GEODETIC HIGHLIGHTS

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Geodetic points on Velika Slivnica

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GEODETIC INSTITUTE OF SLOVENIA

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Introduction

Velika Slivnica is one of the most recognisable and popular mountains in the Notranjska region, with a rich natural and cultural heritage. With an altitude of 1114 m, accessibility, a mountain hut, beautiful scenery and legends about witches, it offers a variety of experiences for mountaineers and nature lovers.

It is located northeast above the intermittent Cerknica lake and is part of the Dinaric Mountains having a carbonate base, which enables the development of diverse flora, especially on dry, sunny slopes. The northern slopes of Velika Slivnica are dominated by beech forests, which are home to numerous animal species, including bears.

In this booklet, we present the geodetic marks in the Velika Slivnica area, among which the cross carved into the rock and the year 1726 stand out. Three hundred years ago, the cross marked the boundary point between the Planina and Bistra estates. Later, in 1823, during the Franciscan land cadastral survey, it also served as a trigonometric point, where surveyors performed the most accurate geodetic measurements of the time. The cross carved into the rock later lost its role as a trigonometric point and was replaced by other geodetic marks erected at this area within the framework of later geodetic surveys carried out in this area in different countries.

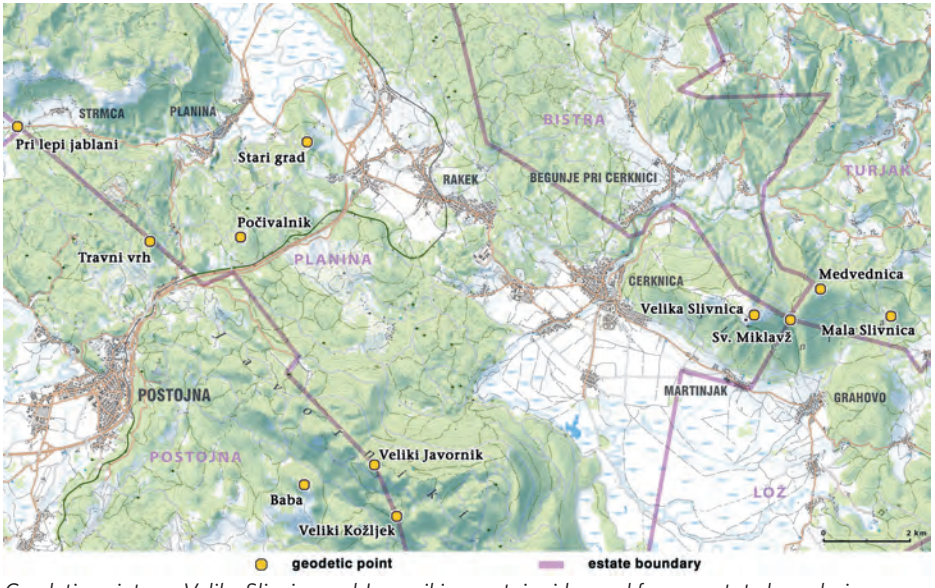
From the top of Velika Slivnica, across Cerknica lake, there is a beautiful view of the Javornik mountain range with mountain Snežnik in the background. There is a first-order trigonometric point on Snežnik. At the top of Veliki Javornik, there is a very old second-order trigonometric point, which belongs to a series of boundary stones demarcating the former districts of Postojna and Planina in 1823. Most of these boundary stones also served as trigonometric points and cadastral municipality boundary marks, a function majority of them still carries today. Among them is the boundary stone standing at location *Pri lepi jablani* (Eng. By the beautiful apple tree) above the village of Studeno, which marks a boundary point first mentioned in the land register as early as 1589. The former Rapallo border also ran along the Javornik mountain ridge, behind it around one metre tall concrete Italian trigonometric pillars were erected between the years 1920 and 1940. Some Italian trigonometric pillars have retained their role as trigonometric points to the present day.

The descriptions of various geodetic (trigonometric and cadastral) marks presented in the Velika Slivnica and Javorniki areas can also be useful elsewhere. When you encounter similar geodetic marks, you will be able to classify them into a specific group and time period based on their shape, size and inscribed letters, thus gaining insight into the development of the geodetic profession and administrative and land ownership relations in our country.

Prof Dr Bojan Stopar,
University of Ljubljana, Faculty of Civil and Geodetic Engineering

Geodetic points on Velika Slivnica and in its surroundings

The summit of Velika Slivnica (1114 m) hides not only stories about witches, but also some geodetic points that are important for the history of geodetic profession. The oldest geodetic mark is presented by a cross carved into a rock formation at the top of Velika Slivnica, dated 1726 and bearing the letters F and H, which connect the peak with the Carthusia Bistra and the Planina estates. The second is a carved natural stone from the late 19th century, set in concrete in the ground, which represents trigonometric point II, no. 301. A little lower down, just below the summit, a stone's throw away from the mountain hut on Velika Slivnica, is the newest geodetic mark, representing a geodetic point numbered MM-301. This is intended for checking measurements made with global navigation satellite systems (GNSS) in the Notranjska region and the wider Cerknica area. The largest antenna at the very top also has a geodetic role, as it represents one of the marks (signals) belonging to trigonometric point no. 301 on Velika Slivnica.



Geodetic points on Velika Slivnica and Javorniki mountain ridge and former estate bonndaries.

The summit of Velika Slivnica is one of the few peaks where geodetic marks have been preserved, on which the most accurate geodetic (trigonometric) measurements have been carried out since the first systematic trigonometric measurements performed at our territory, i.e. from the beginning of the 19th century to the present day.

At a little lower altitude, on the slopes of Velika Slivnica, other trigonometric marks

and old boundary stones can be observed as well. The ruins of Church St Miklavž mark the former boundary point of four estates Planina, Bistra, Turjak and Lož with Snežnik.

