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Overview of the III International Conference on Advanced Technologies in Aerospace, Mechanical and Automation Engineering – MIST: Aerospace-III-2020

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Overview of the III International Conference on Advanced Technologies in Aerospace, Mechanical and Automation Engineering – MIST: Aerospace-III-2020

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Abstract. The overview describes the main directions and results of the III International Conference on Advanced Technologies in Aerospace, Mechanical and Automation Engineering - MIST: Aerospace-III-2020 held in Krasnoyarsk in November 20-21, 2020. It gives the details about the participants and the proceedings.

The Volume contains Proceedings of the III International Conference on Advanced Technologies in Aerospace, Mechanical and Automation Engineering - MIST: Aerospace-III-2020 which was held in Krasnoyarsk, Russian Federation in November 20-21, 2020. Additionally, this volume includes the best reports accepted and presented at the 9-th International Workshop on Mathematical Models and their Applications (IWMMA-2020), which took place in Krasnoyarsk in the framework of the Conference.

The purpose of the Conference is to share the results and prospects of the achievements in using advanced scientific, innovative and information technologies in aerospace industry, material sciences, mechanical engineering and automation, economics and organization of mechanical engineering production, automation engineering for industry 4.0, etc.

IWMMA-2020 provided an international forum for the presentation of original results in mathematical modelling for software- and hardware applications in various fields of engineering, natural sciences, cybernetics, computer science, etc.

The Conference was jointly organised by the International and Russian Union of Scientific and Engineering Associations (Moscow, Russia), Krasnoyarsk Regional Union of Scientific and Engineering Associations and Krasnoyarsk Science and Technology City Hall.

The main partner organisations in preparing and organising the Workshop in Krasnoyarsk as well as of the previous scientific events [1-12] were: JSC “Central Construction Bureau “Geophysics”, JSC “ISS-Reshetnev Company”, Siberian Federal University, Institute of Informatics and



Telecommunications of Reshetnev University, Krasnoyarsk Scientific Centre of the Siberian Branch of the Russian Academy of Sciences.

The Program Committee and Editorial Board included prominent professors and scientists from the Russian and International Union of Scientific and Engineering Associations, Russian Academy of Sciences, University of Maribor (Slovenia), Chinese-Ukrainian University (China), Ruhr University in Bochum (Germany), Siberian Federal University (Russia), Reshetnev Siberian State University of Science and Technology (Russia), Voronezh State Technical University (Russia) as well as specialists from Russian and foreign leading industrial enterprises.

The event has offered a platform for bringing together students, postdocs, innovative academics and industrial experts to exchange their ideas and contribute new engineering approaches to research mechanical and automation processes in various technological and information systems.

The Conference provided the premier interdisciplinary and multidisciplinary forum for researchers, practitioners and educators to present and discuss the most recent innovations, trends, concerns, practical challenges encountered and the solutions adopted in the fields of aerospace technologies, materials sciences, mechanical engineering, cybernetics, data protection, ecological and power engineering, etc. Although the schedule of the Conference was very tight, there were very vivid discussions among the participants.

The international scope of the Conference was confirmed by the participation of representatives from 14 countries besides Russia (Korea, UK, Bulgaria, Nigeria, Uzbekistan, Kazakhstan, China, Slovenia, Ukraine, Kyrgyzstan, Romania, DPR, Montenegro, Italy):

