The International Remote Astronomy Olympiad (IRAO 2021)

Statute and Regulations

1. Because of the covid-19 pandemic the Olympiad in frames of IAO in 2021 will be organized online under the name "International Remote Astronomy Olympiad" (IRAO 2021).

2. The Olympiad will be held in three Rounds: Theoretical Round, Practical Round, and Round on Maps and Images (a round that, under the traditional scheme, is held in bad weather instead of the Observation Round).

3. A team of a participating country.

   3.1. A team of a participating country of the IRAO 2021 consists of no more than 6 Contestants (including no more than 3 Contestants for Group α, no more than 2 Contestants for Group β, and no more than 2 Contestants for Group γ) plus (if any) Students awarded with I or II Diploma at the last IAO (in which they participated) may be included in the team in excess of the above quota, the Team Leader and Native Jury Member, jointly called Participants.

   3.2. There will be no Observers from participating countries at IRAO 2021.

   3.3. As an exception, teams (usually consisting of a small number of participants) are allowed to participate without their own Jury Member in the International part. Participants of these teams pay a significantly higher participation fee, and there will be no marks of the Native Jury Member for such teams.

   3.4. During the preparation of the Rounds and in working Auditoriums technical help of Assistants is allowed.

4. Each participating person (Contestant, Team Leader, Jury Member, Native Assistant, member of LOC) should sign a "code of honor" for the correct and honest conduct of the Olympiad.

5. The fees to participate are relatively small, but participating countries are responsible for hire charges for Auditoriums for Rounds, associated equipment, and domestic travel and accommodation expenses of Team Leaders and Contestants.

6. The Host City for IRAO 2021 is Milan (Italy), and the Host Organization is Brera Astronomical Observatory (the National Institute for Astrophysics, INAF).

7. The dates of the Olympiad are November 5–13, 2021.

8. Schedule of preparing the Olympiad:

   8.1. Participation of countries and territories must be confirmed by sending Pre-Application by e-mail to organizers, preferably not later than October 6, 2021.

   8.2. Registration of Team Leaders and Contestants has to be completed by sending necessary Application Documents by e-mail to organizers, regular deadline for the application is October 14, and the late deadline is October 25.

   8.3. The regular deadline for the fees payment is October 25, and the late deadline is October 31.

8.4. Preliminary contacts to establish necessary connections between the teams and Organizing Committee has to be done on November 1-4, 2021.

8.5. Translation of the supplement tables (like "Constants and Formulae", "Solar System", etc.) may be done a few days before the Rounds.

9. Schedule of the main events of the Olympiad:

9.1. There will be an online Opening Ceremony on November 6, 12:00 UT.

9.2. Theoretical (November 7) and Practical (November 9) Rounds will be held in two different time regions: Western hemisphere and Eastern hemisphere. The beginning of the Rounds in the Western region will be not later than the end of the Rounds in the Eastern region: at 09:00 UT for teams of Eastern hemisphere and 13:00 UT for teams of Western hemisphere.

9.3. Round on Maps and Images (November 8) begins at 13:00 UT for all teams.

9.5. There will be an online Closing Ceremony on November 13, 12:00 UT.

10. Auditoriums for Rounds.

10.1. All work and meetings in the participating country should be conducted in accordance with the epidemiological requirements of this country.

10.2. Rounds have to take place in Auditoriums for Rounds at the national IRAO Host Towns, nominated by the National Committees and approved by the Host Organization.

10.3. There may be only one Auditorium for Rounds for each country. Any expenses associated with hiring facilities are the responsibility of the participating countries, which are also responsible for ensuring that an Auditorium for Round is a suitable and safe environment, with all appropriate facilities that are expected at a standard IAO.

10.4. All the actions of each team at the Rounds take place in the same Auditorium. The actions include: receiving original texts of problems by remote printout, translation of the problem conditions by Native Jury Member, printing out the problem conditions or their translations (immediately before the Rounds), the work of students at the Round, scanning the papers of works of the students after end of their work (immediately after the end of the Round), sending the scanned papers by e-mail to the Organizing Committee (immediately after finishing the scanning), etc.

10.5. Contestants will work in the Auditorium for Rounds in the country in which they currently reside (as an exception, perhaps not in the country of the team they represent).

