Scientific communication about geodesy and land surveying: activity of the geodesic educational initiative ‘Honorable Krakow Meridian' from Poland.

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SUMMARY – in Polish

Geodezja i miernictwo geodezyjne stanowią ważny element nauk o Ziemi, dostarczając najbardziej merytorycznego opisu naszej planety: pomiarów jej kształtu i rozmiarów. Jednakże, ta fundamentalna rola geodezji, jako dziedziny nauki nie jest powszechnie znana w społeczeństwie; szczególnie dobrze widać ten problem w Polsce. Dlatego, w 2012 roku zainicjowano w Polsce akcję edukacji geodezyjnej, pod nazwą „Honorowy Południk Krakowski” (HPK). Jej celem jest popularyzacja geodezji, jej historii oraz dokonań naukowych, upowszechniając wiedzę o tej dziedzinie, w szczególności poprzez oznaczanie w przestrzeni publicznej obiektów o charakterze geodezyjnym oraz zagospodarowywanie zabytkowych monumentów geodezyjnych, jako atrakcji turystycznych i edukacyjnych. Akcja HPK zrealizowała kilka znaczących projektów, w tym wyznaczenie prawdziwego, geodezyjnego środka terytorium Polski oraz liczne działania na rzecz przywrócenia krakowskiego południka zerowego, jako atrakcji na podobieństwo południka Greenwich. Działaniami takimi akcja HPK dąży do wzrostu świadomości znaczenia geodezji w funkcjonowaniu społeczeństwa oraz budowy pozytywnego wizerunku geodety i samej geodezji, jako fascynującej dziedziny nauki o wielkich zasługach dla rozwoju cywilizacji.

SUMMARY – in English

Geodesy and land surveying are an important elements of Earth sciences, providing the most substantive description of our planet: measuring its shape and size. However, this fundamental role of geodesy as a field of science is not widely known in society; this problem is particularly visible in Poland. Therefore, in 2012, a geodetic education initiative was initiated in Poland, under the name of 'Honorable Krakow Meridian' (HKM); in Polish, 'Honorowy Południk Krakowski'. Its aim is to popularize geodesy, its history and scientific achievements, disseminating knowledge about this field, in particular by marking geodetic objects in public space and managing historic geodetic monuments as tourist and educational attractions. The HKM initiative has implemented several significant projects, including the designation of the true geodetic center of the territory of Poland and numerous activities aimed at restoring the Krakow prime meridian as an attraction similar to the Greenwich meridian. With such activities, the HKM initiative aims to increase the awareness of the importance of geodesy in the functioning of society and to build a positive image of the surveyor and geodesy itself as a fascinating field of science with great merits for the development of civilization.

1). INTRODUCTION

Geodesy is the most substantive of the Earth sciences and is the foundation of geography. It describes the planet Earth in the most exact scientific way: by measuring it directly, focusing on the quantitative description – the size and shape of the planet's physical body. Thus, geodesy provides numerous scientific fields with invaluable data necessary to conduct geophysical or astronomical research. The complexity and detail of surveying on such a large scale makes it, by definition, inaccessible to most people; in particular, because of their hermetic nature, in terms of the language used by this kind of description of the Earth. A more practical aspect of geodesy is land surveying, focusing on small–scale geodetic measurements of a cadastral and engineering nature. The average Smith (and in Poland, Kowalski) is already dealing with this geodesy – lower geodesy. But even such geodesy, close to everyday affairs, remains a largely unknown and mysterious field.

