose and method of setting up the measuring point
The measuring site is set to monitor the level of Dobrunjščica at high water levels. The measured level will reflect the impact of damming the bridge and, thus, the threat in the area next to the church in Sostro and especially the area west of Dobrunjščica (school, kindergarten, and cemetery). Levels will not reflect actual flow. For flow measurements, a location where the flow is in the stream bed is more suitable (for example, at the current Fire Station).

Location of measuring point, a priority of placement
The measuring device is attached to the railing and edge of the bridge on the upstream side.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (COORDINATES IN SI-D96/TM)	
N 99365.344 E 469268.727	
https://goo.gl/maps/WTgGjFzqpcztpyiJ6	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	282.03
Altitude points of establishment at the edge of steel construction – angle of the rapper	282.23
Water level – bottom angle	278.75
Difference between angle sensor and angle of bottom	3.28
Mean flow	279.07
Large flow	280.20
High water flow	280.50
Q10	280.27
Q100	281.09
Q500	281.68
Sensor Type	Revivo

Image 41 DOBRUNJŠČICA, BRIDGE - 01

Image 42 DOBRUNJŠČICA, BRIDGE – 02

Image 43 DOBRUNJŠČICA, BRIDGE – 03

BESNICA, PODGRAD, MOST (BRIDGE)

The purpose and method of setting up the measuring point
The measuring site will monitor the flooding of the underpass by the high waters of the Ljubljanica or Besnica. The measured level will give information about whether the underpass is flooded, and the water's depth. The data serves as information on the transportability or passability of the underpass during floods.

Location of measuring point, a priority of placement
The measuring device is attached to the downstream side of the railway bridging facility.

KEY PARAMETERS AT THE MEASURING POINT

COORDINATES (COORDINATES IN SI-D96/TM)	
N 103605.696 E 471874.635	
https://goo.gl/maps/aWiW8d95C2rWyusb9	
ALTITUDE (nM)	
Sensor altitude measured at lowest sensor point – angle sensor	267.70
Altitude points of establishment at the edge of steel construction – angle of the rapper	267.20
Water level – bottom angle	265.33
Difference between angle sensor and angle of bottom	2.37
Mean flow	265.55
Large flow	266.00
High water flow	267.00
Q10	267.25
Q100	268.08
Q500	268.55
Sensor Type	Revivo

Image 44 BESNICA, PODGRAD, BRIDGE - 01

Image 45 BESNICA, PODGRAD, BRIDGE - 02

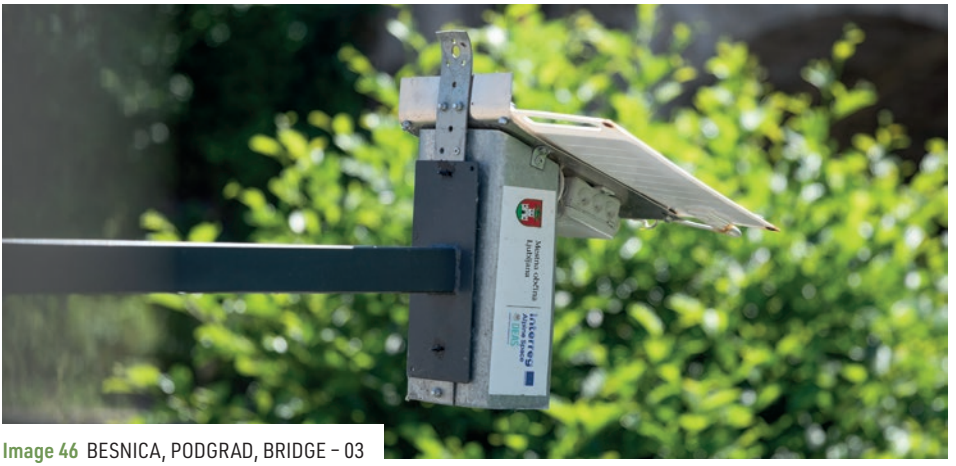


Image 46 BESNICA, PODGRAD, BRIDGE – 03

SPECIFICATION OF KEY PARAMETERS AT THE MEASUREMENT SITE

As part of the DEAS project, we commissioned geodetic measurements from the selected company GEO-2 and IZVO-R, which prepared the elaboration. We used the data from both documents to calculate the height of the water level and the critical parameters needed for each measuring point.