10.6. Conditions at the Auditorium for Rounds: IRAO Rounds and translation of problem conditions should take place in the same sufficiently large auditorium. The Auditorium must be well ventilated. To facilitate social distancing, the desks should be enough in area (at least IAO minimum requirement 0,6 m², while the IAO standard is 1,3×0,7 m) and widely spaced (to the extent required by local authorities due to the pandemic, or at least IAO minimum requirement 2,05×1,5 m between desk centres, while the IAO standard is 2,5×1,6 m).

10.7. A desk must be available for the Team Leader, and a printer and a scanner connected to a PC. The arrangement of the desks, the TL desk, the printer and the scanner must be such as to allow simultaneous viewing by the Invigilator.

10.8. It is compulsory that Team Leaders arrange to use webcams to provide a live video broadcast and record of work during the translation of texts before the Round, work of Contestants actually on the Round, and followed procedures.

10.9. It is required to have several (in total at least 4, and the number depend on the total number of the Contestants in the Auditorium) stationery cameras from all the corners of the Auditorium, connected to different (at least 2) web-nets, all connected to Zoom (or analogous program) conference. All parts and nooks of the Auditorium must be visible. PCs equipped with a video camera and laptops may be used.

10.10. Mobile camera(s) (at least 1, for example in a smartphone of the Team Leader) have to be connected as well to monitor details, requested by the Invigilator.

10.11. The Team Leader must verify and ensure the stability of the video links for the entire duration of the Rounds. Failure of the connection stability, resulting in impossibility for the Invigilator to continuously monitor the progress of the Round, could lead to invalidate the participation of the team.

10.12. The remote Invigilator appointed by LOC for the team, will be the host of Zoom (or analogous program) conference and responsible for the all online permissions.

10.13. Additionally, one camera operated by the participating country has to record offline from the back of the auditorium. This camera and the corresponding computer should have an independent internal power supply.

10.14. All video surveillance in Zoom (or in analogous programs) will be recorded.

10.15. References to any of these Zoom (or analogous programs) conferences will be available for Native Jury Members, so that they may control the situation in the Auditorium of any participating team.

10.16. Details, the actual number of webcams for broadcasting and recording, their connection, and different sources of power supply will be determined by the technical regulations and co-ordinated during preliminary contacts between the Team Leader and the Invigilator.

11. IRAO Invigilators.

11.1. Members of LOC are responsible for controlling participating teams at the Rounds. The Rounds will be monitored by the Organizing Committee with a video-audio link that will use Zoom or another platform defined with the team.

11.2. Each team will be assigned an Invigilator, chosen and nominated by the Organizing Committee. The Invigilators, all belonging to LOC, will be physically in observatories and institutions in Italy; they will follow the instructions of, and report to, the IRAO Board.

Note for LOC: if possible, assign the Invigilator, who knows the mother tongue of the team.

11.3. Every team will be informed about the name and contact information of its Invigilator a few days before the Olympiad.

11.4. The Invigilator, from his workplace, will keep in contact with the assigned team. The link for monitoring the Rounds will be communicated to the Team Leader by the Invigilator.

11.5. A preliminary meeting will be held, on time to be agreed, between the Invigilator and the Team Leader to clarify all the organizational aspects, to verify the quality of the connection, correct visualization of the Auditorium, remote printout, quality of scanning and printing, and the arrangement of the Auditorium.

11.6. The Invigilators will monitor the progress of the Rounds starting from sending (by a remote printout) texts for translation into their mother tongue till receiving all photocopies of all students' papers.

11.7. The Invigilator is responsible to lead and oversee all procedures at the Auditorium for Rounds, gives permissions to perform non-standard actions in the Auditorium, etc.

11.8. The Invigilator will verify that the Round takes place according to the rules described and has the right to issue official recall and disqualification measures in the event of violations.

12. Problems of the Olympiad.

12.1. Theoretical Round. 9 problems (options: 8 or 7 problems) will be prepared. Herewith, problems 1-6 (options: 1-5) are for students of the group α, problems 4-9 (options: 4-8, 3-8 or 3-7) are for the group β, and all the problems are for the group γ. Thus, problems 4-6 (options: 4-5 or 3-5) will be common for all the groups, however, minor variations are possible in these problems (a simpler version for group α, and more complex version for groups β and γ). The duration of the Contestants' work at the Round will be announced at the Opening Ceremony of the Olympiad (in the range from 3¼ to 4¼ hours).