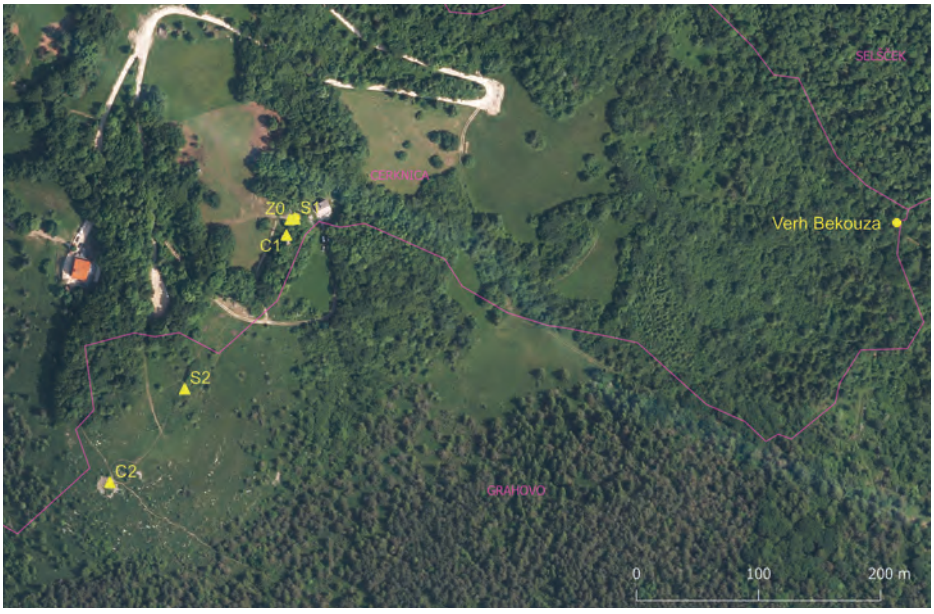
On the other side of Lake Cerknica, on the Javornik mountain ridge, a series of special carved boundary marks from the former district of Postojna from 1823, richly decorated with inscriptions, have been preserved on the even older border between the former estates of Postojna and Planina. Most of them also represented trigonometric points at some point in time.

On the overview map, the locations of the geodetic points mentioned in the booklet are marked with yellow circles. We suggest that you divide your exploration into at least two days: the geodetic points around Velika Slivnica and the special boundary stones in the Javornik mountain ridge.

Appearance of the secont-order trigonometric point no. 301 on Velika Slivnica and its meaning through time

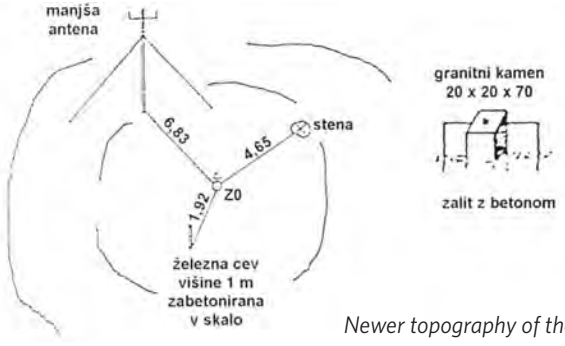
At the top of Velika Slivnica is the second-order trigonometric point no. 301, which is represented in nature by five geodetic marks: the main point Z0, which is today marked with a metal pin, the eccentric point S1, which is marked with a cross carved into the natural rock next to the year 1726, and the signal C1, which is represented by the largest antenna on the southern side of the peak. About 200 m southwest, on a meadow below the summit, there are two more marks that belong to trigonometric point no. 301: eccentric point S2 and signal C2.

The oldest geodetic point on the top of Velika Slivnica.



The physical marks of the second-order trigonometric point no. 301 on the national orthophoto.

The main point Z0 of the second-order trigonometric point no. 301 is marked with a small metal pin.