All this means that although geodesy and land surveying constitute the foundation of our knowledge about the world in which we all live, the knowledge of these areas in society is negligible. From this arises another problem: the unknown cannot be understood, and what we do not understand causes fear and aggression; although it should arouse admiration and respect. This is also the case with geodesy. We observe this phenomenon all over the world, with varying intensity depending on the country. In Poland, due to the complicated and difficult history of our nation, this is a particularly serious problem. Modern geodesy began to take shape in the nineteenth century, when Poland did not exist as an independent state, the national consciousness of Poles was only just consolidating; and it happened under the partitions, occupation of neighboring countries – Prussia, Austria and Russia – sanctioning their power over Polish lands also by introducing their, mainly military, surveying services. As a result, the fear of land surveyors – strongly strengthened during the Soviet occupation after World War II – has survived in Polish society to this day; that land surveyors are comming to measure the land because the "government" (without qualitatively distinguishing whether it is the government of the occupant or the government of its own, independent state) wants to take away from ordinary people... And in the case of the occupation, surveying actually often ended with brutal expropriation of land properties or the imposition of high property taxes on the conquered population. For this reason, there is also a deeply rooted distrust towards surveyors in Polish society, which turns into aggression; this often has an irrational basis, such as the common – as we know, all over the world – belief that a total station is a camera and land surveyors film private properties for an undefined, "sinister" purpose. Failure to understand the basics of the surveyor's work and the principles of land surveying operation also results in the frequent destruction of control points network monuments and border stones: in most cases, not due to maliance, but out of ignorance.

When I started working as a land surveyor assistant, I quickly noticed these problems in the relationship between land surveyors and society. Being huge passionate about geodesy, I decided to share my passion with the society, seeing it as a method of solving these problems through education. So far, no one in Poland has dealt with the popularization of knowledge about geodesy in an organized way. So it was an undeveloped space so far needed by Polish geodesy. I decided to popularize knowledge about geodesy as a my mission.

This is how the geodetic educational initiative 'Honorable Krakow Meridian' was born.

2). THE BEGINNING

The geodetic educational initiative 'Honorable Krakow Meridian' (HKM) has begun with a spontaneous happening on October 9, 2012. In the southern part of Krakow, there is one of the degree confluence points, where the 50 degrees North parallel and the 20 East meridian intersect. It is one of the few places in the world where the significant parallel and meridian, with coordinates expressed in full tens of degrees, intersect in a large city, in an accessible place. After visiting this place – a small forest, at the end of an unpaved road – I noticed that there is no sign, monument or information board to make you aware of the existence of a unique point on the world map in this place. The location of this point in the field was determined in July 2000 by the rector of the AGH University of Science and Technology, science promoter, Professor Ryszard Tadeusiewicz, together with a group of astronomers and land surveyors from this university [Hycner, 2000]. Point has been marked only by a simple surveyor stick, which has not survived till that day, and at the place I have found some new one, surrounded by few stones only. Knowing about the failures of several attempts – undertaken on the initiative of professor Tadeusiewicz – to officially mark this point with a monument, I decided to do it at least temporarily, but legibly enough so that the point 50x20 (as it was usually called; with reference to the geodetic coordinates B and L of this point) could be easily found in the field. Using concrete paving slabs that I found on a nearby pile of rubble, I placed a square of 9 slabs in the exact location of the point, and on the central slab I carved the inscription '50° N + 20° E' with a screwdriver so that the '+' sign lay in the center, exactly where the parallel and the meridian intersect [Królikowski, 2012]. Next to it, I have placed a simple, home–made information plate with an inscription in Polish and English. In this way, as part of the HKM initiative, the first geodesic marker in Krakow was created. Despite the fact that it is a raw and simple object, it successfully fulfills its function until now and allows residents of nearby estates and lovers of geographic curiosities to flawlessly find a point with unusual coordinates in the field, showing at the same time that there is no need for large expenses and extensive construction works to effectively introduce into the space objects of a geodetic nature.

