

# Science Communication and Awareness Rising Events in the Framework of EU Project „GeoSkills+“ for Popularization of Geospatial Education among Young Generations and Students in Bulgaria

Asparuh KAMBUROV, Milena BEGNOVSKA, Lyubov KOSTOVA, Tanya SLAVOVA, Dimitar VELICHKOV, Bulgaria

**Keywords:** Science Communication, Awareness Rising, Public Outreach

## SUMMARY

Together with other Earth Sciences, geodesy implements theory and techniques which bring significant contribution for wider audience understanding of fundamental planetary processes – global warming and climate change being the ones with paramount importance. This importance is already recognized by the United Nations Committee on Global Geospatial Information Management (UN-GGIM), which have recently developed a „Communication strategy on how geodesy contributes to strengthen the study of our changing planet“. Despite its significance, sociological surveys in Europe show that geodesy is still a rather unpopular discipline among the high-school and university-level students. A widespread public awareness strategy needs to be developed for overcoming this drawback. This article presents *science communication* actions as a tool for public awareness in the field of geodesy and other geospatial education disciplines.

Science communication is a relatively new public awareness approach. It already plays a significant role in enhancing the overall society scientific literacy in the United Kingdom and other European countries. Bulgaria still lacks established science communication workflows that may be applied to make geodesy attractive to learn. However, in the last few years a valuable experience was gained through participation in local or internationally recognized science communication events, targeted for young generations and students. These included geospatial-related attractive games and demonstrations, organized by young scientists from the University of Mining and Geology (UMG) and the University of Architecture, Civil Engineering and Geodesy (UACEG), with support from the British Council - Bulgaria. All events are performed in coherence with the European Commission project „GeoSkills+“, which actions in Bulgaria are coordinated by the Geodesy, Cartography and Cadastre Agency. Analysis of the future possibilities for attraction of young generations and students to geodesy using science communication means is included as well.

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## 1. INTRODUCTION

Together with other Earth Sciences, geodesy implements theory and techniques which bring significant contribution for wider audience understanding of fundamental planetary processes – global warming and climate change being the ones with paramount importance. This importance is already recognized by the United Nations Committee on Global Geospatial Information Management (UN-GGIM), which have recently developed a „Communication strategy on how geodesy contributes to strengthen the study of our changing planet“. Despite its significance, sociological surveys in Europe show that geodesy is still a rather unpopular discipline among the high-school and university-level students. A widespread public awareness strategy needs to be developed for overcoming this drawback. This article presents *science communication* actions as a tool for public awareness in the field of geodesy and other geospatial education disciplines.

Science communication is a relatively new public awareness approach. It already plays a significant role in enhancing the overall society scientific literacy in the United Kingdom and other European countries. Bulgaria still lacks established science communication workflows that may be applied to make geodesy attractive to learn. However, in the last few years a valuable experience was gained through participation in local or internationally recognized science communication events, targeted for young generations and students. These included geospatial-related attractive games and demonstrations, organized by young scientists from the University of Mining and Geology (UMG) and the University of Architecture, Civil Engineering and Geodesy (UACEG), with support from the British Council - Bulgaria. All events are performed in coherence with the European Commission project „GeoSkills+“, which actions in Bulgaria are coordinated by the Geodesy, Cartography and Cadastre Agency. Analysis of the future possibilities for attraction of young generations and students to geodesy using science communication means is included as well.

## 2. GEOSKILLS+ PROJECT

GeoSkills+ is an EU multinational vocational education and training (VET) project, supported by Leonardo da Vinci funding programme, part of European Commission’s Lifelong Learning Programme (2007-2013).

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Figure 1. GeoSkills+ philosophy

## 2.1 Aims and objectives

The project will provide an infrastructure to improve geospatial VET skills in Europe and encourage cooperation between the geospatial academic world and the world of work. The expected outcome is a significant enhancement of employability in the geospatial labour market.

