

## INTERNATIONAL CONFERENCE: ONLINE FOR THE FIRST TIME

**The 27<sup>th</sup> St. Petersburg International Conference on Integrated Navigation Systems was traditionally held in the Concern CSRI Elektropribor from May 25 to June 5.**

This year the conference came at a hard time. In the last days of March, when the program was fully formed, the country went into self-isolation. Thereby the Program Committee made a decision about the entirely virtual event, and the Organizing Committee enthusiastically supported this decision.

The program, abstracts and preprints of papers were made available on the conference website. The authors prepared video presentations both in English and in Russian for each paper, so that the participants could choose the most convenient option for viewing. Video presentations by foreign authors were translated into Russian. This work was large and complicated but it was impossible to abandon it, because bilingualism is an important distinctive feature of our event (traditionally, simultaneous translation into Russian and English was provided at the conference). The materials of 92 papers (1 invited, 16 plenary and 75 poster papers) were prepared and posted on the site in such a way.

Besides, there was an option for everyone to ask their questions to the authors using the feedback form posted after each presentation. All materials were available on the site from May 25 till June 5, 2020.

The opening page of the conference featured the welcome speech by the Program Committee Chairman, Academician of the RAS, Doctor of Technical Sciences, Professor V.G. Peshekhonov. He noticed that notwithstanding the fact that face-to-face communication being the heart of the conference was impossible this year, the organizers made every possible effort to present its content. This year the main section was Integrated Systems, and it is for the first time that it was presented so well; it covered both a wide range of applications – from deep space to confined rooms, and a wide range of inertial sensors. This time there are lots of papers on accelerometry, there are also reports on MEMS sensors, laser, fiber-optic and wave solid-state gyroscopes. Map-Aided Navigation was a new section. It was small, but all kinds of fields, such as potential and surface fields, fields of reflecting objects, magnetic and gravitational fields, and their use were discussed there. In conclusion, Academician Peshekhonov wished the participants fruitful and interesting work at the conference.

Certainly, due to the difficult situation not only in our country, but also all over the world, some of the speakers could not confirm their participation, so this time their number was less than in previous years: 179 people from 12 countries (Belarus, Canada, China, Egypt, Germany, Russia, Syria, the United States, Ukraine, Finland, France, South Korea), of which 148 persons were from 19 Russian cities.

An important component of any conference is live communication of participants, and it seemed that this time we would be deprived of this opportunity. O.A. Stepanov and his colleagues, young scientists and postgraduates of Concern CSRI Elektropribor, JSC, and ITMO University (Saint Petersburg), managed to organize a series of online meetings using the Zoom platform in a very short time and almost from scratch.



**O.A. Stepanov**

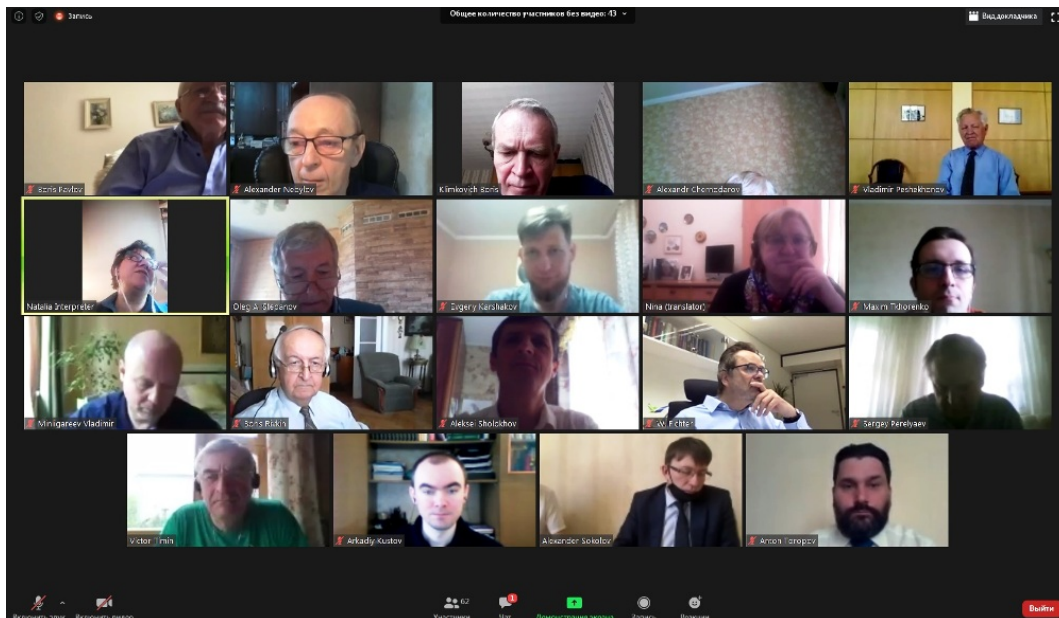


**W. Fichter**

On May 26, the online sessions of the conference were opened. It began with the welcome speech of V.G. Peshekhonov. This was followed by the invited paper by Prof. W. Fichter from the University of Stuttgart (Germany) "Control Concepts for electric aircraft. Rotary- and Fixed Wing Configurations". His presentation aroused great interest, as evidenced by a lively discussion, during which Professor W. Fichter answered numerous questions.