SENSOR COORDINATES IN SI-D96/TM

Coordinates are the measured value of the geo-location of the sensor in coordinates in SI-D96/TM - the data source is the elaboration of the company GEO-2. We use the value for precise placement.

SENSOR ALTITUDE MEASURED AT THE LOWEST POINT OF THE SENSOR - THE SENSOR ANGLE

We measure the altitude value at the lowest point of the sensor - the angle of the sensor, and we use the value to calculate the height of the water level.

ALTITUDE OF THE ESTABLISHMENT POINT ON THE EDGE OF THE STEEL CONSTRUCTION - BENCHMARK ANGLE

The reference angle is the measured value of the height above sea level of the establishment point on the edge of the steel construction. We use data to calculate the water level.

ALTITUDE OF THE BOTTOM WATER LEVEL - BOTTOM ANGLE

It is the calculated value of the "imaginary" elevation of the altitude of the bottom water level. The value is used to calculate the height of the water level.

DIFFERENCE BETWEEN SENSOR ANGLE AND BOTTOM ANGLE (ZERO WATER LEVEL)

This is a calculated value that tells us how far the lowest point of the sensor is from the bottom. The value is used to calculate the height of the water level.

MEDIUM FLOW (FIRST WATER LEVEL)

For the level at medium flow, we chose water level values typical for an average period without precipitation (not during times of increased flows). These values are not identical to the hydrologically determined mean flows Qsr and also include the influence of high waters (arithmetic medium of recorded flows). Therefore, these water levels are slightly lower than those at the hydrologically determined values of Qsr. It is a calculated value given as altitude or in meters.

LARGE FLOWS (OTHER WATER LEVELS)

Here we choose values when the watercourse is not yet flooding in a particular section or when the water level in the watercourse bed reaches almost the edge. The criterion is chosen in the way that

ARSO uses when displaying data from independent hydrological stations. It is a calculated value given as altitude or in meters.

HIGH WATER FLOWS (THIRD WATER LEVEL)

The angles of the high-water flow levels are selected for the flows when the water flow begins to flood in the observed area near the automatic independent station. This information depends mainly on the relief or the size (depth) of the watercourse bed. When determining the angle of high-water flows, the approach used by ARSO is also taken into account. It is a calculated value given as altitude or in meters.

Q10

Q10 represents high-water flow with a return period of ten years. As a rule, the data is determined with the help of hydraulic models. It is a calculated value, given as altitude or in meters - the data source is the work of the company IZVO-R.

Q100

Q100 represents a high water flow with a return period of one hundred years. As a rule, the data is determined with the help of hydraulic models. Information about the flow Q100 and the level at this flow is crucial for planning and ensuring acceptable flood safety. It is a calculated value, given as altitude or in meters - the data source is the work of the company IZVO-R.

Q500

The Q500 flow level represents an extreme event in nature. It is a calculated value, given as altitude or in meters - the data source is the work of the company IZVO-R.

SENSOR TYPE

We used two technical solutions based on technology - radar (Ames) and ultrasonic (Revivo) measurement of signal reflection from the water surface.

CRITICAL LIMIT VALUES AT INDIVIDUAL MEASURING POINTS, EXPRESSED IN METERS

Table 2 contains the combined data for all 16 locations, where the key parameters are presented - the critical limit values of the water level related to the imaginary river bed.