The unusual name of the initiative refers to the original concept of creating the first geodetic tourist attraction in Krakow: a tourist trail, based on the meridian line, running through the city center, as an axis connecting the known and unknown attractions of the city [Królikowski, 2012]. The idea aroused the interest of local media, but did not arouse the interest of the city authorities, so the concept of establishing

such an 'honorable' meridian – as a new entity, having no historical justification – was left aside. The initiative focused on gathering in one place as much information as possible about more or less known meridians from around the world, along with information about monuments commemorating them; their appearance, history and exact location. For the next 5 years, the geodetic educational initiative 'Honorable Krakow Meridian' – in practice, a one–man initiative – collected a large database of meridian monuments, but also other geodetic monuments and the history of geodesy, making it available on social media. In the meantime, it also turned out that there was no need to create a new meridian entity, which was to be the 'honorable Krakow meridian', because there was already a historic Krakow prime meridian, with a very long and fascinating history, dating back to the 14th century... In 2016, HKM's initiative proposed marking the geometrical center of the Brest poviat in connection with the 150th anniversary of the poviat's creation; unfortunately, without any interest from local authorities [Capuccino.eu, 2017].

The breakthrough came only in 2018 and the celebration of the 100th anniversary of Poland regaining independence, combined with the celebration of the Year of Polish Geography, which includes geodesy and cartography. This year, the HKM initiative came up with two local 20° E meridian lines: both completed. The first was the meridian line marked in the local pub by sticking a decorative line on the floor of the premises, painting its continuation in front of the entrance to the pub, and hanging an information board by the beer garden [Bajorek, 2018]. The second project was carried out in the same housing estate, next to the local kindergarten, during the renovation of the pavement: a line of colorful paving stones was laid in the pavement and an information board was placed next to it [Królikowski, 2018]. Two years later, in Krakow city park in Czyżyny has appeared another marker of this meridian; also thanks to HKM initiative [Meus, 2020].

3). THE GEODESIC HEART OF POLAND

Already at the end of 2017, the HKM initiative – in preparation for the celebration of the 100th anniversary of Poland's independence – also drew attention to the most symbolic geodetic point on the map of Poland: its geographical center. For the previous 50 years, it was widely recognized that the geographical (geometric) center of Poland is the village (now, town) of Piątek, in the Łęczyca poviat. Such information was provided by almost all available sources, including school textbooks and geographic atlases. However, there was no scientific study confirming this location. The preliminary calculations also showed that the strictly geometric center of Poland – i.e. the point lying in the middle of the latitudinal and longitudinal extent of the administrative area of Poland (the sum of the territorial division units of the country, i.e. the sum of all registered plots) – is in fact 30 km west of the village of Piątek. So it was a great opportunity to study the problem of locating the center of Poland in a reliable and precise way,

and geodesy is the most competent science for such a task. This is how the project "Geodetic Heart of Poland" was born.

At the same time, the publication of Professor Piotr Różański from the Warsaw University and the Nicolaus Copernicus University in Toruń (Faculty of Physics, Astronomy and Applied Computer Science) has shown the author's calculations of the coordinates of the center of gravity (centroid / geodesic center) of the administrative area of Poland [Różański, 2018]. He has calculated that the centroid of this area is located in the Piątek commune, in the village of Balkowo, which was approximately in line with the traditional location of the ‘geometric center' of Poland. Having established contact and cooperation with professor Różański, we started work on examining several differently defined central points of Poland and thoroughly describing both the history of designating this traditional, ‘geometric center' of Poland, as well as searching for the location of the most substantially defined center of Poland.

At the beginning, the project assumed a monumental commemoration of the exact location of the centroid of the administrative area of the country or the centroid of the land area of Poland – which was most likely incorrectly called the 'geometric center of Poland' when the first calculations were made in 1966, pointing to the village of Goślub in the Piątek commune, what we have confirmed by our modern calculations – in order to refer to the traditional location of the center of Poland, somewhere in the Piątek commune. However, both points were located in inaccessible, marshy and forest areas of the commune, and the local community and local authorities of the commune of Piątek were extremely critical to any plans to undermine the traditional claims about the 'geometric center of Poland' in Piątek – although, contradictory to the facts – strongly rejecting all arrangements and suggestions. In view of the undisputed proofs that the geometric center of Poland does not lie in the Piątek commune, the centroid of the administrative or land area cannot be marked in any way in the field, and in addition, that as part of the implementation of the provisions of the UNCLOS Convention, the borders of coastal communes are going to be systematically extended up to the territorial sea baseline, which will result in a systematic migration of the centroid of the administrative area of Poland to the north – ultimately by 3.5 km, to the neighboring commune of Krzyżanów – it was decided that in our later activities we would focus on the geodetic center / centroid of the total territory of the country, i.e. the most general and at the same time most formal definition of the territory of Poland; because it is defined only by the course of the state border, which position is also precisely and permanently defined.