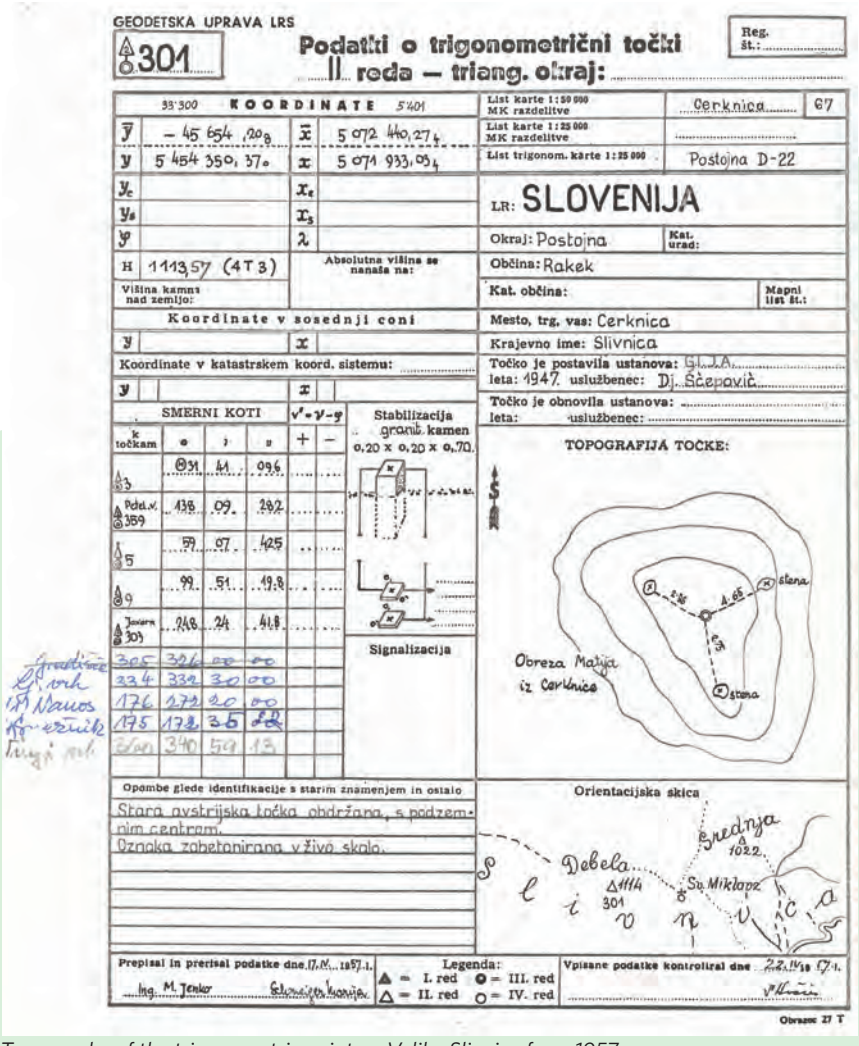


Newer topography of the trigonometric point on Velika Slivnica

The main point Z0 can be found by looking on the ground for a cut iron tube embedded in the concrete between the metal box with the mountaineering logbook and the pole with the signpost. From this tube, we measure a length of 1.92 m in a northward direction, where we find a circular concrete slab again in the level of the ground, in the centre of which there is a metal pin with a diameter of about 1 cm and a small hole at the top. According to old topographies (including basic data and placement sketches of geodetic points) from 1947 and 1957, under the concrete slab probably lies a former Austro-Hungarian trigonometric mark made of carved natural stone, measuring 20 cm × 20 cm and 70 cm high. The carved stone is mentioned in descriptions of a geodetic survey carried out in this area sometime between 1896 and 1904. At that time, the trigonometric point on Velika Slivnica also belonged to the second-order trigonometric network. The same mark is most likely mentioned in the topography of the trigonometric point in the time of Reambulation land cadastral survey in 1869.

The old trigonometric mark is no longer physically accessible today, but based on archival sources, we can conclude that under the concrete there is a mark that is identical to the preserved geodetic mark at the top of Stari grad (703 m) above village of Planina. This one is carved from natural stone and has the letters MT engraved on one side, which stands for military triangulation (German: *Militärische Triangulation*). Today, this mark represents third-order trigonometric point no. 25 in the Postojna trigonometric district.

Stari grad above Planina: carved stone erected during the Austro-Hungarian Empire with the inscription MT.



GEODETSKA UPRAVA LRS

301 **Podatki o trigonometrični točki II. reda — triang. okraj:**

Reg. št.:

33'300 **KOORDINATE** 5'401

$\bar{y}$	− 45 654 ,20₈	$\bar{x}$	5 072 440,27₄
y	5 454 350, 37₀	x	5 071 933,05₄
y_c		x_c	
y_s		x_s	
φ		λ	

H 1113,57 (4T3) — Absolutna višina se nanaša na:

Višina kamna nad zemljo:

Koordinate v sosednji coni: y x

Koordinate v katastrskem koord. sistemu: y x

List karte 1:50 000 MK razdelitve: Cerknica 67

List karte 1:25 000 MK razdelitve:

List trigonom. karte 1:25 000: Postojna D-22

LR: SLOVENIJA

Okraj: Postojna — Kat. urad:

Občina: Rakek

Kat. občina: — Mapni list št.:

Mesto, trg, vas: Cerknica

Krajevno ime: Slivnica

Točko je postavila ustanova: G.I.A.
leta: 1947. uslužbenec: Dj. Ščepavič

Točko je obnovila ustanova:
leta: uslužbenec:

SMERNI KOTI

k točkam	°	'	"	v'−v−g +	−
3	091	41	09,6		
Pdst.v. 359	138	09	29,2		
5	59	07	42,5		
9	99	51	19,8		
Jezera 309	248	24	41,8		
305	326	00	00		
334	332	30	00		
176	271	20	00		
175	178	35	22		
340	340	59	13		

Stabilizacija: gramič. kamen 0,20 × 0,20 × 0,70

Signalizacija

TOPOGRAFIJA TOČKE:

Obreza Matija iz Cerknice

stena

Opombe glede identifikacije s starim znamenjem in ostalo:

Stara avstrijska točka obdržana, s podzemnim centrom.

Oznaka zabetonirana v živo skalo.

Orientacijska skica

Debela, Δ1114, 301, Slivnica, Srednja 1022

Prepisal in prerisal podatke dne 17.IV.1957.1.
Ing. M. Jenko Slovenija, Ljubljana

Legenda: △ = I. red △ = II. red ● = III. red ○ = IV. red

Vpisane podatke kontroliral dne 22.IV.19 57.1.

Obrazec 27 T

Topography of the trigonometric point on Velika Slivnica from 1957.

195. Slivnica.

Spezialkartenblatt, Zone 22, Kolonne XI.