12.2. Practical Round. 3 problems will be prepared. Herewith, problems 1-2 are for students of the group α, problems 2-3 are for the group β, and all three problems are for the group γ. Thus, problem 2 will be common for all the groups, however, minor variations are possible in these problems (a simpler version for group α, and more complex version for groups β and γ). The duration of the Contestants' work at the Round will be announced at the Opening Ceremony of the Olympiad (in the range from 3¼ to 4 hours).

12.3. Round on Maps and Images. One common set will be prepared for all three groups. The duration of the Contestants' work at the Round will be announced immediately before the Round (in the range from ⅜ to 1 hour).

12.4. Problems for Practical Round and Round on Maps and Images should be compiled in such a way that when writing solutions and answers, the student would not need to use any language. Thus, it is assumed that solutions can be represented only by figures, graphs, formulas, numerical values and standard international astronomical symbols (such as $\male$, $\libra$, α UMa, M31, 5^m). The Jury of Practical Round and Round on Maps and Images should ignore (in no way take into account) any texts (in any language) in the solutions.

12.5. Most of the problems for Theoretical Round should be also compiled in such a way that the use of any language would not be required from the student when writing solutions. Writing texts (in native language, or in one of the official languages of the IAO) is allowed in those few cases when the writing something is directly prescribed in the problem conditions. Also, when writing solutions of the problems of Theoretical Round, it is allowed to write a few keywords in English (a short list of these words will be published), as well as terms contained in the accompanying tables.

12.6. The texts of the three Rounds will be prepared in the two official languages of the IAO: English and Russian.

12.7. The Native Jury Member may translate the problem conditions into mother tongues before the Rounds. Translations for the Contestants without a Native Jury Member are not expected.

12.8. All translations must be done in the Auditoriums for Rounds under supervision of the Invigilator.

12.9. The texts of the problems are strictly confidential.

12.10. The Jury Members will have personal responsibility for their secrecy.

12.11. All persons involved, including Contestants, must keep the content of the problems confidential until 22:00 UT of the days of the Rounds.

12.12. Violation of these secrecy rules results in the immediate disqualification of the team, and the disqualification of the person responsible for subsequent editions of the IAO events.

13. Before the Rounds:

13.1. The Team Leader (maybe with the technical help of Assistants) has to prepare all necessary conditions and equipment for work of the National Jury Member (during translation) and Contestants (during the Rounds themselves).

13.2. The equipment for Contestants (during the Rounds themselves) includes an adequate number of copybooks, every page of which authenticated with a stamp and with the initials of the Team Leader, pens, pencils, and admitted materials.

13.3. Finally, the Team Leader provides envelopes for the National Jury Member, also authenticated with a stamp and the TL's initials, in number equal to that of the number of Contestants admitted to the Round.

13.4. Official texts of problem conditions will be released shortly before the Rounds (3¼ or 1½ hours before for translation into mother tongues where necessary, and just before where it is not necessary).

13.5. The texts will be sent with a remote printout by the Invigilator.

13.6. The translation of the problem conditions may be performed by the Native Jury Member only.

13.7. Presence of Team Leaders in the Auditorium is not allowed during the remote printout and translation.

13.8. Temporary leaves of the Auditorium during the translation is not expected. Nevertheless, in exceptional cases permission for this may be done by the Invigilator. In this case, considered a non-standard action, all the way of the Native Jury Member from Auditorium to the doors of restroom and back have to be monitored by mobile web-cam operated by an Assistant.

13.9. The National Jury Member, requesting texts for translation must translate the entire set of the problems of the Round and provide it to at least one Contestant of the team instead of the texts in official language.

13.10. The time for translation is 2½ hours for the Theoretical and Practical Rounds and ¾ hour for the Round on Maps and Images.

13.11. ¾ hour before the Rounds the translation will be released, and the Native Jury Member has to send the translations to the Invigilator.

13.12. Then the necessary copies for each different category of Contestants have to be provided and the original translation has to be scanned and sent to the Invigilator.