On the basis of calculations made by professor Różański, we have found out that the true, geodetic center of the entire territory of Poland – including internal sea waters and the territorial sea – has the coordinates 52°11'27.95" N and 19°21'19.46" E; this point is located 16 km north–west of Piątek, in Nowe Wieś village near Kutno city. By the way, the total area of

the entire territory of Poland was calculated: 322 720.4 km². The designated point was on a private property, in the garden next to the house. However, it was possible to reach an agreement with the landowners and obtain permission to place a symbolic stone commemorative column in the exact position of the centroid of the entire territory of Poland. On October 13, 2018, with the participation of representatives of local authorities, geodetic organizations, under the honorary patronage of the Surveyor General of Poland and the support of several geodetic and patriotic organizations, the position of the center of Poland was determined using a GNSS receiver and a black granite commemorative column was dug in this place, placing a cornerstone under it, taken from the Wawel Hill in Krakow; the seat of the polish kings – the spiritual heart of Poland [Czekaj, 2018].

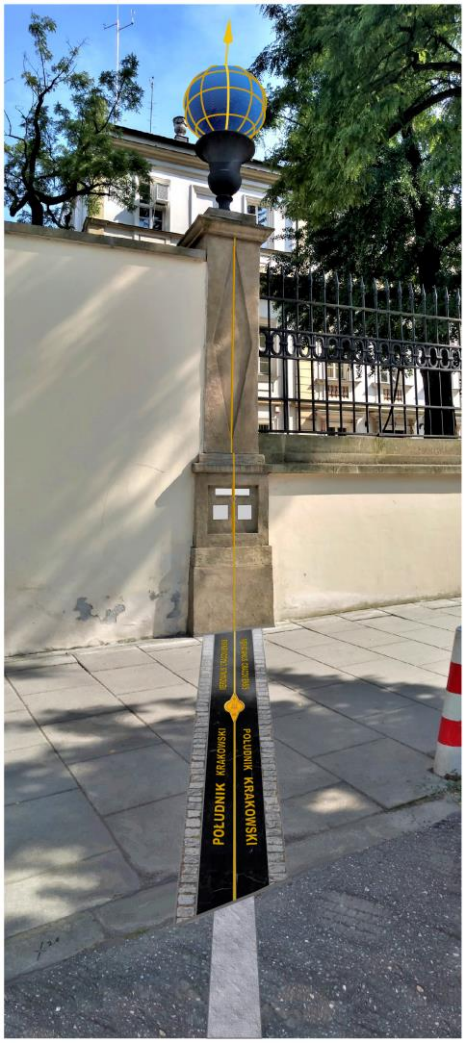
The project "Geodetic Heart of Poland" finally aims to create an educational center on the property with the whole territory of Poland, devoted to the geography of Poland in the geodetic context and the contribution of Polish land surveyors to the description of the territory of our country as the basis for the patriotic awareness of the Polish nation. Although the owner of the property decided to sell the property, local and central authorities were not interested in buying it. Also, no research institution in the field of geodesy and cartography in Poland wanted to undertake the verification of Professor Różański's calculations so that the new Polish measure could be officially accepted as the real one and corrected incorrect information in encyclopedias, school textbooks and geographic atlases. The undoubted success of the project was, however, the media coverage of this initiative, in particular the fact that on this occasion the words "geodesy" and "land surveyor" were presented in a positive light as professionals and scientists. The project continues and popularizes knowledge about the true center of Poland, striving to make it a fully–fledged and generally accessible tourist attraction: geodetic.