Table 2
Critical Water Levels

Watercourse	Location	»PV-SP First water level // medium flow (PV-SP)«	»DV-VP Second water level / high flow (DV-VP)«	»TV-VP Third water level / high water flow (TV-VP) - FLOOD«	»ZERO-WATER LEVEL Calculated value from geodetic measurements between the sensor measuring point and the bottom of the watercourse«
Ljubljanica	PODPEČ	6.1	9	9.2	10.48
Ljubljanica	BREST (LIPE)	6	7	7.6	9.10
Ljubljanica	AC (JUŽNA OBVOZNICA)	8.4	9.5	11	14.54
Ljubljanica	LIVADA	8.35	9.5	10.5	12.93
Iška	LIPE (KOLIŠČE)	1	2	2.5	3.65
Iška	TOMIŠELJ (BREST)	0.18	0.88	1.88	3.76
Bizoviški štradon	VOLAR	1.08	1.78	2.48	3.63
Ižica	HAUPTMANCE	0.7	2.3	3.3	3.72
Ižica	IŽANSKA CESTA (KAROLINKE)	1.9	3	3.5	5.97
Jarek	MIHOV ŠTRADON - JUG	0.5	1.25	1.75	3.51
Jarek	MIHOV ŠTRADON - SEVER	0.5	1.25	1.75	4.01
Glinščica	PODUTIK	0.17	0.37	0.67	5.08
Glinščica	BRDNIKOVA	1.8	2.3	2.9	4.12
Gameljščica	SREDNJE GAMELJNE	0.47	1.67	1.87	2.56
Gameljščica	SPODNJE GAMELJNE	0.36	1.36	1.66	5.14
Dobrunjščica	SOSTRO	0.32	1.45	1.75	3.28
Besnica	PODGRAD	0.22	0.67	1.67	2.37

