SERBIA IN ASTRONOMICAL CONTESTS BETWEEN 2017 - 2020

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Abstract. The subject concerns contests in astronomy and astrophysics under the supervision of the National Astronomical Olympic Committee of Serbia, both national and international, during 2017-2020. Included are: contests in Serbia (Regional – 15 1st prizes, 6 2nd, 9 3rd, 16 honorable mentions and National – 9 1st prizes, 5 2nd, 9 3rd, 3 honorable mentions), as well as Serbian participation in contests held abroad, such as International Olympiad in Astronomy and Astrophysics (2 silver medals, 4 bronze, 4 honorable mentions), St-Petersburg Astronomical Olympiad (1 2nd prize, 5 3rd) and Global electronic Competition on Astronomy and Astrophysics (2 2nd prizes, 2 3rd and 2 honorable mentions).

1. INTRODUCTION

The history of attending contests in astronomy for pupils of secondary school in Serbia is quite long. It started in 2002, so that, next year (2022) we will celebrate the 20th anniversary.

Contests in astronomy are organized by the National Astronomical Olympic Committee of Serbia (NAOC) every year. In Serbia there are two levels of contests: Regional (from 2008) and National (from 2002). The selection of the Serbian team for international contests is based on the success in the National Contest. International contests which have been attended by pupils from Serbia are: International Astronomy Olympiad (IAO), International Olympiad on Astronomy and Astrophysics (IOAA) and Sanint-Petersburg Astronomical Olympiad (SPAO). The first IAO was held in 1996 in Russia (Nizhnij Arkhyz), and XXIV IAO took place in 2019 in Romania (Piatra Neamt), in 2020 IAO was not held because of the COVID-19 pandemic. The first IOAA was held in 2007 in Thailand (Chiang Mai) and the last one, XIII IOAA, took place in 2019 in Hungary (Keszthely); in 2020 it was not held because of the pandemic. Instead, an on-line contest was organized, Global electronic Competition on Astronomy and Astrophysics (GeCAA). SPAO is a correspondence type of competition. The first SPAO was held in school year 1994/95 and XXVI SPAO is for the current school year 2020/21.

Serbia appeared in an international contest in 2002 at VII IAO in Russia (Nizhnij Arkhyz). In the subsequent years participants from Serbia were regularly present in IAO, except 2003 (VIII IAO, lack of funds), the last time Serbia participated in XVI IAO in 2011 in Kazakhstan (Alma-Ata). Serbia participated for the first time in III IOAA in 2009, Iran (Tehran). From that time Serbia was regularly present in IOAA including the last one in 2019. Therefore, in 2009, 2010 and 2011 Serbia attended both IAO and IOAA. GeCAA was also attended by Serbian pupils. The first attendance in SPAO of Serbia was in XX SPAO by only one pupil, Marko Purić (2nd grade, Mathematical Grammar School, Belgrade) in school year 2012/13. He won the first prize! From that time Serbian pupils have been participating in SPAO regularly including the current school year (2020/2021).

Other important details can be found in Vidojević et al. (2018). In the present contribution we will describe the participation of Serbian pupils in national and international astronomical competitions between 2017 and 2020.

2. COMPETITIONS

2. 1. COMPETITIONS WITHIN SERBIA

There are two levels of competitions within Serbia and they are organised on two levels: Regional and National. Regional: only theoretical part (3 questions + 4 tasks). Selection for higher competition level: every participant who achieves 30% of total number of points, or has right of direct participation, if in the previous year a medal at International olympiad was obtained. National: theoretical part (5 tasks) + practical part (data analysis & observations-indoor or outdoor depending on weather) Selection: 5 to 10 best participants become members of the Serbian national team for international competitions. Since the competitions by 2017 are described in Vidojević, et al. (2018) here we give the data concerning the most recent competitions.

In the three Regional Competitions the participants were from the following regions, i.e. schools: in 2018 Mathematical Grammar School and Zemun Gymnasium (City of Belgrade), Gymnasium "Svetozar Marković" (Niš, Nišava District), Gymnasium "Branko Radičević" (Stara Pazova, Srem District), Čačak Gymnasium (Čačak, Moravica District); in 2019 Mathematical Grammar School, Zemun Gymnasium, I Belgrade Gymnasium, IX Belgrade Gymnasium and XIV Belgrade Gymnasium (City of Belgrade), Gymnasium "Svetozar Marković" (Niš, Nišava District), Čačak Gymnasium (Čačak, Moravica District) and Mitrovica Gymnasium (Sremska Mitrovica, Srem District); in 2020 Mathematical Grammar School, IX Belgrade Gymnasium and XIV Belgrade Gymnasium (City of Belgrade), Gymnasium "Svetozar Marković" (Niš, Nišava District), Čačak Gymnasium (Čačak, Moravica District), Mitrovica Gymnasium (Sremska Mitrovica, Srem District) and Gymnasium "Takovski ustanak" (Gornji Milanovac, Moravica District).