A derivative project, started somewhat in parallel, is "Small navel of the World". Its aim is to designate and commemorate with monuments the geodetic means of "small homelands", that is voivodships, poviats, communes, cities and even districts of towns and villages. Each such point is to be a meeting point for the local community and a symbolic center of their small world, as a symbol of the unity of the local community and its place in the big world. As part of this project, the surveying initiative of HKM has already marked several dozen points throughout Poland, including the geodetic center of the Polish capital, Warsaw and several other cities [Grochowalski, 2019], districts, communes and provinces; some have already been marked in the field with small monuments, and their marking is at different stages of implementation. Wherever a new center of an area is designated, it is mentioned that it is a geodetic measure, that it was designated by land surveyors, using a precise geodetic method, used to designate a new geodetic center of Poland. The consistency of such a message builds a

positive image of geodesy and land surveyors in the society, which is also one of the main goals of the HKM initiative.

4). POLISH GREENWICH

The geodetic initiative "Honorable Krakow Meridian" focuses in a special way on the object that was the pretext for its creation: Krakow Prime Meridian [Meus, 2019a].



During the 10 years of the HKM initiative's activity, a considerable amount of historical material was collected on this meridian. The Kraków meridian appears for the first time in history in 1379, as the basis for astronomical calculations made by Herman of Przeworsk, the court astronomer and medic of the Polish king Władysław Jagiełło. From then on, it was widely used to perform astronomical calculations at the University of Krakow. It was used by the famous Polish astronomer, Nicolaus Copernicus in his work "De revolutionibus orbium coelestium" from 1542 as the reference meridian for astronomical observations, proving that the Earth orbits the Sun while rotating on its axis. Around 1640, another Polish astronomer and physicist, the rector of the University of Krakow, Stanisław Pudłowski, by measuring the course and longitude of the Krakow meridian, formulated the concept of the first in history, naturally defined unit of length: the prototype of a meter, based on the length of a second pendulum on the Krakow meridian. Pudłowski created this project almost 150 years before the adoption of the meridian definition of the metro by the Paris Academy of Sciences. Stanisław Pudłowski died in 1645. This concept was continued by his colleague of Italian origin, Tito Livio Burattini, who, emphasizing the role of Pudłowski in formulating the idea of a universal measure, developed it with derivative measures, creating a whole system of mathematically related natural measures. He presented this project in the famous treatise "Misura Universale" of 1675: he also called the proposed unit of length for the first time the "metro cattolico" (universal measure).

The Kraków Meridian appears on many maps of the Kingdom of Poland from the 17th and 18th centuries, as well as on the plans of the city of Kraków from the 19th century. In 1792, when the first state astronomical observatory in Krakow (Śniadecki Collegy at Kopernik Street, in the botanical garden of the Jagiellonian University) was opened, founded by the astronomer, geographer and mathematician Jan Śniadecki, the Krakow meridian was officially designated by him through the transit telescope placed in the observatory. Śniadecki also postulated the

implementation of a nationwide campaign of triangulation measurements – basing the triangulation network on the Krakow meridian – in order to draw up a detailed map of the Kingdom of Poland on their basis. Unfortunately, the kingdom fell shortly afterwards and the period of partitions and occupation of Polish lands began. At that time, however, works in the field of astronomy based on the Krakow meridian were still published. Numerous calendars with information about astronomical phenomena, the time of which were calculated for the Krakow meridian, were also published. From 1838 until 1984, the time signal was transmitted from Kraków in various forms, giving the exact time of noon for the Kraków meridian.