Member States are struggling with challenges of linking geospatial VET education to labour market needs. Over past decade, European geo-information field has developed into a vital and dynamic sector and geospatial education community has not been able to keep up the pace with labour market demands. Adequate numbers of well-trained VET students in the fields of land surveying, mapping data collection, storage and information supply are strongly in demand in EU labour market. There are too few graduates, at all levels including VET. A whole generation geospecialists will retire in coming years. Other labour market fields (medical care, financial, logistics) are increasingly asking for GEO knowledge. VET level GEO will offer a response to this need.

## 2.2 Project structure

The project will take innovative practices already existing in Europe and redefine them so that they can effectively be implemented in a few ‘pilot’ countries: Belgium, Bulgaria and Lithuania. The chosen partnership for this project will ensure that the transfer of innovation will be successful as all organisations share similar problems and have similar responsibilities. In addition, the partnership has been carefully chosen in order to represent in the EU different levels of maturity of adapting geospatial vocational education and training to labour market needs. All participating partners are given in Table 1.

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**Table 1. GeoSkills+ partnership table**

Netherlands	Dutch Cadastre, Land Registry and Mapping Agency
	GEO Employment Market Foundation
Bulgaria	Geodesy, Cartography and Cadastre Agency
Lithuania	Vilnius Gediminas Technical University
Belgium	Belgian Order of Surveyors
	Council of European Geodetic Surveyors
	European Association of Geographers
	Flemish Association for Geographic Information

The Bulgarian Geodesy, Cartography and Cadastre Agency (GCCA) is the Lead Partner for Work Package 2 - Rising Awareness. Overall the projects comprises five work packages (Table 2).

**Table 2. GeoSkills+ Work Package list**

Work Package (WP)	Key actions	Leader (legal name)
<p>WP 1. Define a Cooperation Model</p> <p><i>Cooperation leads to better understanding between employers, education institutes and students as a solid basis for job matching and employability.</i></p>	<ul style="list-style-type: none"> <li>- define Geo community (academia, government, industry, new players);</li> <li>- define institutional format of cooperation;</li> <li>- organize enabling activities.</li> </ul>	Belgian Order of surveyor experts
<p>WP 2. Transfer of Innovation: Exchange methods to improve awareness of geospatial vocational education and training (VET)</p> <p><i>Awareness rising for geospatial VET will attract students and will enhance the attractiveness of GEO labour market.</i></p>	<ul style="list-style-type: none"> <li>- define target group(s);</li> <li>- define indicators;</li> <li>- define measurable methods for awareness of geospatial VET;</li> <li>- define which level is vocational education level of GEO in Belgium, Bulgaria, Lithuania;</li> <li>- create awareness rising activities;</li> <li>- develop system of indicators for measuring progress/ identify achievements;</li> <li>- add measurement system to see impact after 1 year.</li> </ul>	Geodesy, Cartography and Cadastre Agency - Bulgaria

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<p>WP 3. Transfer of Innovation: Exchange ways to Bridge the Gap between GEO students and employers</p> <p><i>Transfer/exchange of best practices will bring not only GEO education and labour market closer together but can lead to mobility of geospatial VET students throughout Europe. It will also help to harmonize GEO education and labour market visions and needs.</i></p>	<ul style="list-style-type: none"> <li>- define Gap;</li> <li>- document existing initiatives, best practices: CLGE Dynamic Knowledge Base, SAGEO: Geoplaza;</li> <li>- compare initiatives;</li> <li>- create pre-conditions (ask questions such as is curriculum right; should universities add more practical issues vs. theoretical);</li> </ul>	<p>Vilnius Gedimino technikos universitetas</p>
<p>WP 4. Dissemination</p> <p><i>Participating geospatial European associations will disseminate and sustain project findings.</i></p>	<ul style="list-style-type: none"> <li>- Dissemination Plan;</li> <li>- Promotional Materials;</li> <li>- Sustainability Plan.</li> </ul>	<p>Council of European Geodetic Surveyors and European Association of Geographers</p>
<p>WP 5. Progress Management and Progress Reporting</p>	<ul style="list-style-type: none"> <li>- execution activities on time, within budget;</li> <li>- maintaining contact among consortium;</li> <li>- monitoring, reviewing, reporting.</li> </ul>	<p>Dienst van het Kadaster en de Openbare Registers</p>