In the two National Competitions the participants were from the following regions, i.e. schools: in 2018 Mathematical Grammar School (City of Belgrade), Gymnasium "Svetozar Marković" (Niš, Nišava District), Gymnasium "Branko Radičević" (Stara Pazova, Srem District), and Čačak Gymnasium (Čačak, Moravica District); in 2019 Mathematical Grammar School, (City of Belgrade), Gymnasium "Svetozar Marković" (Niš, Nišava District), Čačak Gymnasium (Čačak, Moravica District) and Mitrovica Gymnasium (Sremska Mitrovica, Srem District). Unfortunately, the National Competition in 2020 had to be cancelled – that was the official instruction from the Ministry of education.

Table 1: Competitions in Serbia 2018 - 2020; the last column (special prize + honourable mention).

Year	Level	Participants	Gold	Silver	Bronze	Recognition
2018	Regional	28	5	5	5	0 + 5
2018	National	24	5	2	0	0 + 2
2019	Regional	19	5	0	1	0 + 8
2019	National	13	4	3	1	0 + 1
2020	Regional	14	5	1	3	0 + 3

The lack of literature on astronomy in the Serbian language is evident, and therefore NAOK is making great efforts to alleviate this lack. Collections of problems are translated most often from English and Russian e.g. Vidojević 2019(1), 2019(2).

The best participant at the National competition wins a special prize named after Jelena Milogradov Turin (1935 – 2011), the founder of the astronomical competitions in Serbia. The winners of this prize are presented in Table 2. It is worth to notice that in 2018 for the first time the award went outside of Belgrade (Mathematical Grammar School) – to Niš Gymnasium "Svetozar Marković", and next year – 2019 – to Gymnasium in Čačak.

Table 2: Jelena Milogradov-Turin award, from 2011 till 2020.

Name (year of birth), school, city				
Stefan Andjelković (1992), Mathematical Grammar School, Belgrade				
Luka Bojović (1996) & Ivan Tanasijević (1995),				
both from Mathematical Grammar School, Belgrade				
Ivan Tanasijević (1995), Mathematical Grammar School, Belgrade				
Ivan Tanasijević (1995, Mathematical Grammar School, Belgrade)				
Vuk Radović (1998), Mathematical Grammar School, Belgrade				
Vuk Radović (1998), Mathematical Grammar School, Belgrade				
Igor Medvedev (1999), Mathematical Grammar School, Belgrade				
Bogdan Stanojević (1999), Gymnazium "Svetozar Marković", Niš				
Zlatan Vasović (2001) Čačak Gymnazium, Čačak				
not awarded because competition was not held (COVOD-19 pandemic).				

The National Astronomical Olympic Committee (NAOC) possesses a telescope (Portable Telescope-PT) foreseen to be used for the purpose of extra-teaching only (see Vidojevic et al. 2018, Telescope 2 – Newton type, 150/750 mm with equatorial mounting EQ3). Interested students should acquire necessary observational skill by using PT without any assistance. PT is to be sent to schools throughout Serbia to be at disposal within an allocated time. For the first time PT was sent to Gymnasium

"Svetozar Marković" in Niš on April 25, 2019. Niš is the city with the highest number of pupils interested in astronomy after Belgrade. The PT testing in Niš indicated the necessity of removing some shortcomings. For this reason PT was sent several times from Niš to Belgrade and vice versa, until these shortcomings were removed.

The pandemic was a hindrance to the accomplishment of the plans. Life regime and school activities were changed (teaching via internet, restricted motion and gathering of groups exceeding 5 persons and the like). The accomplishment of the planned activities has not been possible from March 2020 till the present time (early March 2021 onwards). After suppressing the pandemic and returning to the normal life and school activities PT will continue all its activities from the point where it was stopped. During the pandemic PT is kept by Astronomical Society "Rudjer Bošković" in Belgrade.