MODE OF OPERATION OF THE SENSOR GAUGE, DATA PROCESSING AND DISPLAY

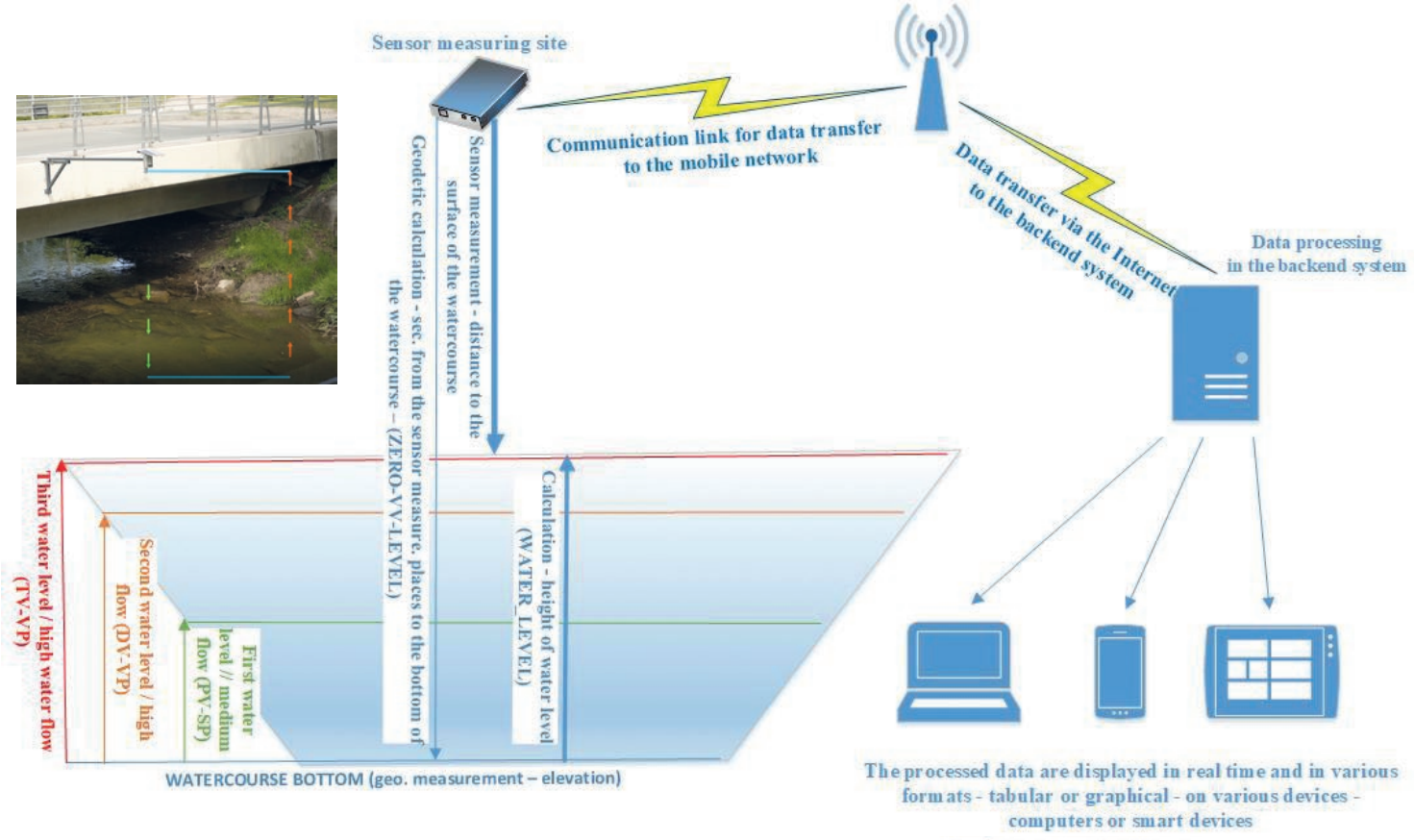
OPERATION OF THE SENSOR GAUGE

In the DEAS project, we use two types of gauges: radar and an ultrasonic method of reflecting the signal from the water surface (Image 49). In the background, based on the calculated parameters, the height of the water level at each location is calculated, which is then automatically placed in the green, yellow, orange or red danger zone. In the event of a sudden rise of water levels, we receive information about what is happening at each measuring point within ten minutes at the latest. For the two meters shown in Image 48, it is considered that they obtain energy for their operation via solar panels, and the data is transmitted via the mobile network of telecommunications providers.

Image 47
Radar or ultrasonic water level gauge

The entire system of data capture, processing and display, shown in Image 48, consists of the following:

- selected sensor measuring site (Ames or Revivo);
- communication links for data transfer to the mobile network;
- data transfer via the Internet to the Revivo back-end system, located in England, or the Ames back-end system, located in Slovenia;
- data received from both systems is processed in the back-end system so that it is accessible in graphic or tabular form on various devices or is accessible for further processing as open data via API.



DISPLAY OF THE OPERATION OF THE SENSOR MEASUREMENT POINT, THE LIMIT VALUES, AND THE TRANSMISSION, PROCESSING, VISUALIZATION AND DISPLAY OF

Image 48 Schematic representation of sensor measuring location operation

DATA PROCESSING AND DISPLAY

Since it is a pilot setup, we purposely used two completely different data collection systems in the DEAS project.

The system of the REVIVO Institute, whose measurements of reflection from the water surface are based on the ultrasonic principle, is simple and robust and was created as part of the NAIAD project. Measuring sensor stations thus measure temperature, pressure, and humidity in addition to measuring the height of the water level and enable the connection of additional modules for measuring wind speed and precipitation. The data is stored at the Geographical Department of Kings College of London and is accessible via www.freestation.org and www.policysupport.org.

The company Ames, whose reflectance measurements are based on the radar principle, developed a more complex system under the project's requirements, enabling highly accurate analytics already at the measurement point. In contrast, data processing in the back-end system triggers warning SMS and electronic messages at critical limit values. We can access the data with the help of a username and password via the website http://eemis.net.