The memory of the Kraków meridian faded in practice at the end of the 19th century. It was only the activity of the HKM's geodetic initiative that the knowledge about this meridian began to come back to life. In 2022, thanks to the efforts of the HKM initiative, the meridian was returned to the map of the city of Krakow as a historical layer in the geoportal of the city hall. In 2019, precise geodetic measurements were made in the botanical garden and in the building of the old astronomical observatory in order to determine the precise course and contemporary geodetic length of the Krakow Meridian by GNSS–RTK measurement. Its current geodetic length is 19°57'21.237" E. Thanks to this, it was possible to determine its course in the city of Krakow. Currently, work is underway at the Jagiellonian University on the permanent marking of the Krakow meridian in the botanical garden, as well as on the commemoration of the meridian and its history from the street side, with the use of a decorative column in the wall of the botanical garden, through which runs the Krakow meridian. Also in one of the revitalized parks in Krakow, a decorative line of the Krakow meridian is to appear soon and the authorities of the Prądnik Biały district want to mark the course of the Krakow meridian on the sidewalks and streets of this district of Krakow.

6). 52 DEGREE PARALLEL ARC

As you know, the only geodetic object entered on the UNESCO List is Struve Geodetic Arc. There is, however, another similar geodetic object, much less known but much more international: the geodetic arc of the 52 degree north parallel. Arc was built in the second half of the 19th century. The triangulation chain was originally intended to connect the Greenwich observatory with the observatory in Warsaw, but it was extended over time, connecting the transatlantic cable station on Valentia Island in Ireland with the city of Orsk in the Ural Mountains in Russia, on the border between Europe and Asia. There are two important points of this geodetic arc in Poland that deserve special attention. One is the Sucha Góra triangulation point on the border of the cities of Bytom and Tarnowskie Góry in the south of Poland [Lamparska & Danch, 2021], and the other is located in the capital of Poland, Warsaw: it is a historic column of the survey monument at Theater Square.

The Sucha Góra triangulation point, known under the German name Trockenberg, was probably created as early as 1827, but it was not until 1852 that it was

given high–class coordinate measurement precision and of great importance for triangulation measurements in Central Europe. It was then that the famous Prussian surveyor Johann Jacob Baeyer established Trockenberg at the Laplace point by means of precise astronomical observations and triangulation measurements, connecting the triangulation network of Pruss and Russia, and indirectly also of Austria, through Trockenberg. The Trockenberg point was for over 100 years the zero point of the local geodetic coordinate system used in cadastral measurements of Upper Silesia and mining measurements in coal mines. Today, the granite pillar of the 1st class Prussian triangulation point is a sign of the basic geodetic network control point (II class), the coordinates of which are 50°24'38.910" N and 18°52'30.889" E. It is located on the steep rock ridge of the former dolomite quarry, overgrown by the forest.

The HKM initiative has been taking part in the independent project "Geographic Heart of the Upper Silesia" for several years, aimed at creating a recreation and education park in Sucha Góra, devoted to geodesy, astronomy and geology. An important element of the project is the reconstruction of the triangulation tower in Sucha Góra, the renovation of the historic geodesic monument and the creation of educational paths devoted to the history of geodetic measurements carried out using the Trockenberg triangulation point. A special sundial is being built at the local fire station, the gnomon of which is located on the meringue line of the Sucha Góra base meridian, also marked here. Recently, the civic budget project aimed at rebuilding the triangulation tower in Sucha Góra has won in 2021 year edition [Osadnik, 2022].