### 2.3 Current project results in Bulgaria

GCCA Bulgaria took action for preparation of suitable questionnaires through which to define the technical schools pupils' and university-level students' awareness of geospatial-related disciplines. Another survey was developed as well, which aimed to define the gap between schools and the world of business. Schools and geodetic companies in three major Bulgarian cities were visited (Sofia, Plovdiv and Stara Zagora). After the surveys were completed, enough information was collected and reports about the current situation in Bulgaria were developed. Major growing issues in the field of education, business and state administration were further identified. It was realized that for the creation of sustainable "pyramid" in geospatial education, the relationship between state administration, schools, associations and business needs to be improved significantly.

GCCA Bulgaria hosted a workshop in Sofia (between 27th and 28th of October), during which Assoc. Prof. Todor Kostadinov (University of Architecture, Civil Engineering and Geodesy) presented all collected results and reports to the Geoskills+ project partners and other guests to the event from local organizations, schools representatives and stakeholders. Two presentations were prepared, which summarized collected information from the surveys:

- Cooperation and differences between education and geodetic practice in Bulgaria;
- Vocational Education and Training in geodesy in Bulgaria.

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As part of WP 2, Implementation and Execution plans are currently being developed. Awareness rising activities are planned. Some of them will implement science communication activities, targeted for students and young generation audience.

The next section presents various science communication events that took place in Bulgaria in 2013 and 2014, which are closely related to public awareness of geospatial technologies and the GeoSkills+ project philosophy.

### **3. SCIENCE COMMUNICATION EVENTS IN BULGARIA**

#### **3.1 What is science communication?**

Science Communication is an area of relatively short but rather intense history. One of the earliest occasions when the need for wide-spread engagement of science with society was in 1985 when in the UK the Royal Society published its report on The Public Understanding of Science, which became known as the Bodmer Report. According to most researchers this was the birth of an entire movement aimed at Public Understanding of Science. The Bodmer Report brought that same year to the establishment of the Committee on the Public Understanding of Science (Copus) founded by the British Association for the Advancement of Science (BAAS), the Royal Institution and the Royal Society. It's main goal was to make science and research more accessible to the general, non-scientific public.

A driving force behind these developments were the measures introduced by Mrs Thatcher's government at the time, when public funding was placed under severe scrutiny and the need for public support for any publicly funded area was paramount.

Kick-started by government strategies, the Copus eventually brought about the environment that changed the attitudes of scientists to public communication, and developed the public understanding of science. Standards for communicating science and technology were set, indicators of measuring success were put together and a Copus Grant Schemes was set up (1987). These lasted until 2003 and were funded by the Office of Science and Technology and the Royal Society.

Popularising science was no longer sufficient a term since its focus was on a one-way channel of talking at the general public. The first major cultural shift occurred with the realisation that, to become truly an act of engagement, the communication between society at large and the scientists has to be two-way, to involve researchers' awareness of and interest in public opinion, and an openness to debate scientific matters with all stakeholders.

The media have played a critical role in this process by recognising the need to finding specialist reporters and columnists, and by dedicating resources to science matters. Quick to follow were academia, and many UK universities now offer bachelor and master degree in the field. In 2002 the first Professor of Science Communication in UK was named at the University of West of England (Prof. Frank Burnet). Science Communicator is an official profession in the UK. Science communication is practiced in a variety of forms nowadays, for

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audiences of different, well targeted ages and professional backgrounds, geographical location or interests. These events bring together growingly interdisciplinary teams, at the centre of which are the scientists, but often in collaboration with artists, representatives of industry, public authorities, the media, the NGO and civil sector, and even the clergy.

Development in other countries followed suite with varied consistency. Regular reports of the state of play by the European Commission, Eurobarometer and others reveal the patchy landscape across Europe, with islands of excellence, and with environments still lagging behind. A late adopter, for instance, is Bulgaria, where science communication started developing systematically only after 2004 when the British Council began its activities in the field.