13.13. Once the copies have been made, the Native Jury Member should put them in the appropriate envelopes and place them on the desks assigned for the Contestants. In the team without Native Jury Member this job should be done by one of the Assistants.

13.14. After that the Native Jury Member has to leave the Auditorium (leaving no type of material on the desks) at the same time, when the Contestants and Team Leader enter the Auditorium.

13.15. Assistant may help the Native Jury Member in technical aspects only.

14. At the Rounds:

14.1. The Team Leader fulfills all his or her duties in the Auditorium during the Rounds.

14.2. The Contestants and the Team Leader will be able to access the Auditorium 10 minutes before the start of the Rounds. At the same time, the Native Jury Member who carried out the translation must leave the auditorium.

14.3. For the entire duration of the round, only the Students, Team Leader and possible sometimes technical Assistant (only for solving technical problems and non-standard actions) may be present in the Auditorium.

14.4. The Students absent at the beginning will not be able to participate in the round.

14.5. It will be the responsibility of the Team Leader that students deposit the backpacks, telephones and anything not admitted to the Round before they reach the assigned desk.

14.6. Before the beginning, the Team Leader has to recall to the students the principal Rules for the conduct of the Round.

14.7. Students have to follow the standard "Rules and Regulations for a participant of the Olympiad" (http://www.issp.ac.ru/iao/statutes/p/2021.html) as well as the following specific requirements.

14.8. The use of any type of notes, both in paper form and in electronic form, will not be allowed during the round. Electronic equipment of any kind, except button non-programmable calculators at the Theoretical and Practical Rounds, may not be brought by Contestants into the Auditorium for Rounds. The violation of these rules will result in disqualification of the participant.

14.10. Details of externally worn hearing aids or any other electronic equipment worn for medical reasons must be submitted for approval to LOC before beginning of the Olympiad.

14.11. Students will be able to use their own stationery materials, such as specified in the file with the "Rules and Regulations for a participant of the Remote Olympiad", and they will be able to keep bottles of water and snacks on the table.

14.12. Students will get the problem conditions in the official or the native language.

14.13. Passport of National ID of the Contestant (just the document, sent with the team application) has to be located at the desk. At the time defined by the Invigilator this document should be shown in close-up with the mobile web-cam.

14.14. Temporary leaves of the Auditorium during the Round are not expected. Any exceptional need must be discussed and authorized by the Invigilator. In this case, considered as non-standard action, all the way of the Contestant or Team Leader from the Auditorium to the doors of the restroom and back has to be monitored by mobile web-cam operated by an Assistant. The student authorized to leave of the auditorium, will have to keep the assignment (written and unwritten sheets) at his or her own desk. In no case will it be possible to leave the auditorium before 30 minutes from the start and 20 minutes before the end of the Round.

14.15. At the Theoretical and Practical Rounds, the Contestants are allowed to ask written questions concerning the problem conditions during the first 1½ hours of the Contest. If the question concerns terms in the text that appeared due to translation or unclear font/print, the Team Leader can give an answer on his or her own. In other cases, the Team Leader should translate the question and send it to the Invigilator, who is in contact with the Host Specialist. The answer (or, most often, the "no comments" reply) will be given after a while. In some cases, the question may lead to sending the answer to all participating countries.

14.16. The end of the Round has to be communicated by the Invigilator with notice approximately 30 and 10 minutes (10-15 and 3-5 minutes for Round on Maps and

Images) before the end. After the end of the Round, students will not be allowed to continue to write for any reason whatsoever. Violation of this rule results in the student being disqualified.

14.17. As soon as the assignment is delivered the students will have to leave the auditorium immediately.

14.18. Assistant may help the Team Leaders in technical aspects only.

14.19. It will not be possible, under any circumstances, to have other people present, and in particular to have people located outside the camera's field of view used for audio-video monitoring. Violation of this rule will result in the disqualification of the team.

15. After the Rounds:

15.1. Just after the Rounds the Team Leader will scan the Contestants' papers to jpeg files.

15.2. The files will be named with Code-of-Contestant followed by Name-of-Round and Number-of-Page, like "IT-α-3-Theo-page1.jpg". The quality of scanning should be enough for reading (recommended 300 dpi, i.e. approx. 2500×3500 pixels for A4 paper). The files must have correct orientation, contrast, etc.