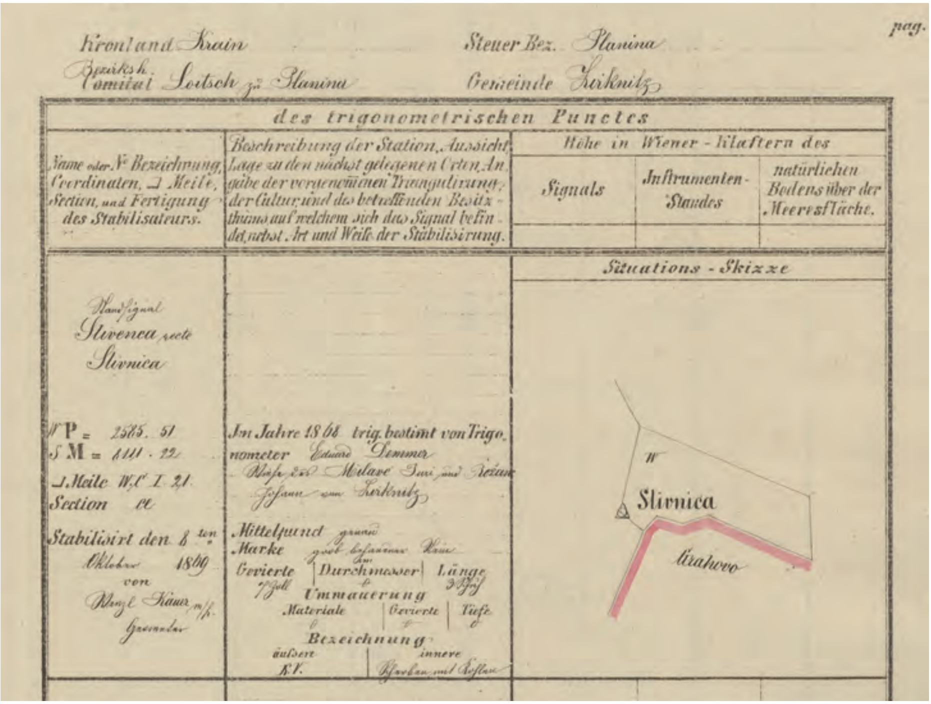
(Krain, Bezirk Loitsch). Auf dem höchsten Punkte des langgestreckten Bergrückens 1½ Stunden östlich des Ortes Zirknitz.

Markierungsstein: $h = 0{\cdot}20\ m.$ $h' = 1{\cdot}18\ m.$

$\varphi = 45°\ 47'\ 25{\cdot}3834$ $\lambda = 32°\ 4'\ 31{\cdot}8710$ $H = 1114{\cdot}1\ m.$

172 Krimberg	− 1·92	17° 37' 36·06	4·208 0172
236 Koroška gora	+ 1·8	25 36 48·3	3·818 1643
233 Nad krogam	− 4·1	58 83 21·4	4·012 4455

Excerpt from the description of trigonometric measurements performed on Velika Slivnica sometime between 1896 and 1903 (source: Die Ergebnisse der Triangulierungen der K.u.K. Militärgeigraphischen Institutes).



Topography of the trigonometric point on Velika Slivnica from 1868 (source: ARS fond 1959).

On topographies from the period after the Second World War, we can see that 4.65 m from the main point Z0 on Velika Slivnica towards the northeast, there is a cross carved into the rock (you should look for »+ stena« on the topography). If we walk from the main point to the rocky outcrop on the summit plateau of Velika Slivnica, we will find a cross carved into the rock and the year 1726 in front of it. The numbers in the year are 11 cm high, and the cross has arms 9 cm long. A closer look at this rock reveals two larger letters carved on its sides: H and an upside-down F. The letter H is 14 cm high, while F is 19 cm high. Be careful when searching for the letter F, as you can easily slip into the depths.

A review of archival materials from the Franciscan land cadastral survey of 1823 reveals that this cross was already used at that time as a trigonometric point, which was included in the so-called numerical triangulation, labelled on the archival plans as a triangle with an inscribed circle. At that time, numerical triangulation included trigonometric networks of the highest orders, i.e. the first and second orders. The basis for calculating the coordinates of trigonometric points in numerical triangulation were special geodetic measurements in trigonometric networks, which resulted in the coordinates of individual geodetic points. These trigonometric points were densified with so-called graphically determined triangulation points, which were determined

in the field directly during the measurement and simultaneous drawing of cadastral survey plans. This means that the graphically determined triangulation point was first drawn on the plan, and its coordinates were obtained by reading them from the plan afterwards. Graphically determined triangulation points are labelled with square on Franciscan land cadastral maps, plans and sketches.

The highest point on the top of Velika Slivnica: a natural rock with a carved cross, a year 1726 and the letters H and F on each side.

On the sketch of the Franciscan land cadastral survey of the cadastral municipality of Cerknica, there is an inscription H.F. under the triangle representing trigonometric point, which allows us to connect the cross with inscriptions on the rock at the top of Velika Slivnica. Nevertheless, at the time of the Franciscan land cadastral survey, the cross itself no longer represented a boundary mark of cadastral municipalities, but only a trigonometric point and a parcel boundary mark. The cadastral municipality boundary mark was located just below the rocky summit of Velika Slivnica on its east side, at a location called *Pod grajskim konfinam* (Eng. Under the castle boundary mark). Today, the boundary mark no longer exists there, as this location has changed significantly due to the construction of a wider access road to the Slovenian Radio Amateurs' house located just below the summit of Velika Slivnica.

The year 1726 and the letters H and F on the highest stone protrusion of Velika Slivnica tell us that this cross once marked the boundary between two estates, namely Planina and the Carthusia Bistra. The letter H stands for the German translation of Planina estate *Haasberg*, while F stands for the Freudenthal for *Carthusia* Bistra. The letter H can also be found on other boundary stones of the former Planina estate, mostly as a combination of the letters HH, which stands for *Herrschaft Haasberg* meaning estate Haasberg. Below the mountain Krim, carved boundary stones between the former Carthusia Bistra and the Ig estates from the same year, 1726, have been preserved, which also feature the letter F due to the same reason. You can find out more about them in one of our previous Geodetic Highlights: Boundary marks of the Carthusia Bistra from 1726[1].

Excerpt from the map of the Franciscan land cadastral survey from 1823 for the cadastral municipality of Cerknica.