The second, unique point of the 52 degree parallel geodetic arc triangulation chain is the column, located on the Theater Square in the center of Warsaw, the capital of Poland. For many years, the column was commonly called the "Warsaw meridian" because on the metal plate at its top you could see the line described as "the meridian of the top of the town hall tower". However, it was not until 2019, as a result of an investigation of the HKM's geodetic initiative – started on the occasion of designating the geodetic center of the city of Warsaw and the geodetic center of the Mazowieckie Voivodeship – that it was discovered that the column was created in 1872 as a survey monument, used for astronomical, triangulation and magnetic measurements in relation to triangulation point 52 parallel geodetic arc on the spire of the town hall tower, i.e. the nearby Jabłonowski Palace [Meus, 2019d]. It is the only building in this part of the city that survived the destruction of the city of Warsaw during the Second World War and the fighting during the Warsaw Uprising in 1944 intact. This column, made of white marble and surrounded by an original cast–iron balustrade, is located at the coordinates 52°14'38.303" N and 21°00'33.038" E, in the parking lot in front of the Grand Theater building in Warsaw.

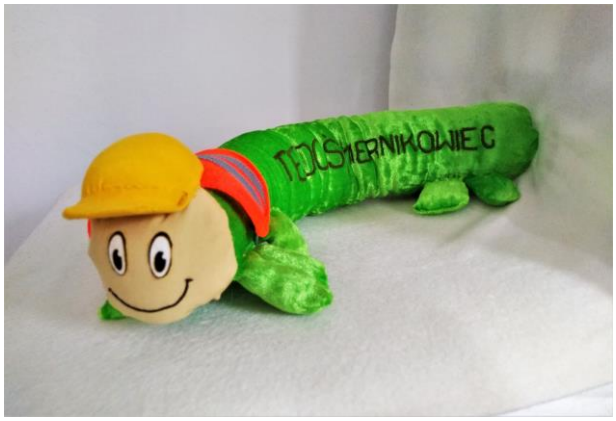
In connection with the FIG international geodetic conference to be held in Warsaw, the geodetic initiative of HKM proposed that the geodetic column at Theater Square in Warsaw should be entered in the register of monuments as a Monument of the European Geodesy; at the same time, by placing an information board next to it, describing the true history of this monument and its importance for geodesic studies of the shape and size of the Earth in the area of the European continent.

7). OTHER PROJECTS

The "honorable Krakow Meridian" geodetic educational initiative deals with many aspects of geodesy and popularizes knowledge about this science in various ways. Designates and marks interesting geodetic objects with monuments, studies the history of Polish and world geodesy monuments, disseminates knowledge about the basics of land surveying ... But that's not all!

When, in mid–2021, the Russia and Belarus attempted to trigger a migration crisis on the Polish border, a heated discussion about the Polish state border began in the media, raising doubts as to its correct course. Indeed, a comparison of the available data on the length of the entire Polish state border and individual sections of the Polish border with neighboring countries revealed even several dozen kilometers differences between the values provided by various official sources, such as the Central Statistical Office, Border Guard and the Head Office of Geodesy and Cartography. Therefore, the HKM initiative carried out a survey of the geodetic data made available through the National Geoportal concerning the state border. The review consisted in comparing vector data on the course of the state border line from the State Register of Borders with orthophotomaps of border areas, with the state border marks visible in the aerial photos. Hypothetically, both data sets should coincide with errors not exceeding the accuracy of fitting the aerial photos into the coordinate grid. In reality, however, differences of up to 52 meters and errors in the geometry of the state border lines were detected, impossible to explain either by the accuracy of the measurement in the field, or by transformation errors between different datums. Therefore, for reasons of national security, the survey report was submitted to the Surveyor General of Poland, who handed it over to the Border Guard. Unfortunately, after a few months, both institutions stated that in their opinion all the data was up–to–date and correct, and all allegations were groundless. The facts, however, contradict this, which everyone can check on their own, because the data examined in this report are publicly available, openly and free of charge, and the report itself was made public by the HKM initiative on November 10, 2021… [Meus, 2021a].

The HKM initiative aims to improve the image of geodesy and the land surveyors themselves. The main tool to achieve this goal is education, but also PR activities. Such a project is the idea of establishing the official mascot of Polish geodesy: Theodor the Inchworm (In Polish: Teodoś Miernikowiec). The mascot of geodesy would be a plush toy, depicting a green caterpillar in a reflective vest with the word "land surveyor" and a yellow helmet. This caterpillar belongs to a unique group of butterflies: Geometridae, often called Inchworms, due to their characteristic way of moving, as if their body were measuring sections of the earth (it was once believed that they measured exactly 1 inch; hence the common name – their worm). So it can be said that ichworms are land surveyors among animals!