And yet, the climate has indeed changed. Nowadays there are dedicated European Commission resources, a Europe-wide network of science event organisers (EUSEA), a network of science centres and museums (ECSITE), and an ever-growing cadre of practitioners.

### 3.2 Sofia Science Festival

A geospatial educational interactive event named “Which is Natalia Satellite?” was conducted during the Sofia Science Festival 2014. It was divided in two parts - an indoor presentation and an outdoor game. Having an hour to make the audience – mostly teenagers, familiar to the world of state-of-the-art geospatial (GNSS and cloud-based GIS) technologies, it was a real challenge to win over them and to do some hands-on activities.



**Figure 2.** Ms. Lyubov Kostova’s opening speech of the „Which is Natalia Satellite“ quest, Sofia Science Festival 2014

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The 15 minute presentation introduced GNSS technologies in a simple, intelligible and impressive way. GNSS basics, purposes and applications were explained in terms of the European Galileo system. The topic got the audience personally engaged in the story of the Galileo satellite given the name of their compatriot, the young Bulgarian girl Natalia Ruseva.



**Figure 3. A total of six Trimble Juno SD and 3D mobile GNSS devices were used in 3G internet mode to connect in real-time to the cloud-based Trimble TerraFlex solution. A paper model of a Galileo satellite was hidden in the park - two competing groups of children had to perform tasks to find it. Once found, it was launched on a helium rocket in the sky.**

A high interaction between the presenter and the audience was realized in series of questions and answers. This helped to pull the presentation out of the frame of a typical lecture, to have all minds aware - thinking and experiencing, and also to have some feedback. The teenagers gave exact answers to some of the questions, and other provoked their logical reasoning.

The end of the presentation emphasized on GNSS applications which was a prelude to the second part of the event. While the challenges of the first one were related to tell information in an interesting and intelligible way, the second one was to train the audience how to use professional technologies in a few minutes. The widespread and innovative combination of GNSS and GIS technologies for a wide variety of application as well as ease of use made it perfect for this activity.

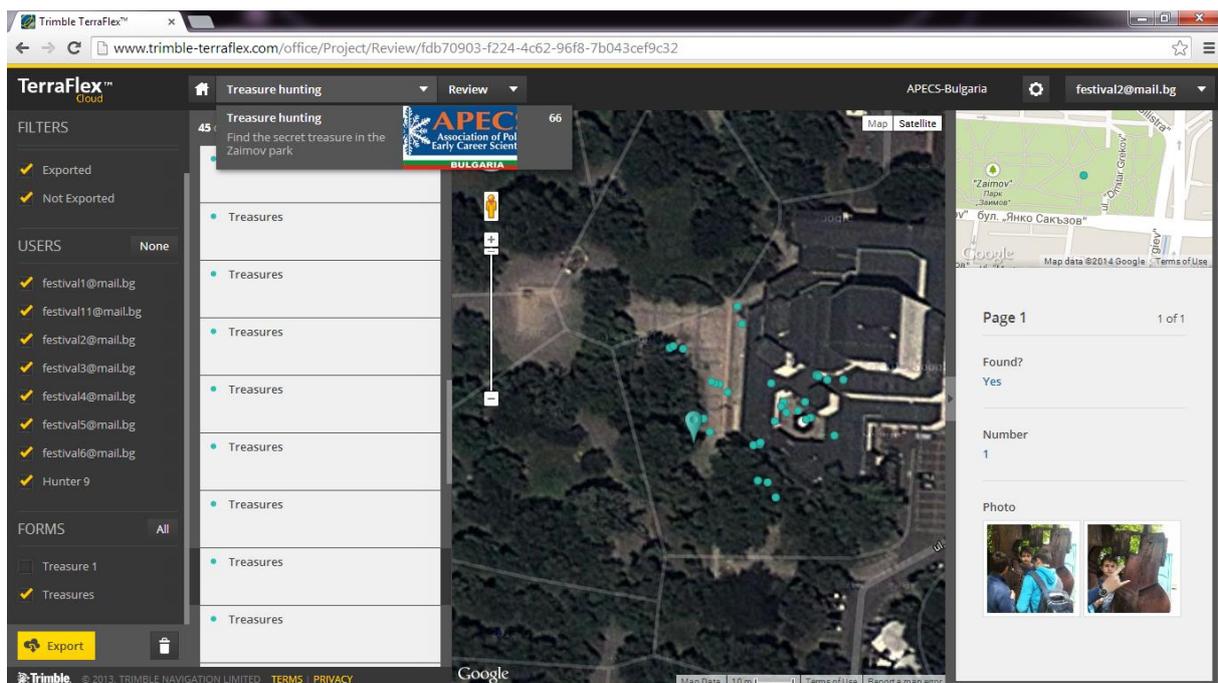
Hiding the professional workflow behind the mask of a game's rules was really helpful. The audience were divided into two teams as a competition highly stimulates winning desire and so to have the job done in the best possible way for the shortest time. Each team had to