[1] https://gis.si/wp-content/uploads/2024/09/Geodetske-tocke-Kartuzija-Bistra-ang-splet.pdf

Excerpt from the sketch of the Franciscan land cadastral survey from 1823 for the cadastral municipality of Cerknica.

The fact that the former boundaries of the estates do not exactly follow the boundaries of today's cadastral municipalities, which date back to the time of the Franciscan land cadastral survey, is also evident by the ruins of the Church of St Miklavž, which is in older sources referred to as St Nickolas. At the end of the 18th century, the Church of St Miklavž represented a boundary point between four estates: Planina (German: *Haasberg*), Bistra (*Freudenthal*), Turjak (*Auersperg*) and Lož with Snežnik (*Laas mit Schneeberg*). It is located on the eastern side of Velika Slivnica, just below the saddle where two macadam roads leading to the top of Velika Slivnica meet today: the first from Cerknica and the second from Grahovo. During the Franciscan land cadastral survey, the boundary between the cadastral municipalities of Grahovo and Selščck had already been moved to the top of the saddle. The Church of St Miklavž was built at the end of the 15th century and stands next to the small spring which bears the same name. The church acquired its present appearance after bombing during the Second World War.

St Miklavž ruins on Velika Slivnica.

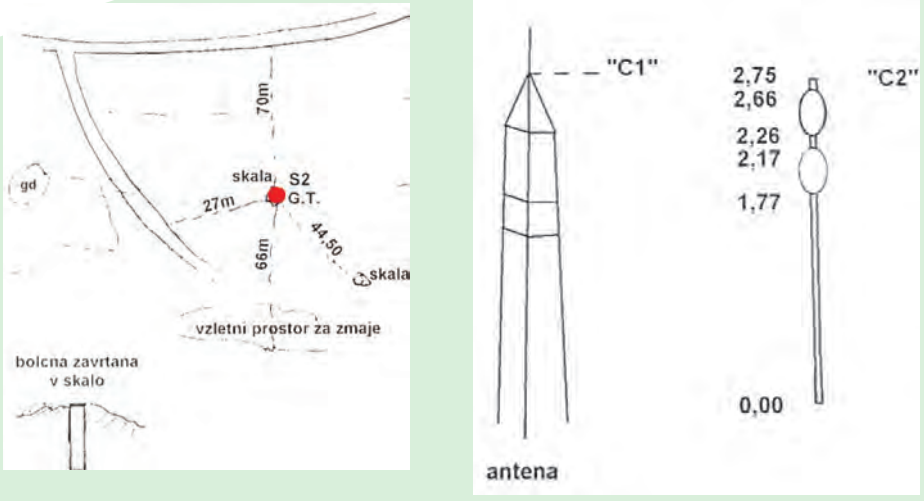
Excerpts from the maps and sketches of the Franciscan land cadastral survey from 1823 show that there were two more boundary marks on the eastern side of the Slivnica peak, on the border between the cadastral municipalities of Cerknica and Grahovo. The first was located at *Na Slivenzi* and the second at *Verh Bekovca*. We can reach them by descending from the summit along the mountain trail that leads to the saddle above the Church of St Miklavž. Today, no boundary mark can be found at the first location. But at the second location *Vrh Bekovca*, there is preserved uprooted boundary mark 80 cm long and 20 cm × 20 cm in cross-section without any inscriptions. Vrh Bekovca is now located on the edge of a clearing called Koželice and represents the triple boundary point of the cadastral municipalities of Selščck, Cerknica and Grahovo. The uprooted boundary mark is located next to the edge of the forest, a few metres away from the mountain trail. The red forest markings on nearby beech trees indicate that we are at the cadastral municipality boundary point.

The uprooted boundary mark of the tripoint of the cadastral municipalities of Selščeк, Cerknica and Grahovo.

To the second-order trigonometric point no. 301 at the top of Velika Slivnica belong additional three geodetic points. Point C1 was located at the top of a large antenna at the top of Velika Slivnica. However, since the antenna was reconstructed in 2000, the coordinates from the trigonometric point database no longer represent the actual situation and therefore can no longer be used by surveyors. Points S2 and C2 are located on a meadow 30 metres lower in altitude, 160 and 260 metres away to the southwest below the summit or east of the mountain hut on Velika Slivnica.

The point S2 or GNSS network point MM-301.

We can find point S2 by descending by the path from the summit to the mountain hut. First, right next to the edge of the forest, a few metres away from the path, we will see inconspicuous rocks at ground level. The point S2 is placed in a rock with a top diameter of 2 m × 1.5 m. This geodetic mark got its current form in 2000, when a new hole was drilled into the natural rock and a special screw with a thread was inserted into it enabling to directly attach the GNSS receiver antenna on it, which is called a »bolcna« in topography. The threaded screw has a metal cap at the top, approximately two centimetres in diameter. This point is also a part of the international GNSS network where it is named MM-301. Surveyors occasionally perform continuous several days long GNSS measurements at this point. The first such measurement was performed in 1996.

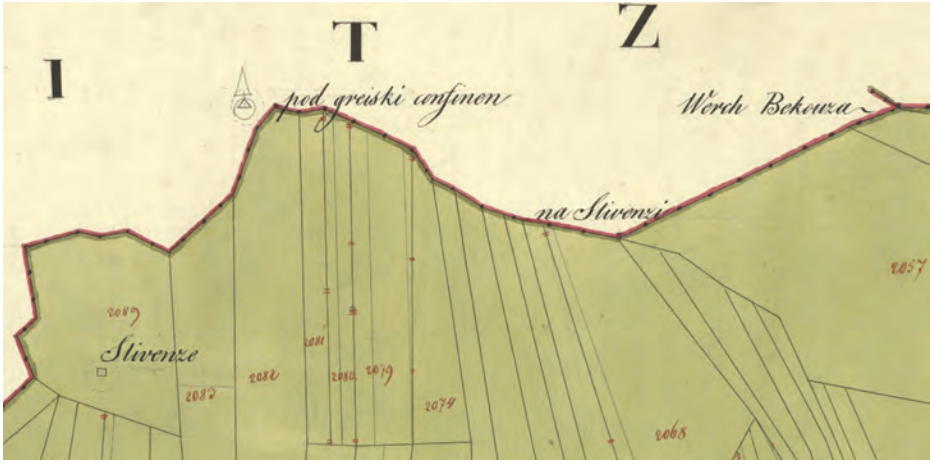


Topographies of the point S2 and signals C1 and C2.