The opening session ended with a discussion of a plenary paper prepared jointly by the scientists from two Russian and two German organizations on a hot topic "Development of Technology for Monitoring Animal Migration on Earth Using Scientific Equipment on the ISS RS".

In late afternoon of June 26, the online section "Map-Aided Navigation" was held with great success. On May 27, the meeting on "Integrated systems in GNSS-denied environment" was held. These two topics are very relevant for the developers of modern navigation systems.



### During the online session “Map-Aided Navigation”

May 28 turned out to be the busiest day of the conference, with the following sections held: "Satellite and INS/GNSS Technologies in Navigation", "Inertial Systems and Sensors", "Space Systems and Satellites".

The session "Space Systems and Satellites" was dedicated to the memory of the recently deceased outstanding scientist, academician of the Russian Academy of Sciences Evgeny Mikrin. E.A. Mikrin (15.10.1955 – 05.05.2020), a designer of rocket and space technology, worked in the field of spacecraft mechanics and control processes. The meeting began with plenary report "Precision consumption-optimized lunar landing using signals from circumlunar satellite navigation" by M.V. Mikhailov, ScD. (S.P. Korolev RSC Energia, PJSC). E.A. Mikrin was one of the authors of this report. There were also other presentations on space issues.

In addition to the technical part, the section featured recollections of people who closely knew Evgeny Mikrin and worked with him: M.V. Mikhailov; Academician of the RAS I.A. Kalyaev (Southern Federal University, Taganrog); corresponding member of the RAS E. V. Shakhmatov (S.P. Korolev Samara National Research University); A.V. Fomichev, PhD (Bauman MSTU) and other scientists. I.V. Belokonov, ScD, (S. P. Korolev Samara National Research University) cited the condolences from the corresponding member of the RAS, G.P. Anshakov (RSC Progress, JSC). Colleagues of Evgeny Mikrin mentioned his unique talents of scientific and technical foresight, passion for his work, determination and professionalism. Many people noted the warm relationships between Evgeny Mikrin and his teacher, an outstanding scientist and designer Boris Chertok, who was the "scientific father" for E.A. Mikrin.

On May 29, the session on "Inertial Systems and Sensors" continued, after which the panel session "First Experience of Virtual Conference" was conducted.

During the panel session, the participants discussed the prospects for keeping the previous format of the event, as well as holding a conference with two (or more) working languages, and the ways of using the materials generated during online sessions in the best way in the future, including the use for educational purposes.

A member of the Conference Program Committee B. S. Rivkin, PhD, (Concern CSRI Elektropribor, JSC) noted that the activity of participants in the discussion of reports sharply increased in the new format. Another important point is the opportunity to have the English and Russian versions of presentations on the screen.

O.N. Granichin, ScD (St. Petersburg State University), supposed that it is too early to talk about the prospects of full conversion of the conference to the online format. In addition, he shared his experience of holding a round table in virtual mode, the materials of which were published in a book that can be used in the future educational process.

N.V. Kuznetsov, PhD (St. Petersburg State University), expressed the opinion that the experience of conducting online conferences proved to be very successful. He suggested to combine both formats and to provide an option of online participation at "traditional" conferences in the future.



**M.V. Mikhailov**



**A.L. Fradkov**

A.L. Fradkov, ScD (Institute for Problems in Mechanical Engineering of the RAS) shared his experience of holding the 18th European Conference on Control (ECC 2020) online. He said that we cannot yet answer the question whether the "traditional" conferences will remain in the future. It is much more important to think about the benefits of online conferences. In this format, there are other communication opportunities that need to be mastered, and a lot of interesting things are waiting for us in the future virtual world.

O.A. Stepanov emphasized that the possibility of organizing online sections relies on the young participants of the conference.

On June 2 and 3, the conference continued with online sessions of the section "Inertial Systems and Sensors". In the afternoon of June 2, the section "Data processing in navigation and motion control systems" was held. On June 4, a meeting was held on the topic "Modern research and development of navigation methods", the main feature of which was that it was mainly attended by speakers from China. They managed to organize their participation thanks to the assistance of Professor Xing Xiangmin. O.A. Stepanov and Professor Wu Yuanxin from Shanghai Jiao Tong University chaired the meeting. After the conference, Professor Wu Yuanxin was invited to join the Program Committee of the next 28th St. Petersburg Conference on Integrated Navigation Systems.



**Wu Yuanxin**

At the conference closing on June 5, a corresponding member of the RAS O.A. Stepanov noted that the next stage of the conference will be the publication of its proceedings. The materials in English are published in the prestigious international system IEEEExplore and indexed in the leading scientific citation databases Scopus and Web of Science.

At the closing ceremony, the participants thanked the Organizing Committee for the hard work done. The scientists also noted the high level of papers presented during the scientific event. In addition, it turned out that there was even more time to answer the questions and discuss the papers than at a "traditional" conference. There were a lot of suggestions that we need to develop and maintain the format of online conferences in the future, but almost everyone expressed their hope that they will soon be able to see each other live.

In addition to the scientific part, a virtual cultural program was also organized. The organizers posted relevant links to virtual tours and online performances of the leading theaters in St. Petersburg on the conference web pages. Since one of the days of the conference coincided with the City Day, the participants could listen to online concerts of classical and jazz music dedicated to this festival. There were also virtual tours around the city and its suburbs, and excursions in the largest museums of the Northern capital.

***We thank all the conference participants for their fruitful cooperation. We are waiting for everyone at the next conference in 2021!***