- Federal University of Agriculture, Abeokuta, Nigeria
- University of Maribor, Kranj, Slovenia
- Aktobe regional university named after K. Zhubanov, Aktobe
- Al-Farabi Kazakh National University, Almaty, Kazakhstan
- Babcock University, Ilishan-Remo, Nigeria
- CECF ELECTRIC TRADING, Shanghai, China
- China University of Petroleum, Beijing, China
- Information and Computational Technologies Institute, Almaty, Kazakhstan
- Kyungpook National University, Daegu, Korea
- Institute of Mathematics and Informatics, Bulgarian Academy of Sciences, Sofia, Bulgaria
- K Zhubanov Aktobe Regional University, Aktobe, Kazakhstan
- Karaganda Economic University of Kazpotreboyz, Karaganda, Kazakhstan
- Karaganda industrial university, Temirtau, Kazakhstan
- Karaganda State Technical University, Karaganda, Kazakhstan
- Kazakh University of Economics, Finance and International Trade, Nur-Sultan, Kazakhstan
- Kingston University, London, UK
- Kyiv National University of Construction and Architecture, Kyiv, Ukraine
- Kyrgyz State Technical University named after I. Razzakov, Bishkek, Kyrgyzstan
- L.N. Gumilyov Eurasian National University, Nur-Sultan, Kazakhstan
- Samarkand State University, Samarkand, Uzbekistan
- Satbaev University, Almaty, Kazakhstan
- Shakarim State University of Semey, Semey, Kazakhstan
- Donetsk National Technical University, Donetsk, DPR
- Shenzhen MSU – BIT University, Shenzhen, China
- Sumy State University, Sumy, Ukraine
- Tashkent pharmaceutical Institute, Tashkent, Uzbekistan
- Technical University of Cluj-Napoca, Cluj county, Romania
- Toraighyrov University, Pavlodar, Kazakhstan
- University of Padua, Padua, Italy
- Yessenov University, Aktau, Kazakhstan
- University of Montenegro, Montenegro
- JSC “Volkovgeologiya”, Almaty, Kazakhstan
- National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine

- State University of Telecommunications,
Kiev, Ukraine

The participants from Russia represented more than 180 universities, scientific institutes and organisations, industrial enterprises:

- Academy of the Investigative Committee of the Russian Federation
- Admiral Makarov State University of Maritime and Inland Shipping
- Altai State University, Barnaul
- Altai State Agricultural University
- Baltic State Technical University “VOENMEH”, St. Petersburg
- Bauman Moscow State Technical University
- Bekhterev National Medical Research Center of Psychiatry and Neurology, Ministry of Health of Russia, Saint Petersburg
- Biysk Technological Institute (branch) of the Altai State Technical University
- Blagonravov Institute of Mechanical Engineering, Russian Academy of Sciences, Moscow
- Blagoveschensk State Pedagogical University
- Bolkhov Plant of Semiconductor Devices
- Bryansk State Technical University
- Center for Physical and Technical Problems of Energy of the North of the Federal State Budgetary Institution of Science of the Kola Scientific Center of the Russian Academy of Sciences, Apatity
- Center of Information Technologies and Systems for Executive Power Authorities, Moscow
- Center SB RAS, Krasnoyarsk
- Chuvash State Agrarian University, Cheboksary
- Chuvash State University named after I. N. Ulyanov, Cheboksary
- Dagestan State Technical University, Makhachkala
- Dagestan State University, Makhachkala
- Department of Applied Mechanics and Graphics, Chuvash State University named after I.N. Ulyanov, Cheboksary
- Department of special design bureau "Spectrum"
- Far-East Institute of Management, Branch of RANEPa, Khabarovsk
- Federal Research and Clinical Center of Intensive Care Medicine and Rehabilitology, Moscow
- Federal State Autonomous Institution «Military Innovative Technopolis «ERA», Anapa
- Federal State Treasury Military Educational Institution of Higher Education Military Educational and Scientific Center of the Air Force "Air Force Academy named after Professor N Ye Zhukovsky and Yu A Gagarin, Voronezh
- FGBSI «The Federal Center of Analysis»
- Financial University under the Government of the Russian Federation, Moscow
- GAZ METALLOKOMPLEKT LLC, Taganrog
- Gubkin Russian State University of Oil and Gas, Moscow
- HSE University, Moscow
- Immanuel Kant Baltic Federal University, Kaliningrad
- Institute of Astronomy of the Russian Academy of Sciences, Moscow
- Institute of Automation and Electrometry, Siberian Branch, Russian Academy of Sciences
- Institute of Biology, Karelian Research Center, RAS, Petrozavodsk
- Institute of Biophysics SB RAS, FRC KSC SB RAS
- Institute of computational modelling SB RAS, Krasnoyarsk
- Institute of Geology of Karelian Research Center, RAS, Petrozavodsk
- Institute of Geology of Komi SC, Russian Academy of Sciences, Syktyvkar
- Institute of Information Technology and Radio Electronics of Vladimir State University
- Institute of Physical Chemistry and Electrochemistry RAS, Moscow
- Institute of Radio Engineering and Electronics, Russian Academy of Sciences, Moscow
- Institute of Technical Chemistry of Ural branch of Russian Academy of Sciences, Perm
- IPCP RAS, Chernogolovka
- ITMO University, Saint Petersburg
- Izhevsk State Medical Academy