As we continue down the path across the meadow, which is also occasionally used as a take-off site for paragliders, we will see at the end of this meadow next to a wooden bench a metal pole just under 3 m high. This is the C2 signal of the second-order trigonometric point no. 301.

Signal C2.

It is interesting to note that somewhere on this meadow, where the S2 and C2 points are located today, a measuring table was set up during the Franciscan land cadastral survey, on which a graphically determined trigonometric point was measured. On the Franciscan land cadastral survey map, this location is marked with a square and the name *Slivenze*. The meadow is still densely dotted with natural rocks, but none bears any visible markings that would indicate it was once used as a graphically measured trigonometric point.



The square marked Slivenze indicates a trigonometric point whose coordinates were determined by graphic surveying during the Franciscan land cadastral survey.

Other interesting geodetic points in the vicinity

Post-war trigonometric points on neighbouring peaks

On the neighbouring peaks around Velika Slivnica, there are several trigonometric points marked with granite squares having upper cross-section of 15 × 15 cm, which means that they were erected after Second World War during the Yugoslav era in the 1950s and 1960s. Some of them have the inscription VT on one side, which stands for military triangulation and reveals that they were erected by employees of the Geografski inštitut jugoslovanske ljudske armade from Belgrade. The trigonometric mark at the top of Loza hill (876 m) above village Nova Vas is included in this group. It represents third-order trigonometric point no. 160 from the Postojna trigonometric district. The other granite trigonometric marks, which do not have the inscription VT, were erected at the same time by employees of the former Geodetski zavod Slovenije.

Medvednica (1024 m): forth-order trigonometric mark no. 532 in the trigonometric district of Postojna.

Loza (876 m): third-order trigonometric mark no. 160 in the trigonometric district of Postojna.

Mala Slivnica (863 m): forth-order trigonometric mark no. 533 in the trigonometric district of Postojna.

Other boundary marks in the vicinity

On the other side of the saddle above St Miklavž on Velika Slivnica is the peak of Medvednica (1024 m). At the top you can find a granite forth-order trigonometric mark no. 532 presented on previous page and on its north-western shoulder a carved boundary stone of three cadastral municipalities of Selščck, Grahovo and Ulaka. Until the end of the 18th century, this point also marked the border between the estates Turjak and Carthusia Bistra. The preserved carved boundary stone bears the letter A, which can be linked to the Auersperg family, the former owners of the estate Turjak.

Western shoulder of Medvednica: tripoint of the cadastral municipalities of Grahovo, Selščck and Ulaka.

On the slopes of Velika Slivnica also other interesting boundary stones can be found marking both parcels and cadastral municipalities. On the saddle above St Miklavž you can find at least two parcel boundary marks made of concrete bearing on one side the inscription FP.

Special parcel boundary marks on the saddle above St Miklavž.

Boundary stones of the former Postojna estate in Javorniki

West of Lake Cerknica lies the Javornik mountain ridge with Mount Veliki Javornik (1269 m) at its centre. Until the end of the 18th century, the border between the estates Postojna and Planina ran along the top of the Javornik mountain ridge (see the overview map at the beginning of this booklet). A little later, at the beginning of the 19th century, this border became the border of the highest administrative division within the provinces, i.e. the districts of Postojna and Planina, as well as one level lower administrative division, i.e. the counties of Postojna and Planina. At the same time, it also became the border of the cadastral municipalities. During the Franciscan land cadastral survey in 1823, a special boundary marks were erected on several peaks, which at that time also represented the boundaries of cadastral municipalities, districts and counties. After 1849, the districts and counties were renamed and their boundaries were also changed in some places. However, the boundaries here remained the same, except that the higher order division now were named Postojna and Logatec, while the counties were still named Postojna and Planina. This border lost its role as the border between the two higher administrative divisions at the beginning of the 20th century, but it retained its role of cadastral municipalities boundary to this day. Today a part of this border represents the border between the municipalities of Postojna, Cerknica and Pivka as well.

For this reason, the boundary marks from 1823 on this border have many more inscriptions than expected on the usual boundary marks of cadastral municipalities from that time. On one side, they have the inscription HH, which stands for the county or estate of Planina in German *Herrschaft Haasberg*, and on the other side, BHA, which stands for the district of Postojna *Bezirkshauptmannschaft Adelsberg*. In small letters, those boundary marks also have the name of the section in which the boundary mark is located added on one side. For example, the boundary marks *Pri lepi jablani* and *Travni vrh*, which are presented below, belonged to the Travni vrh section. Most of these boundary marks also served as trigonometric points during the Franciscan land cadastral survey, and many of them still hold this function today.