The friendly appearance, evoking positive associations and the simplicity of the mascot make it a perfect ambassador of land syringing among ordinary people, in particular, strongly speaking to families with children and thus building a positive image of the land surveyor in the youngest people. Theodor the Inchworm character could also play an educational role in contacting land surveyors with children and constitute a cheap gadget for surveying companies [Meus, 2019b].

8). PLANS FOR FUTURE...

HKM's surveying initiative has ambitious plans; slowly, going beyond the borders of Poland. They result directly from the projects implemented so far, most of which have very far–reaching goals. Let us list the most important plans of the HKM initiative in points:

1. Official recognition of the geodetic center of Poland in Nowa Wieś and creation of a geodetic tourist attraction in its location with an educational center dedicated to land surveying.
2. Maximum exposure of the Krakow meridian line and the creation of the "Sky & Earth.PL" Educational Center along its course, which will include the Museum of Polish Astronomy and Geography; including, surveying.
3. Inscription on the UNESCO World Heritage List of preserved monuments 52 degree north parallel geodetic arc.

The HKM initiative is already establishing contacts with foreign geodesy and land surveying enthusiasts in order to support similar initiatives and projects all over the world, but also to popularize knowledge about Polish geodetic treasures. The French–language geodetic journal XYZ has already written about the activities of the HKM initiative [Meus, 2021b], and the media in Germany and the Czech Republic informed about the designation of a new center of Poland. Talks on several international projects are already underway:

1. The "meridian of Polish–American friendship" in California, similar to the meridian of friendship on the Japanese island of Iriomote; this meridian would have a geodetic length expressed in consecutive digits, from 1 to 9, i.e. 123°45'6.789" W.
2. Marking the line of the Italian prime meridian Monte Mario at the Copernican Astronomical Observatory in Rome, on the occasion of the 550th anniversary of the birth of Copernicus, at the same time as a monument in honor of Tito Livio Burattini.
3. Development of geodesic relics on the Irish island of Valentia, constituting the western end of the 52 parallel geodetic arc.
4. In memory of Robert "Bob" Volmer from Indiana, USA, who died in January 2022, as the longest working land surveyor in the world, by building an educational monument in the location of the centroid of the State of Indiana territory.
5. Return to the plans – interrupted by Russia's invasion of Ukraine – of cooperation with Ukrainian land surveyors in order to mark geodetic objects in Ukraine, such as the Kiev meridian and the geodesic center of Kharkiv and Lviv.
6. Designation of the geodetic center of Greece as a tribute to the contribution of ancient Greek mathematicians to the construction of the geometric basis of geodesy; after all, the word "geodesy" comes from the Greek language.

9). CONCLUSION.

The geodetic educational initiative "Honorable Krakow Meridian" is a unique grassroots initiative, not only in Poland but also in the world. It aims to bring together lonely geodesy enthusiasts in order to make geodetic objects more visible in the public space, and thus raise the social awareness of the role and achievements of geodesy. The HKM initiative for 10 years, deprived of the support of the organization and especially of state surveying institutions, was based on the commitment and enthusiasm of its founder and chairman, land surveyor Mariusz Meus; called ‘Mr. Meridian’ [Czekaj, 2019]. Entering the second decade of activity, new prospects are opening up for the implementation of even more ambitious educational projects, already in close cooperation with surveying institutions and organizations from Poland and abroad, so that knowledge about geodesy and land surveying in societies of all countries around the world grows continuously. The ultimate goal of the HKM initiative is to make geodesy for ordinary people a science as fascinating as astronomy or quantum physics, and the work of land surveyor was treated with due respect and admiration.

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