- Joint Stock Company «Russian Space Systems», Moscow
- Joint Stock Company Space Rocket Centre Progress
- Joint-Stock Company “Academician M. F. Reshetnev” Information Satellite Systems, Zheleznogorsk
- Joint-stock company “NTC “Atlas”, Moscow
- JSC “Testing Technical Center - NPO PM”, Zheleznogorsk
- JSC SDO Chromatec, Yoshkar-Ola
- K G Razumovsky Moscow State University of technologies and management (the First Cossack University)
- Kalashnikov Izhevsk State Technical University
- Kalmyk State University named after B.B. Gorodovikov, Elista
- Karachay-Circassian State University, Karachaevsk
- Kazan Federal University
- Kazan National Research Technological University
- Kazan State Agrarian University
- Kazan State Power Engineering University
- KB of BMSTU, Kaluga
- Keldysh Research Center, Moscow
- Khakass Technical Institute of Siberian Federal University, Abakan
- Komsomolsk-on-Amur State University
- Krasnoyarsk Science & Technology City Hall
- Krasnoyarsk State Agrarian University
- Kuban State Agrarian University named after I. T. Trubilin, Krasnodar
- Kuban State Technological University, Krasnodar
- Kurgan State University
- LLC Electrotechnical Company Eco Svet, Moscow
- Lomonosov Moscow State University
- Mari State University, Yoshkar-Ola
- Marine Hydro-physical Institute, Russian Academy of Sciences, Sevastopol
- Matrosov Institute for System Dynamics and Control Theory of SB RAS
- MCS, Moscow
- Mechanical Engineering Research Institute of the Russian Academy of Sciences, Moscow
- Medical Cybernetics and Computer Science Department, Penza State University
- Mendeleev University of Chemical Technology, Moscow
- Military Academy of logistics named after General of the army A.V. Khrulev, Saint Petersburg
- Military educational and scientific center Air force « Air Force Academy named after Professor N.E. Zhukovsky and Yu.A. Gagarin », Voronezh
- Military Institute (engineering) of the Military Academy logistics support named after Army General A. V. Hrulev, St. Petersburg
- MIREA - Russian technological university (RTU MIREA), Moscow
- Molecular Electronics Research Institute, Zelenograd
- Moscow Automobile and road construction State Technical University
- Moscow Aviation Institute
- Moscow Polytechnic University
- Moscow Power Engineering Institute
- Moscow Radiotechnical Institute of RAS
- Moscow State University of Civil Engineering (National Research University)
- Murmansk Arctic State University
- N.N. Krasovskii Institute of Mathematics and Mechanics of the Ural Branch of the Russian Academy of Sciences
- National Research Mordovia State University, Saransk
- National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)
- National Research University of Electronic Technology, Zelenograd
- National University of Science and Technology «MISIS», Moscow
- North Caucasian State Academy, Cherkessk, Karachay-Cherkess Republic
- Novosibirsk State Agrarian University
- Novosibirsk State Technical University
- NRTU «Moscow State Institute of Steel and Alloys»
- Omsk state technical University
- Orel State University named after I.S. Turgenev
- Orenburg State University
- Pacific National University, Khabarovsk
- Penza State University