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resolve several tasks in order to follow a track leading to the final point. “Treasures” were hidden at each place so nobody would get disappointed no matter the final results. The winning team was given the privilege to “launch” symbolically a “rocket-like” helium balloon with “satellite” payload.

To complete the tasks, some participants were given GNSS handheld devices, and others used their own GNSS-enabled smartphones. All of them had to use a certain professional GIS software for the very first time. To prove they followed the track strictly, participants had to record their positions as point features and take some photos as additional attribute information. The data were synchronized real-time with a web server so after the end of the game all collected features were checked on the map. The results were even better than expectations – the participants not only finished successfully, but also fulfilled the requirements for GIS data collection. The game appeared to be a great, enjoyable and funny adventure as well as an exciting educational experience.



**Figure 4.** The cloud-based GIS solution used – Trimble TerraFlex. The left window shows a list of all mobile GNSS devices used in the Treasure hunting project. The middle window shows the features (treasures) found in the park. The right window shows treasures attribute data, including photos of the participants. The real-time server data synchronization capability proved itself a powerful way for focusing children attention on geospatial technologies.

The overall impression of the event was of well-prepared, intelligent young people with open minds to geospatial GNSS and GIS technologies. On one hand, the good results can be easily explained with teenagers’ familiarity with modern technologies. On the other hand, it gives an example how geodesy can go far beyond frontiers of typical applications and problems. Introduced in a suitable and interesting way, it can easily attract young people’s minds, and growing popularity would be of help for future science development.

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### 3.3 European Researchers' Night

The European Researchers' Nights is providing a framework of events dedicated to popular science and fun learning. They are an opportunity to meet researchers, talk to them, and to find out what they really do for society, in interactive and engaging ways. This can be through hands-on experiments, science shows, learning activities for children, guided visits of research labs, science quizzes and more.

([http://ec.europa.eu/research/researchersnight/about\\_en.htm](http://ec.europa.eu/research/researchersnight/about_en.htm))

The European Researchers' Night takes place every year all over Europe and beyond the last Friday of September. The events are supported by the European Commission as part of the Marie Skłodowska-Curie Actions, which is an EU programme to boost European research careers. Often billed as family events, the European Researchers' Nights in fact appeal to people of all ages – whether with their family, their school, friends or on their own – who are intrigued by how things work and by what science means for their lives. Many of these popular science events let the visitor go behind the scenes, e.g. to labs that are usually closed to the public. One may discover the scientist in him while being part of a Europe-wide mega event.

The European Researchers' Night 2014 was covered in over 300 publications across Europe, according to preliminary estimates gathered by the organisers. At least 70 million people may have been aware of the experiments, science shows, games, guided tours and performances organised on the night of 26 September in over 300 cities in Europe and beyond.

([http://ec.europa.eu/research/researchersnight/media\\_en.htm](http://ec.europa.eu/research/researchersnight/media_en.htm))

In Bulgaria the European Researchers' Night is organised by the K-TRIO 2 consortium, including New Bulgarian University (coordinator), British Council – Bulgaria, BAS Center of



Innovation, Thracian University, Plovdiv University, Medical University – Plovdiv, Ruse University, Medical University – Varna.