Pri lepi jablani

The northernmost boundary stone in this series is located at a place called *Pri lepi jablani* (Eng.: By the beautiful apple tree), which is now situated by the old road heading to the castle of Predjama, east of the village of Studeno. By the road, somewhere halfway between villages Studeno and Strmica, there is an 88 cm high pentagonal carved boundary stone with engraved inscriptions and an information board telling us that the boundary stone is no longer placed at its original location. This means that surveyors can no longer use it for their measurements. The location *Pri lepi jablani* was first mentioned in the land register as early as in 1589 as the boundary point of the Jama (Predjama) estate, known in German as *Luegg*. This also explains the inscription HL on the boundary stone – *Herrschaft Luegg*. The current boundary stone dates from 1823. At that time, it marked the boundary point between counties of Jama (HL), Planina (HH) and Postojna (BHA). Shortly afterwards, the county Jama was annexed to the county of Senožeče. As the boundary stone was moved, the inscriptions no longer show the correct directions to the former counties.

The boundary stone *Pri lepi jablani* is already listed in the national cultural heritage register under the number 1-23902[2].

Boundary stone Pri lepi jablani from three sides.

[2] *Boundary stone Pri lepi jablani in the Cultural Heritage Register:* https://geohub.gov.si/ghapp/giskd/?showLayers=MK_EVRD_6832&query=MK_EVRD_6832_0%2CEID%2C1-23902

Travni vrh

If we continue along the former estate border between Postojna and Planina, we will find the next completely preserved boundary stone from 1823 on the top of hill Travni vrh (738 m) (Eng.: Grassy peak) north above the location called Postojnska vrata and north above the highway. It has similar inscriptions as the one on the boundary stone *Pri lepi jablani*. It is 100 cm high and has a cross-section of 38 cm × 30 cm. Next to it lie the remains of an Italian trigonometric pillar made from concrete, 40 cm high and with a rectangular cross-section of 38 cm × 35 cm. At the top it has also a preserved hole in which a geodetic signal was placed for trigonometric measurements. The boundary stone at this location served as a trigonometric point as early as 1823 and retained this role until the interwar period. After the First World War, this area remained behind the Rapallo border in Italy. At that time, the Italians erected a concrete trigonometric pillar near the boundary stone. During the Yugoslav era, this trigonometric point was not included in the new trigonometric network. But the boundary stone has retained its role of a boundary mark between the cadastral municipalities of Postojna and Kačja vas to this day.

Travni vrh: carved boundary stone and, next to it, the remains of an Italian trigonometric pillar from two sides.

The concrete pillars of Italian trigonometric points can have a quadrangular or hexagonal horizontal cross-section. They are usually around 120 cm high but can also be slightly lower. The former represented trigonometric points of lower orders, while the latter represented higher orders. Many of these pillars have the letters RA and the year of erection engraved on one of their sides, usually between 1920 and 1940. RA (Italian: Rete Artiglieria) is an abbreviation for the former Italian trigonometric network, known as the artillery network. Occasionally, the Italianised name of the local name of the peak where such trigonometric pillar stands is also written on one of its sides. The abbreviation RA can also be found, but less frequently, in the concrete foundations of existing boundary stones from earlier periods. In such cases, the Italians used existing boundary stones for their trigonometric survey. Examples of this are the boundary stones from 1823 on Veliki Kožljek which will be presented in further text and the three-sided boundary mark from 1876 on the hill of Srnjak under village Kalce.

Preserved Italian trigonometric pillars with a quadrangular cross-section at Počivalnik (721 m) from 1926 and with a hexagonal cross-section at Baba (1085 m) from 1936.

Veliki Javornik

A beautifully preserved boundary stone, which in 1823 marked the boundary between districts of Postojna and Planina, can still be found on Veliki Javornik (1269 m) on the meadow in front of the Radioklub Proteus hut. Even at the time of the Franciscan land cadastral survey, it served not only as a boundary mark but also as a trigonometric point, a role which it has retained to the present day. It is 89 cm high and has a cross-section of 35 cm × 35 cm. The engraved inscription MT on its top reveals that is served as numerically measured trigonometric point at the time of the Franciscan land cadastral survey. More recently, a metal pin has been placed on its top, which today represents a new mark to which the geodetic measurements refer to. At the beginning of the 20th century Veliki Javornik was also a second-order trigonometric point, the same as Velika Slivnica, therefore direct measurements were performed between the two summits. The current geodetic role of the Veliki Javornik is similar to that of the second-order trigonometric point No. 301 S2 on Velika Slivnica, as the boundary mark on Veliki Javornik is both the second-order trigonometric point no. 303, as well as the GNSS network point MM-303.

167. Veliki Javornik.

Spezialkartenblatt, Zone 22, Kolonne X.

(Krain, Bezirk Adelsberg). Fast kreisrundes Plateau auf dem Gipfel des Rückens, südöstlich von Adelsberg.

Markierungsstein: $h = 0{\cdot}89\ m$.

$\varphi = 45°\ 45'\ 29''9789 \quad \lambda = 31°\ 57'\ 44''7112 \quad H = 1268{\cdot}9\ m.$

172 Krimberg	+ 3''23	35° 46' 6''43	4·368 6567
195 Slivnica	− 2·82	67 54 32·58	3·977 2520
175 Schneeberg	+ 1·37	147 41 54·07	4·348 0080
118 Osvinica	− 4·49	231 23 45·11	4·104 2178
176 Nanos	− 2·09	282 15 13·11	4·291 3780
259 Streliski vrh	+ 1·91	308 35 8·31	4·314 4148
303 Smolevec	+ 2·86	335 24 32·86	4·308 9538