- Peoples' Friendship University of Russia
- Perm National Research Polytechnic University
- Peter the Great Saint Petersburg Polytechnic University
- Polytechnic Institute of the Siberian Federal University, Krasnoyarsk
- Povolzhskiy State University of Telecommunications and Informatics, Samara
- PRO FERRUM Limited Liability Company
- Prof. V. F. Voino-Yasenetsky Krasnoyarsk State Medical University
- Program Systems Institute of RAS, Pereslavl-Zalessky
- ProjectMarket LLC
- Prokhorov General Physics Institute of the Russian Academy of Science
- Research and Design Institute of design information, automation and communication on railway transport, Moscow
- Research Centre for Medical Genetics (RCMG), Moscow
- Research Institute CENTERPROGRAMSYSTEM, Tver
- Research Institute of the Federal Penitentiary Service of Russia, Moscow
- Reshetnev Siberian State University of Science and Technology, Krasnoyarsk
- RSREU, Ryazan
- Russian Technological University
- Saint Petersburg Baltic State Technical University "Voenmeh"
- Saint Petersburg Electrotechnical University «LETI»
- Saint Petersburg Federal Research Center of the Russian Academy of Sciences (SPC RAS)
- Saint Petersburg State Forestry University named after S.M. Kirov
- Saint Petersburg State Technological Institute (Technical University)
- Saint Petersburg State University of Aerospace Instrumentation
- Saint Petersburg State University of Architecture and Civil Engineering
- Saint Petersburg State University of Civil Aviation
- Saint Petersburg State University of Industrial Technology and Design
- Saint Petersburg University of State Fire Service of EMERCOM of Russia
- Saint-Petersburg Mining University
- Samara State Agrarian University
- Samara State Transport University
- Samara University
- SC «State Research Institute of Physical Measurements», Penza
- Science Perm Federal Research Center, Ural Branch of the Russian Academy of Sciences
- Scientific Research Institute for System Analysis within Russian Academy of Sciences, Moscow
- Sevastopol State University
- Siberian Cossack Institute of technology and management (branch) Moscow state University of technologies and management named after K. G. Razumovsky (the First Cossack University), Omsk,
- Siberian Federal Scientific Centre of Agro technology, Russian Academy of Science, Krasnoobsk
- Siberian Federal University, Krasnoyarsk
- Siberian State Automobile and Highway University (SibADI), Omsk
- Skolkovo Institute of Science and Technology, Moscow
- South Ural State University (National Research University, Chelyabinsk
- Southern Federal University, Rostov-on-Don
- South-Ural State Agrarian University, Troitsk
- South-West State University, Kursk
- SSC FCUE «Keldysh Research Centre», Moscow
- State Agrarian University – Moscow Timiryazev Agricultural Academy
- State University for the Humanities, Moscow
- Stock Company «Experimental Design Bureau «Electroavtomatika» named after P A Yefimov, Saint Petersburg
- Surgut State University
- Syktyvkar State University
- Technological Institute for Superhard and Novel Carbon Materials, Troitsk, Moscow
- The All-Russian Research Institute of Starch Products—a Branch of "The Federal Research Center for Food Systems named after Gorbатов" RAS, Krasnoyarsk
- The Institute of Geothermal and renewable energy problems-the branch of the Federal State Budgetary Institution of the Science of the United Institute of high

- temperatures of the Russian Academy of Sciences, Makhachkala
- The Institute of Radioelectronics and Information Technologies, Yekaterinburg
- Togliatti State University
- Tomsk State Pedagogical University
- Tomsk State University of Control Systems and Radioelectronics
- Trapeznikov Institute of Control Sciences RAS, Moscow
- Tula State University
- Tver State Technical University
- Ufa State Aviation Technical University
- Ufa State Petroleum Technological University
- Ural Branch of the Russian Academy of Sciences, Ekaterinburg
- Ural Federal University named after the first President of Russia B.N. Yeltsin, Ekaterinburg
- Ural State University of Economics, Yekaterinburg
- V M Gorbatov Federal Research Center for Food Systems of Russian Academy of Sciences
- V. Grebenshchikov Institute of Silicate Chemistry, RAS, St. Petersburg
- Vladimir State University
- Volga State University of Service, Togliatti
- Volga State University of Technology, Yoshkar-Ola
- Volgograd State Technical University
- Voronezh State Medical University named after N N Burdenko
- Voronezh State Technical University
- Voronezh State University
- Vyatka State University, Kirov
- Yaroslav the Wise Novgorod State University
- Yuri Gagarin State Technical University of Saratov