Figure 5. Ms. Lyubov Kostova and the location of the European Researchers' Night 2014. Left Photo: Stefan Dzhambazov

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### 3.3.1 Geospatial quest for parents and children

The international initiative European Researchers' Night was held on September 26, 2014. Its main objective is to encourage young people to engage in research. In the Doctor's garden and courtyard of the British Council, a team of the Department of "Mine Surveying and Geodesy" of University of Mining and Geology "St. Ivan Rilski", presented to children, students and their parents geodesy as a funny and fascinating science. In the form of a game called "Whereto in the night", visitors were able to experience the high precision Global Navigation



**Figure 6. State-of-the-art geodetic instruments for treasure hunting in the night park. Milena Begnovska performed attractive demonstration of robotic total station Trimble S6, while Asparuh Kamburov used Trimble SPS 985 in network RTK mode to attract children to satellite navigation.**

Satellite System (GNSS) receiver, Robotic Total Station and Reducing Tacheometer Dahlta 020 B. With the Total Station, the children measured their growth alone, with the remote control, and focus and reliance on remote inscriptions was achieved thanks to the telescope of the tachymeter. Visitors to our impromptu scientific workshop were able to learn what it means to determine the angle between two directions, how to measure lengths with rangefinder, how it can be done scanning surfaces, can Surveyors to work at night and many interesting and curious things. The group of children and parents held a fun scientific expedition in the park, where with the help of the GNSS receiver, the game continued with the discovery of previously hidden objects. As part of the fun was held quiz, after which all participants received specially prepared for the event certificates and prizes.

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### 3.4 European Space Expo

The European Space Expo is a free EU public awareness initiative for promotion of the entire European Space Programme, including the geodesy-related GNSS (Galileo and EGNOS) and Copernicus missions. The accent is put on the vast array of services, applications and benefits that these activities and investment bring to Europe. The event's main objective is to provide a simple way for a consistent European space benefit message to be targeted to different Member States and different target groups, including young generations.

The Expo is a travelling highly-technological open-air exposition, hosted by selected cities in different EU Member States. The main attraction is a light collapsible dome construction, called the ZENDOME. It's 300 sq. m area is equipped with plenty of interactive educational multimedia screens, which encircle a center-positioned stage. There, on every full hour a space-based presentation is given by a science researcher or communicator, chosen from a space-related university/academia or enterprise from the hosting Member State country. In Bulgaria, the EU Space Expo was hosted on the main square in the capital Sofia, in the period 16-24 May 2014.



**Figure 7. European Space Expo 2014, Sofia. A wider audience presentation by Asparuh Kamburov on GNSS research in Antarctica.**

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In the framework of this event, a geospatial-oriented presentation named „Benefits of European Space initiatives - Galileo and Copernicus - for Bulgarian polar research“ was given on the 24th of May. The presentation focused on importance of geospatial and GNSS technologies for glacier melting research at the Bulgarian Antarctic Station on Livingstone Island during the 21th Bulgarian Antarctic Expedition.

### 3.5 European Space Agency Kids‘ competition

The European Space Agency (ESA) provides a highly interactive web portal for children – ESA Kids. It hosts a monthly competition on various space topics. In June 2014 the topic was the International Space Station (ISS). Children everywhere are encouraged to perform activities, games, models, drawings or whatever they can come up with, focused on the topic. Our team developed an educational game, consisting of paper model of ISS, combined with real-time tracking of its orbital location. A web-based tracker was used. On every 15 minutes the ISS location was pinned on a global map. Photos from the game were sent to the ESA Kids competition and finished as a runner up. The children were awarded from ESA with school accessories and certificate.



Figure 8. The ISS educational game, awarded in the monthly ESA Kids space competition

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### 3.6 FameLab

How do you find new voices in science and engineering, new spokespersons for engaging the public in science, when the science system itself does not reward public awareness? Why not invent a laboratory for public awareness?