The data, obtained via two routes (Revivo and Ames), are subsequently combined in a back-end system developed by the Faculty of Computer Science and Informatics of the University of Ljubljana and is also accessible via the API https://vodostaji.si/api/ v1/tbd in XML format or via the graphical interface www.vodostaji.si

Image 49
Graphical representation of data from each measuring location – October 2021\ u2012 via the AMES back-end system

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Image 50
XML data format accessible through API VODOSTAJI.SI

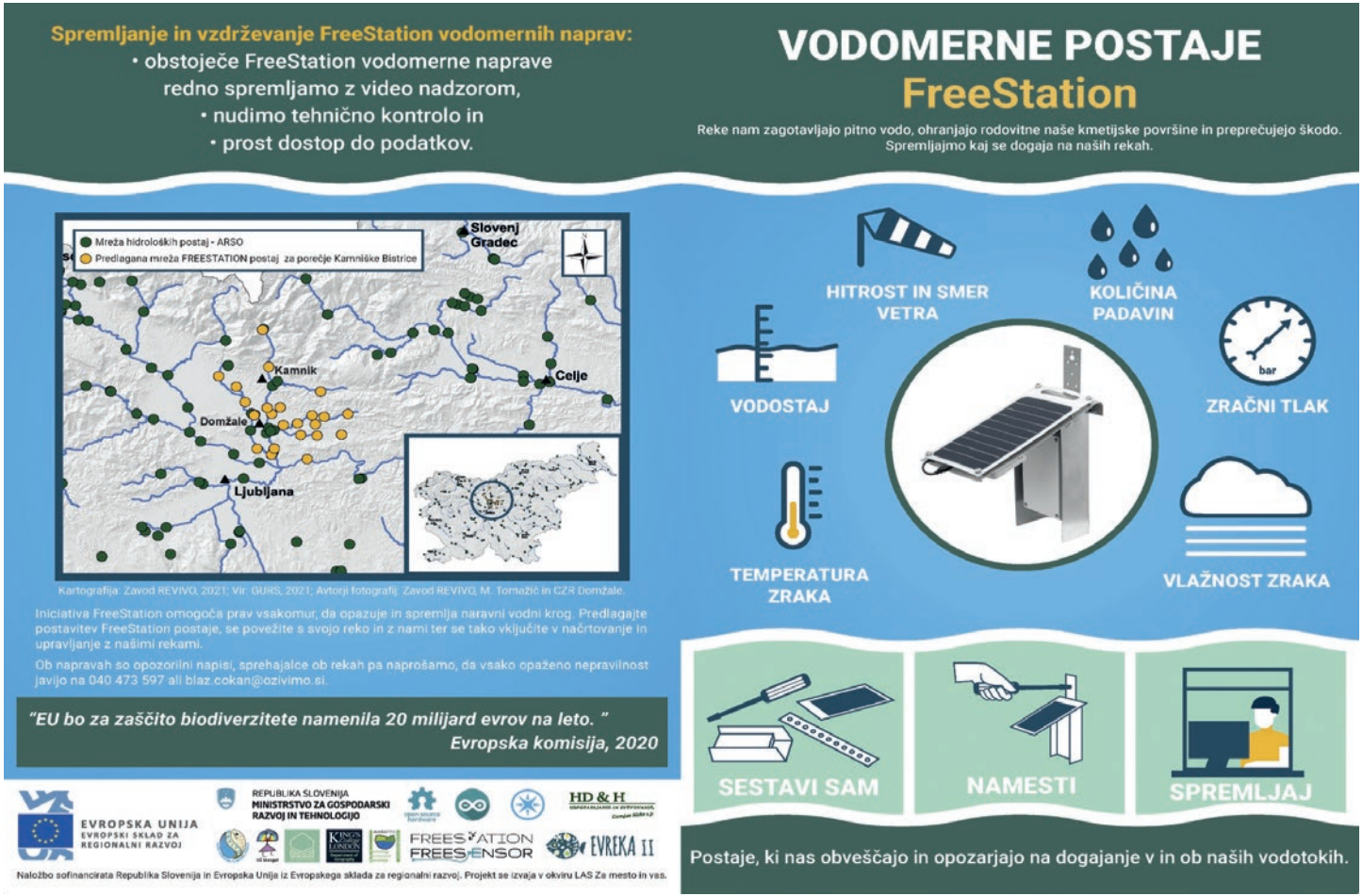

Image 51 FreeStation water metering stations - Institute Revivo

Image 52 Geographic display of data through the AMES back-end system

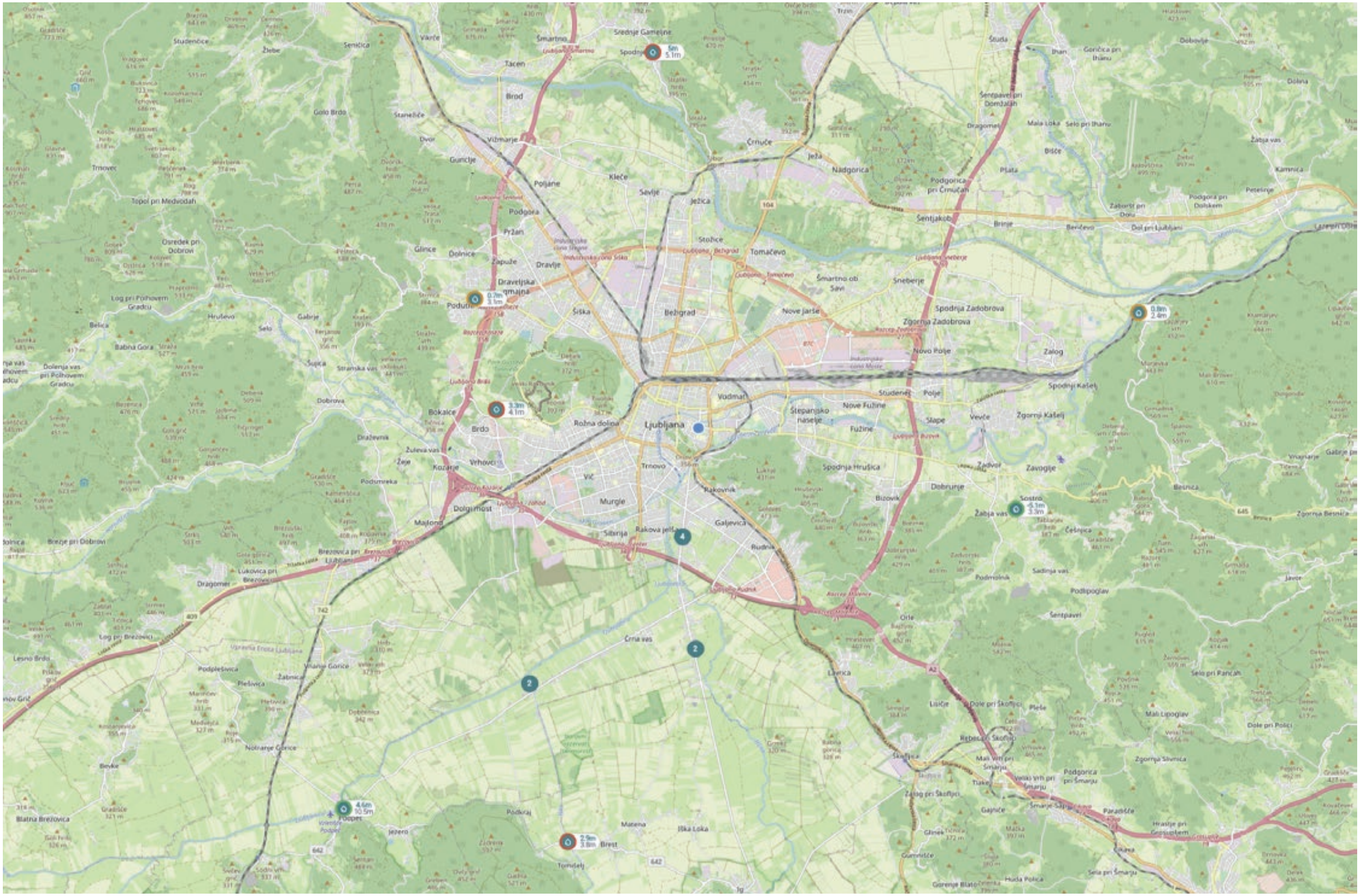

Image 53 Graphical representation of grouped data on the VODOSTAJI.SI

DEAS STRATEGY FIELD TRIP: MAY 28, 2022

There were many events as part of the DEAS project. However, we would like to highlight the final meeting of the "DEAS Strategy Field Trip" on the Ljubljanica River, which we organised in cooperation with the Ljubljana Technology Park.

For the first time, we presented a network of measuring stations at 16 strategic points and the already existing measuring infrastructure of ARSO for the meeting participants in the scope of an organised field trip. Overview represents a rich source of open data on crucial water levels in the area of MOL.

At the event, we talked about how best to use the new data so that it has the most significant value for residents and everyone else affected by flooding.