2. 2. INTERNATIONAL COMPETITIONS

Serbia has participated in several International Olympiads: IOAA – International Olympiad on Astronomy and Astrophysics (from 2009); Structure of the competition: theoretical part + practical (data analysis + observation) + group competition. IAO – International Astronomy Olympiad (2002 – 2011); Structure: similar to IOAA except group competition. SPAO – Saint Petersburg Astronomical Olympiad (from 2013) correspondence type of competition; structure: theoretical part + data analysis part. For detailed reports from various olympiads see e.g. Eskin et al. 2012, Miler 2009, 2011, Ninković & Milić 2011, 2014, Vidojević & Ninković 2016, Vidojević et al. 2018(2).

In 2020 instead of the regular IOAA an on-line competition – Global electronic Competition on Astronomy and Astrophysics (GeCAA, https://gecaa.ee/) – was organized by an international academic committee where Serbia had a representative, dr Sonja Vidojević. This committee invited/asked all 38 participating countries to submit their proposals for the tasks. One of Serbian proposals was selected–that one for the data analysis. The Serbian team for GeCAA was selected on the basis of the achievements in the Regional Competition, exceptionally only for this competition, due to pandemic (National Competition was not held). The participants who won any of prizes (9 students) acquired right to contest individually and the ones with honorable mention (3 students) to participate in group competition (for achievements see Table 3). The GeCAA was attended by 278 students from 38 countries.

The Society of Astronomers of Serbia at the assembly held on 16 April 2019 decided by a majority vote not to support the organization of the IOAA 2021 in Serbia due to uncertain fundings and insufficient professional staff for this undertaking.¹ The withdrawal of the candidacy was sent to the International Olympic Committee (see Fig. 1).

3. CONCLUSION

The participation of our team was helped and enabled by many people of good will who gave a great contribution with their enthusiasm and volunteer work. There are also certain institutions and companies that have recognized the importance of

 $^{^{1}}$ In 2013, at the 7th IOAA, Serbia was nominated as the host for 15th IOAA in 2021 (see Atanacković 2018, Vidojević et al. 2018(1)).

The Society of Astronomers of Serbia



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Друштво астронома Србије Волгина 7 11060 Београд

ПИБ: 100132062 Матични број: 07084650

Друштво астронома Србије

Dear Dr Stachowski,

As president of the Society of Astronomers of Serbia (SAS), I need to inform You that at the last held assembly of the SAS we made a decision that Serbia and our Society (even with the help of our Government) does not have enough funds, as well as people who will be able to participate in the organization of International Olympiad of Astronomy and Astrophysics in 2021 (IOAA 2021) in Serbia. Thus, with regret, I have to inform you that Serbia has to withdraw from the candidacy to host the IOAA 2021. We are very sorry about this situation and we hope that Serbia will be able to host some of the future IOAA events.

My sincere apologies and I wish You success in your future events.

POHO Best regards, Vladimir Đošović **BEO** 7 President of the Society of Astronomers of Ser Department of Astronomy, Faculty of Mathematics. University of Belgrade e-mail: <u>vladimir_djosovic@matf.bg.ac.rs</u>

Figure 1: The withdrawal of the candidacy sent to the International Olympic Committee. The presentation of this document is due to courtesy of Vladimir Djošović, President of SAS (Serbian Astronomical Society) 2019–2020.

Table 3: Olympiad achievements. The number of participants (4th column) pertains to senior+junior+automatically qualified (winners from previous Olympiad); the last column (special prize+honorable mention).

Year	Olympiad	Country	Participants	Gold	Silver	Bronze	Recognition
2018	IOAA	China	3	0	0	1	0 + 2
2018	SPAO		3	0	0	1	0 + 0
2019	IOAA	Hungary	5	0	0	1	0 + 1
2019	SPAO		8	0	0	4	0 + 0
2020	GeCAA	On-line	12	0	2	2	0 + 2
2020	SPAO		2	0	1	0	0 + 0
Total				0	3	9	0 + 5

the participation of our talented students in such a great world competition, not only to show their knowledge, but also to gain new acquaintances and experiences in socializing with peers from around the world and in the best way to represent our country by friendliness, cosmopolitanism, selflessness, willingness to help, and many other beautiful qualities that adorn our competitors.

The competitions within Serbia – Regional and National – have been already planned and included in the official Competition Calendar for 2021. IOAA 2021 should be held in Colombia, the country which was originally foreseen as host for 2020, but because of the pandemic (COVID-19) the competition did not take place.

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