FameLab was an initiative of the National Endowment for Science, Technology and the Arts in the U.K. and the British Council in Europe that had an unprecedented impact on public dialogue about science. In fact, working through the media and other partners in southeast Europe, FameLab was in part responsible for a major perceptual shift in the social impact of science. Initially set up by the Cheltenham Science Festival, FameLab was a “pop idol” contest for scientists that was broadcast, in part, on live TV and was aimed at an adult, non-scientific audience. The FameLab competition takes place in two main laps - national and international. In each participating country, the format is identical. First there are the auditions (or heats), held in as many cities as is appropriate to the country. Ten to a dozen finalists are selected and are then taken through a two-day master class. In the end, they reach the Grand National final.

The mission of contestants is to deliver a highly charismatic, totally clear, and uncompromisingly scientifically correct performance that explains a science concept. The performance is recorded for the Web and television, and can last no more than three minutes. Participants are allowed to dance, sing, recite poetry, and bring their own props as long as they do not use PowerPoint presentations or the like, or forget that the goal is to communicate about science. After the national winners have been chosen, they all meet in the U.K. at the Cheltenham Science Festival, birthplace of the FameLab competition.

FameLab really did create fame for many young scientists, particularly in the Balkan countries, and is a fabulously successful lab experiment in two ways: it help strain young scientists to communicate more effectively, and it helps promulgate an interest in science, including geospatial.

#### 3.6.1 Promoting GNSS research in Antarctica

Geospatial and atmospheric research in Antarctica by means of Global Navigation Satellite Systems (GNSS) is a topic well known in the professional geodetic community, yet rather obscure for the wider audience. This was the main motivation behind the topics chosen for the FameLab Bulgaria 2013 national competition. Glacier melting and ionospheric influence on GNSS signals during the current Solar Maximum were demonstrated theatrically by means of understandable terminology and available materials. The national final took place at the Sofia Theatre Grand hall during the Sofia Science Festival 2013. The audience consisted of up to 200 children and their parents. GPS satellites and the Sun were represented by helium-filled balloons, the ionosphere – by a coloured scarf, and the Earth - by a Pilates ball (Figure 10). The full national final video of the 3-minute GNSS theatre is available here: [https://www.youtube.com/watch?v=4xkF\\_OAtxx4](https://www.youtube.com/watch?v=4xkF_OAtxx4)

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Figure 9. Asparuh Kamburov at the Famelab Bulgaria 2013 national final.

The demonstration, despite not winning, appeared to be highly successful for explanation of otherwise difficult geospatial matter to a wider audience. It will be refined and further used for public awareness geospatial event in schools and elsewhere. Science competitions like Famelab are extremely powerful for popularization of science among wider audience, including teenagers. The highly open way of presenting the matter is what still lacks in the conventional geospatial vocational education in Bulgaria.

### 3.7 Science casino

Within science communication, *scientific casino* is a brand new term, which had emerged during brainstorming session for the celebrations of 125 years from the establishment of the National Museum of Natural History in Sofia, Bulgaria (thanks to its PR manager Ms. Sylvia Tosheva). The initial idea was further developed by the authors into a rather innovative approach, related to educational game quests. The underlying idea is to bet knowledge and win more knowledge. The game took place in the whole building of the Museum. It consisted of three distinctive levels:

- Entry level test (bet) of geographical knowledge. The Google Earth planetary model (representing the wheel of fortune) was projected on a wall (inside the Museum's Fish Hall) and rotated manually by the player via state-of-the art interactive screen device. Depending on the player's knowledge of the place the rotating model stops on, relevant quantity of casino chips were distributed to him for further use in the game;
- Geological roulette. After level 1 the player moves to the roulette table and bets on different rock samples. 36 different rock samples were used, each one representing a roulette number. The rocks were divided into three main sections, according to their type - magmatic, metamorphic and sediment. Furthermore, the sediment rocks were subdivided into silicates, carbonates, oxides, etc. Once the player wins on a rock

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(number), he has to answer a question by the game senior inspector – the geologist Dr. Petko Petkov from the „Earth and Man National Museum“.

- Every turn the player with the most chips enters third level – a quest inside the geological exponents halls in the museum. A check list was to be filled for a time limit of 20 minutes. The deposit's place of origin and its Mohs hardness was to be written down from its label, among other tasks.