Representatives of companies and the public, research and educational institutions attended the meeting. Deputy Mayor Dejan Crnek and Luka Novak from the Department for Protection and Rescue at MOL gave opening speeches.

After the user experience, there was a strategic part of the event where we presented opportunities for combining and exploiting open data at a strategic level. Aleš Veršič from the Government Service for Digital Transformation introduced the European legislation that dictates frameworks for data strategies and the Slovenian open data ecosystem, such as the OPSI hub.

Željko Gudžulić (Project Manager at MOL), Ram Dušić Hren, Matevž Pesek (External DEAS Pilot Experts) and Monika Cvetkov (Project Manager at the Ljubljana Technology Park) presented an insight into the project's contribution to the data economy.

Darja Kukovič and Lucija Brezočnik from the Faculty of Electrical Engineering, Computer Science and Informatics in Maribor summarised and confirmed that the potential of open data in the wider Alpine region is excellent. Tina Jukić from the Faculty of Administration presented an example of cooperation between two countries to establish service development based on open data.

Aleš Pevc (Head of the Technology Office and Development Projects at the Ljubljana Technology Park) gave his perspective on the development and expansion of the "open data ecosystem" at the local, regional, national and international levels and the impact of cooperation between different stakeholders.

At the meeting, together with Jure Dolinar from the Ljubljana Fire Brigade, we recorded video material, which we used to create an informative video clip, accompanied with the photographs by Jasna Klančišar and Maja Ličen. The video in Slovenian with English subtitles, emphasises the presentation of the network of measuring stations and its usefulness.

Image 54
DEAS STRATEGY FIELD TRIP

Image 55
DEAS VIDEO The video is available online: https://www.youtube.com/embed/3qGVHVaXANM

CLOSING WORDS

The broader area of MOL is ranked first in terms of flood risk in Slovenia, as well as in terms of damage potential, the risk to people, critical infrastructure, cultural heritage, economy and other criteria. The floods confirm this. Extensive floods in Slovenia in 2010 also covered the Ljubljana basin, where flood damage was estimated at more than **EUR 30** million, which is why the state and the local community implemented measures to increase flood safety is necessary. From the past floods and other high-water events, we learn the national network of water measuring stations of the Environment Agency of the Republic of Slovenia needed to allow a deeper insight into the hydrological conditions of watercourses as necessary for protection, rescue and assistance. When applying for the DEAS project, we emphasised that, in cooperation with the profession and technological partners, we would plan and establish a network of sensors for water level measurements and then publish the information obtained in this way on open data platforms. In the broader area of MOL, we identified 30 critical flood locations where it made sense to place measuring points.