15.3. As soon as the scanning is completed, the files will be sent to the e-mail address of the Invigilator.

15.4. As soon as the Invigilator has received all the files and checked their quality the video link will be closed and the Round actions will be considered concluded.

15.5. The original copybooks must be kept by the Team Leader up to two years after the conclusion of the Olympiad.

15.6. The Assistant may help the Team Leader in technical aspects only.

16. Jury work and Awarding:

16.1. The structure of the Jury work will be very similar to the work at standard Olympiads, except that the communication will be conducted online. The days for Jury job are November 7-11, and finalization results and final Jury decision (voting by e-mail) is November 12.

16.2. The jury consists of two parts: the International part is formed from representatives of all participating teams (1 person per team, named the Native Jury Member) and possible Observers from nonparticipating countries, and part of the LOC is formed from scientists and teachers of the host country and, possibly, neighboring countries.

16.3. At the day of the Theoretical Round during the next hours the Native Jury Member will repeat in printing form all written by Contestants texts and if the writing language is different from English, then translate them into English. In the team without Native Jury Member this job should be done by the Team Leader. The results should be composed in a joint file (named with Country-Code followed by Name-of-Round, like "IT-Theo.doc") and sent to the Invigilator. After the Practical Round and Round on Maps and Images, this procedure is not expected.

16.4. On November 8, 16:00 UT (some time after the Round on Maps and Images) there will be a distribution of jobs for checking solutions of the Theoretical Round through all papers of the students (of the Group) among the Native Jury Members.

16.5. Every problem of the Theoretical Round is to be checked and evaluated by four jury members: three of them (two members of the International part and one member from LOC part) check the solution through all papers of the students (of the group) and the fourth is the Native Jury Member (one of the Team Leaders of

the Contestant). There are only three marks if the Native Jury Member is simultaneously "through all of the students" Jury Member for this problem. As a rule, the final score is set as the arithmetic average of four or three scores. However, in the case of a serious discrepancy between the scores issued by different Jury members, the responsible LOC member of Jury makes a recheck and issues the final score.

16.6. Every problem of the Practical Round is to be checked and evaluated by three jury members: two members from LOC part check the solution through all papers of the students (of the group) and the third is the Native Jury Member (team leader of the student). As a rule, the final score is set as the arithmetic average of three scores. However, in the case of a serious discrepancy between the scores issued by different Jury members, the responsible LOC member of Jury makes a recheck and issues the final score.

16.7. Every problem of the Round on Maps and Images is checked by a group of LOC Jury members. The final score is set as a consensus decision of the members of this group of Jury members.

16.8. The jobs on checking solutions of the Round on Maps and Images should be completed by November 9, 12:00 UT.

16.9. The jobs on checking solutions of the Theoretical Round through all papers should be completed by November 10, 12:00 UT.

16.10. The jobs on LOC checking solutions of the Practical Round through all papers should be completed by November 10, 18:00 UT.

16.11. Native checking (checking all solutions of all students of the team) of the Theoretical and Practical Rounds should be done from November 10, 12:00 UT till November 11, 12:00 UT. Native checking of Contestants from teams without a Native Jury Member is not carried out.

16.12. There will be no Final Jury Meeting in traditional form. On November 12 Jury Members will receive the "blind minutes" and possible alternatives for cut off levels, and the Diploma degree boundaries will be decided by voting by e-mail. Procedure of "Breaking Rules" for the boundaries will not be operated.

16.13. Other awards will be decided by a joint solution of the IAO Chairman and the Host Country Jury Chairman.

16.14. The Jury Chairman may call video conference Jury meetings (via zoom or other program) at his or her discretion. Any other decisions will be made by e-mail voting or directly by the Jury Chairman.

16.15. Awarding will be announced on the online Closing Ceremony.

16.16. The Diploma will be posted to Team Leaders, assuming that national presentation ceremonies will be arranged.

17. The Host Organization, with the approval of the IAO Committee, may vary protocols concerning the conduct of the IRAO (the virtual IAO event 2021) as and when necessary. Some flexibility may be required to make matters run as smoothly as possible.

18. Separate detailed documents explaining the procedures, technical details and protocols concerning various aspects of the Olympiad will be distributed. The actual document outlines only general aspects.