The game's objective was developed in coherence with the International Year of Crystallography (2014). It proved extremely valuable for children understating of various earth science's basics. The implementation of geospatial technologies (e.g. Google Earth) on a touchable wall and the quest-like experience will be further used for educational games in schools and elsewhere.



**Figure 10. The casino team - members of the Association of Polar Early Career Scientists (APECS) Bulgaria: Inspectors – Dr. Eleonora Balkanska, Felicite Zeuh, Desislava Petkova-Peneva, Elena Isaeva, Stefaniya Klain, Igljika Trifonova, Denitsa Borisova, Senior Inspector – Dr. Petko Petkov, Dealer - Asparuh Kamburov.**

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#### 4. SUMMARY

Geodesy and related geospatial disciplines, despite being a fundamental part of the Earth sciences family, are still not popular among society. More or less this statement may be extended to science as a whole. In an age of evermore importance of science in everyday life, the augmentation of overall scientific literacy of the society is paramount. Public outreach activities by means of modern science communication strategies are proven tools and have significant contribution for that.

The purpose of the presented projects and events is promotion of geodesy and geospatial technologies among young people and supporting their professional guidance. Interest in this informal educational initiative was extremely large and we believe that attracting future surveyors to the profession can be achieved through organizing such events where science can be presented from its curious and funny side. In that way we can hear the questions of young people, what they are concerned, what is interesting to them, how to help them understand what is geodesy. We can show them what we do with these seemingly complex instruments and how science can become a pleasant and fascinating pastime.

At the university we teach students who have already chosen their path for professional development in geodesy, but we also strive to attract a wider range of people in our scientific field, by introducing new and non-traditional methods of presenting and promoting it. Through appropriate educational presentations, exercises in geodesy can be exported outside of the university and to be presented to all inquisitive people, on interesting and fascinating way, on accessible language, regardless of their age.

We believe that our love for geodesy will be able to ignite the interest of more and more children and adolescents and will attract them to vocational schools and universities, where to learn the intricacies of science geodesy.

Our work with children and students will continue and we hope that interest in geodesy will become more and more people will know the answer to the question "What is Geodesy?"

We are already preparing for the European Researchers' Night 2015.

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## BIOGRAPHICAL NOTES

Mr. Asparuh Kamburov is working as Assistant Professor at the Department of Mine Surveying and Geodesy, University of Mining and Geology, Bulgaria. He has a Ph.D. degree in precise geodetic GNSS positioning. He has participated in the Sofia Science Festival 2013 and 2014, finalist of the Famelab Bulgaria 2013 competition, organiser of the Science casino museum quest, workshop leader of the ESA KIDS awarded ISS Bulgarian educational game.

Ms. Milena Begnovska is working as Assistant Professor at the Department of Mine Surveying and Geodesy, University of Mining and Geology, Bulgaria. She is currently preparing a Ph.D. dissertation in the field of innovative techniques for mine surveying. She have participated in the European Researcher's Night 2014. Ms. Begnovska has been working as a high-school teacher and has profound experience with younger generation children.

Ms. Lyubov Kostova is the Director of British Council – Bulgaria. She is a prominent science communicator, organizer of Sofia Science Festival, Famelab Bulgaria, co-organizer of the European Researcher's Night in Bulgaria to name a few. Apart science communication, Ms. Kostova is a translator of English literature and a devoted parent.

Ms. Tanya Slavova is a Ph.D. student at the University of Architecture, Civil Engineering and Geodesy, Bulgaria. Her primary research fields are local gravity field anomalies and Geographical Information Systems. She has participated in Sofia Science Festival 2014. She is a dedicated educator and a certified Trimble Mapping and GIS training specialist.

Mr. Dimitar Velichkov is a graduate engineer from the University of Architecture, Civil Engineering and Geodesy, Bulgaria. Having been building experience for several years as a professional surveyor in the USA, he is currently employed at the Geodesy, Cartography and Cadastre Agency, Bulgaria. He is representing the Bulgarian partner in the „GeoSkills+“ project.

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