We have established a system of 17 measuring points at 16 different locations of watercourses and reservoirs:
- in the southern part of the city on Ljubljanica River, Iška, Ižica, Farjevac and at Volar;
- in the northern part of the city on Gameljščica;
- in the eastern part of the city on Dobrunjščica and Besnica;
- the newly built reservoirs Mihov Štradon and Brdo near the Ljubljana Technology Park.

The placement of additional sensors for measuring the water level makes it possible to supplement the data of the Environment Agency of the Republic of Slovenia and thereby:
- an even more comprehensive system of observing hydrological parameters in the area of MOL;
- control of the water regime at low and medium flows at sluices, dams and reservoirs;
- the possibility of timely action in the event of a flood hazard;
- the possibility of more reliable information for residents in flood-prone areas.

The proposal for additional independent automatic stations for measuring the water level of watercourses is given to establish a comprehensive system of observing hydrological parameters in the MOL area by supplementing ARSO measuring points and measuring points on already built facilities and facilities that are about to be implemented.

Ljubljana is in the area of torrential, river, meteoric and lowland swamp floods. There will always be floods here, but it is up to us to prepare, adapt and respond accordingly with various activities. And one such activity is the DEAS project.

DEAS SLO TEAM

MUNICIPALITY OF LJUBLJANA (MOL)

ANDREJ PILTAVER, DEPARTMENT FOR ENVIRONMENTAL PROTECTION
SABINA POPIT, OFFICE FOR DIGITALIZATION
MATEJ CERAR, OFFICE FOR DIGITALIZATION
MOJCA PLANTAN, OFFICE FOR DIGITALIZATION
TANJA GERŠAK, OFFICE FOR DEVELOPMENT PROJECTS AND INVESTMENTS
ŽELJKO GUDŽULIĆ, EMERGENCY MANAGEMENT DEPARTMENT, DEAS PROJECT MANAGER

LJUBLJANA TECHNOLOGY PARK

ALEŠ PEVC, HEAD OF TECHNOLOGY OFFICE AND DEVELOPMENT PROJECTS
PETER MEDICA, PROJECT MANAGER
MONIKA CVETKOV, DEAS PROJECT MANAGER

EXTERNAL COLLABORATORS

ALEŠ VERŠIČ, MINISTRY OF PUBLIC ADMINISTRATION
ANDREJA LAMPE, CHAMBER OF COMMERCE OF SLOVENIA
BORUT ŠUŠTAR, AMES
JURE DOLINAR, LJUBLJANA FIRE BRIGADE
MATEJ GOJČIČ, RRA LUR
MATEVŽ PESEK, FRI
NEVENKA CUKJATI, MATJAŽ LOGAR, SRIP SMART CITIES
POLONA PENGAL, EVA HORVAT, REVIVO
RAM DUŠIČ HREN, BRIGHT3R
ROK FAZARINC, I-ZVOR
SIMON DELAKORDA, INEPA
VOJKO ROZMAN, LUKA DUJC, GEO-2

Interreg Alpine Space DEAS

European Regional Development Fund

DEAS - Data Economy Alps Strategy

To stimulate participation, competitiveness and new business in Alpine Space

EXPECTED IMPACT

01. to improve the value of Open Data and Linked Open Data with innovative public services and new business models

02. to raise competitiveness of the Alpine Space with the exploitation of OD/LOD on tourism & culture, environment and mobility sectors

03. to promote Data Economy as an opportunity for Social Innovation in Alpine society and for new products and services by SMEs and start-ups

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TEHNOLOŠKI PARK LJUBLJANA

European Regional Development Fund

SUPPORT FROM THE EUROPEAN UNION: € 1.915.509

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