The program of the Conference consisted of keynote and plenary talks, presentations of the participants. The Conference took place at the Krasnoyarsk Science and Technology City Hall for those participants who could come and participate in the scientific session of the conference. There was also online section for those scientists from other cities and countries with travelling restrictions due to the situation with coronavirus infection (COVID-2019). The Organizing Committee took the decision not to postpone or cancel the Conference because the issues of discussion were of great interest, and the Conference had been planned in advance. The Organizing Committee expresses gratitude to the scientists of The Siberian Scientific Center of the Russian Academy of Sciences, Professors of the Siberian Federal University, Krasnoyarsk State Agrarian University and Reshetnev University etc. who could come to the City Hall and make reports as well as to participate in the online session. More than 70 participants who could not come due to the restrictions connected with COVID-19 presented poster presentation which can be found at the website of the conference and took part in the online session with reports which had been prepared and sent to the Organizing Committee beforehand. The online section was held on the Zoom platform (<https://us02web.zoom.us/>) which let all the participants to watch the reports and ask questions online as well as to write them in the chat format. The speakers answered the questions online. The participants who could come to the City Hall also participated in the discussions and question sessions. The overall technical quality of the conference was good, the platform lets to add more than 100 participants simultaneously. The participants can watch the reports, write questions and speak. The moderator can change the roles so that the speaker can answer questions and make comments.

A wide range of fundamental and applied problems in various production and technological systems has undergone consideration during the meeting. The programme of the Conference included the following 4 sections:

- Aerospace Technologies and Industrial Production;
- Mathematical Models and their Applications (IWMMA-2020);
- Cybernetics, Automation and Information Technologies;
- Energy, Chemical and Ecological Engineering.

This was the 3rd Conference which attracted even more participants with very urgent reports [1, 5]. All the participants evaluated the results of the Conference as highly important for the sustainability of modern society industrial development.

All participants were invited to present their papers in this Volume and all submitted manuscripts went through the independent peer review process. We are very grateful to all reviewers from Russia, China, USA, Slovenia, Germany and Republic of Kazakhstan for their time and highly professional comments. We deeply believe that their reviews gave opportunity to improve the scientific quality of the presented papers which may be useful for academic, scientific and industrial partners.

More than 350 reports were submitted to the Organizing Committee of the III International Conference “Advanced Technologies in Aerospace, Mechanical and Automation Engineering - MIST: Aerospace-III-2020” and IWMMA-2020. 198 reports were selected for inclusion into this Volume after the review process. All the papers were subjected to rigorous peer-review by conference committee members and international reviewers. The papers were selected based on their quality and relevance to the Conference and Workshop directions.

The proceedings present to the readers the recent advances in the field of aerospace engineering, mechanical engineering and industry, materials science, data protection in automation systems, cybernetics, information technologies, ecological engineering and power engineering. These papers reflect modern engineering approaches in all Conference directions, broaden the researches of the previous Conferences [1-12].

We chose the IOP Conference Series: Materials Science and Engineering to provide all contributors with the opportunity to publish their papers in an international, peer-reviewed journal. This is understood and appreciated by all the participants of our Conference, and therefore this Volume provides an excellent overview of the main topics of our Conference.

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On behalf of the conference committee and organizers, we would like to thank all the authors who contributed to this Volume as well as to the reviewers, speakers and all the conference participants for their support to MIST: Aerospace-III-2020.

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