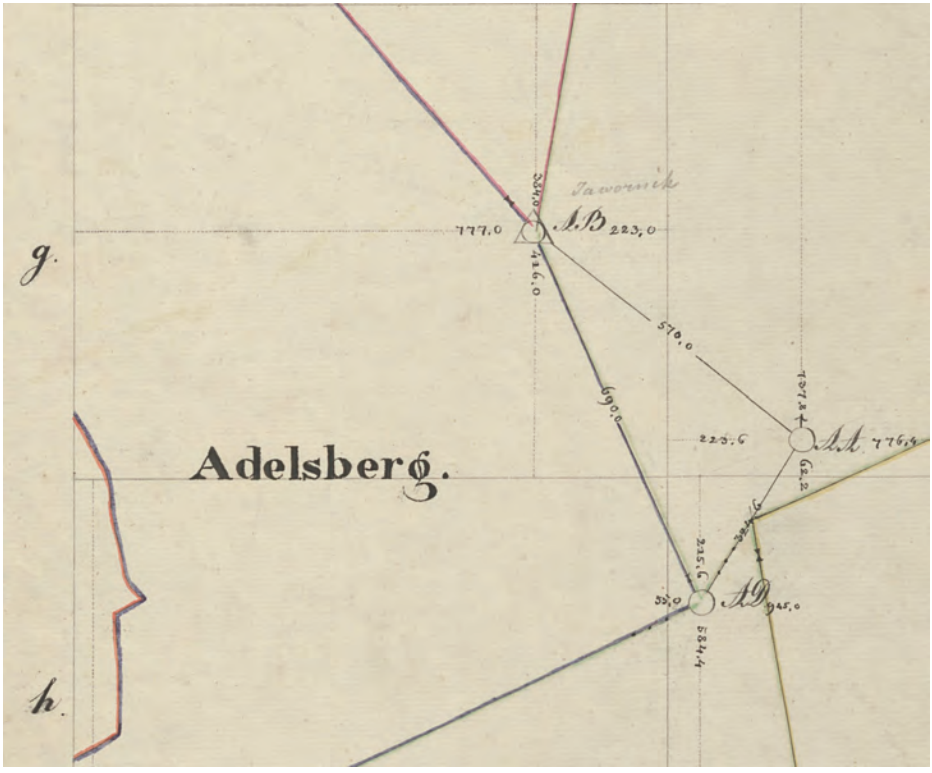
Excerpt from the description of trigonometric measurements performed on Veliki Javornik in the period 1896–1903 (source: Die Ergebnisse der Triangulierungen der K.u.K. Militärgeigraphischen Institutes).

Boundary stone at Veliki Javornik from two sides.

Veliki Kožljek

On Veliki Kožljek (1240 m), there is another beautifully preserved boundary stone previously representing the boundary between Postojna and Planina districts from 1823. This boundary stone still serves as a boundary point between the cadastral municipalities of Trnje and Postojna and is still today a trigonometric point. Unlike the boundary marks on Velika Slivnica and Veliki Javornik, only a graphical trigonometric survey was carried out on it during the Franciscan land cadastral survey. This is depicted in a form of the circle on the trigonometric survey sketch. The Italians also carried out trigonometric measurements on it between both World Wars, this can be resolved from the inscription RA written in its concrete base. Today, it represents the fourth-order trigonometric point no. 196 in the trigonometric district of Postojna. The survey is carried out on a metal pin at its top.

Boundary stone at Veliki Kožljek from two sides.



Excerpt from a sketch of a trigonometric measurement performed for the Franciscan land cadastral survey, where Veliki Javornik is at the top, Veliki Kožljek is in the middle on the left side and Debeli vrh is in the middle on the right side (source: ARS fond 1959).

Geodetic points as heritage

On the tops of mountains and hills, we often encounter various types of geodetic marks representing trigonometric points and various boundary marks. In both cases, these can be small squares measuring up to 20 cm × 20 cm in cross-section, carved, brick or concrete pillars of various heights, or occasionally even brick towers over ten metres high. Metal boxes with mountaineering logbooks are often attached to larger pillars. The average mountaineer usually do not know what these marks represent. Interestingly, these geodetic marks usually testify on the geodetic history and therefore represent an important part of the geodetic technical heritage. However, they are not just a geodetic technical heritage, as they also tell us a lot about the former ownership, administrative or spatial divisions in Slovenia. In this booklet, we presented the carved cross on Velika Slivnica from 1726, which still represents a trigonometric point, as well as tells us that exactly three hundred years ago it represented the boundary point between the estates of Planina and Carthusia Bistra. During the Franciscan land cadastral survey in 1823, it got a new role, it became a trigonometric point. The summit of Velika Slivnica has retained this role to this day. As the point on Velika Slivnica has always been part of the second-order trigonometric network, surveyors have used it in the past to carry out the most accurate geodetic measurements. In the past, these were carried out with different kinds of surveying instruments or theodolites, which were replaced by high-quality GNSS instruments a good three decades ago. To calculate the coordinates of geodetic points, surveyors always use the most accurate measuring and calculation procedures.

Uncovering and presenting the history of the development of the geodetic profession, as well as development of former and current ownership and administrative boundaries in the area, may be of interest to all of us who meet in this area. We hope that this presentation of the geodetic technical heritage found on Velika Slivnica and the neighbouring Javorniki mountain range will encourage you to submerge in our shared history.

More details about the geodetic points mentioned in this booklet are available in papers:

Triglav Čekada, M. (2023). ***The cadastral municipality boundaries under Krim: the boundary between Bistra and Engelshaus from 1726.*** Geodetski vestnik, vol. 67, no. 3, 325–342.
https://geodetski-vestnik.com/arhiv/67/3/325_Triglav_Cekada.pdf

Triglav Čekada, M., Kozorog, E., Premrl, B. (2025). ***The Jama (Luegg) estate boundaries in the forests of Hrušica, Slovenia.*** Geodetski vestnik, vol. 69, no. 2, pp. 180–204.
https://www.geodetski-vestnik.com/arhiv/69/2/180_Triglav_Cekada_at_al.pdf

Scan the QR code to view the digital booklet on the Geodetic points on Velika Slivnica

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