8th RUSSIAN-GERMAN CONFERENCE

«ELECTRIC PROPULSIONS: DEVELOPMENT AND APPLICATION IN SPACE»
ABOUT CONFERENCE

The 8th Russian-German Conference on Electric Propulsions and their application 2020(+1) will take place from 11th to 15th of April 2021 in Kaliningrad. Both fundamental and applied research works related to the development of various types of electric propulsions and their application on board spacecraft designed for different purposes will be the topic of the conference. Near a half of all the operating or operated electric propulsions in space are made by EDB Fakel. In 2020 Fakel turned 65 years and we decided to hold a conference to celebrate this anniversary.

The Conference is intended for a contribution to the international cooperation both in industrial and scientific fields.

CO-CHAIRS

Garri A. Popov

Academician of the Russian Academy of Sciences, full member of the International Academy of Astronautics, Director of the Research Institute of Applied Mechanics and Electrodynamics of the Moscow Aviation Institute (RIAME MAI), Russia

Prof. Peter J.Klar

Prof. Dr., Director of 1 Institute of Physics, Justus-Liebig University Gießen, Germany

ORGANIZERS

Michael V. Korkunov

Dr., Director, JSC EDB Fakel, Russia

Evgeniy V. Kosmodemyansky

Dr., General designer, JSC EDB Fakel, Russia

KEY INFORMATION

Date 11th – 15th April, 2021
Location Virtual
Fees 100 Euro
Website rgcep.fakel-russia.com
Type Full paper submission (oral presentation)
PROGRAM OF THE CONFERENCE

A total number of **59 talks** will be given by the speakers and fill out one complete conference week. The conference agenda includes 8 Technical Sessions chaired by international experts with virtual oral presentation.

Paper topics:

- Ion thrusters;
- Stationary plasma thrusters;
- Magnetoplasmodynamic thrusters;
- Power sources and thruster-spacecraft conjunction
- Spacecraft with electric propulsions. Flight dynamics, propulsion control;
- Electric propulsion on the small, micro- and nano- satellites;
- Electric propulsions application in planets and asteroid rendezvous mission;
- Electric propulsion application for utilization of space debris.

The Conference materials, including all the presented abstracts, will be published on the conference home page and in the electronic collection.

All papers will be published in the Journal of Physics: Conference Series, IOP Publishing.
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<th>Sunday, April 11, 2021</th>
<th>Monday, April 12, 2021</th>
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**Conference Welcome / Plenary Session**

**Moderators:**
- **Garri A. Popov** - Academician of the Russian Academy of Sciences, full member of the International Academy of Astronautics, Director of the RIAME MAI
- **Peter J. Klar** - Prof. Dr., Director of 1 Institute of Physics, Justus-Liebig University Gießen, Germany

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<tr>
<th>Time</th>
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<tr>
<td>10:00-10:45</td>
<td>P. Klar</td>
<td>Words of Welcome to the 8th Russian German Conference on Electric propulsion</td>
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<td>G. Popov</td>
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<td>M. Korkunov</td>
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<td>E. Kosmodemiansky</td>
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<td>10:45-11:00</td>
<td>P. Klar</td>
<td>Recent developments in Electric Propulsion</td>
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<td>11:00-11:15</td>
<td>D. Loskutov</td>
<td>The Unified Product and Component Portal for Space Industry</td>
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<td>11:15-11:30</td>
<td>H. Leiter</td>
<td>Electric propulsion – Challenges for academia and industry 2021 and beyond</td>
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<td>11:30-12:00</td>
<td>M. Kaplin</td>
<td>A brief history and an overview of EDB Fakel</td>
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<td>V. Panfilov</td>
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<td>O. Mitrofanova</td>
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<td>12:00-12:45</td>
<td>V. Kim</td>
<td>Plasma Thrusters with closed drift of electrons: ideas and trends of development in the past and at present time</td>
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<td>D. Merkur'ev</td>
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<td>A. Semenkin</td>
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<td>14:00-14:20</td>
<td>J.F. Plaza, A. Post, J. Toledo, L. Conde, J.L. Domenech-Garret, J.M. Donoso</td>
<td>Electron emissions from NACES high performance cathode based on C12A7:e-electride material for in-space electric propulsion applications</td>
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<td>14:20-14:40</td>
<td>D. Kashirin, S. Semenikhin, S. Khartov</td>
<td>Gas-Electric Isolator operation as part of a low-power Radio-Frequency Ion Thruster with a wide range of thrust control</td>
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<td>16:00-16:20</td>
<td>D. Zschätsch, M. Reitemeyer, L. Chen, J. F. Plaza, A. Post, P. J. Klar</td>
<td>Investigation of C12A7:E- under harsh conditions in relation to hollow cathode neutralizers</td>
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<td>16:40-17:00</td>
<td>H. Leiter et al</td>
<td>Commercial electric propulsion development and production – Ariane group projects and products</td>
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<td>17:00-17:20</td>
<td>S. Gordeev, S. Kanev, S. Khartov</td>
<td>Numerical mathematical model of radio-frequency Discharge in the Discharge chamber of Radio-frequency Ion Source</td>
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| 10:00-10:20 | A. Elakov  
E. Bogachev  
A. Mogulkin  
V. Nigmatzyanov  | New Features in Application of High-Dense Carbon-Carbon Composite On Non-Woven Basis In Ion Source's Ion Extraction Systems |
| 10:20-10:40 | V. Abgaryan  
A. Kupreeva  
A. Melnikov  
V. Nigmatzyanov  | Radio-frequency ion source temperature field modeling and measurements         |
| 10:40-11:00 | L. Pietzonka  
C. Eichhorn  
F. Scholze  
D. Spemann  | Laser-Induced Fluorescence Velocimetry on a Radiofrequency-Driven Ion Source |
| 11:00-11:20 | Coffee break                                 |                                                                               |
## Technical Session B

### Stationary plasma thrusters

**Moderators:**

- **Vladimir Kim** - Prof. Dr., Chief researcher at RIAME
- **Carsten Bundesmann** - Dr, Senior Researcher of IOM, Leipzig, Germany

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<td>C. R. Koppel G. Quinsac</td>
<td>Electric Thruster Selection Criteria and Examples</td>
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<td>A. Neumann M. Brchnelova K. Hannemann</td>
<td>Modeling of Cryopumps for EP Usage</td>
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<td>12:20-14:40</td>
<td>P. Dietz K. Keil P.J. Sarnoch K. Holste P.J. Klar</td>
<td>Optimization OF AN IODINE FED RF-NEUTRALIZER</td>
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<td>12:40-13:00</td>
<td>D.A. Maystrenko A.A. Shagayda A.S. Lovtsov</td>
<td>Probe Development for Electric Propulsion Diagnosis</td>
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<td>14:00-14:20</td>
<td>F. Kiefer, K. Holste, C. Volkmar, R. Thüringer, P. J. Klar</td>
<td>Electromagnetic Compatibility Test Facility with Reverberation chamber for Electric Propulsion</td>
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<td>14:40-15:00</td>
<td>M. Kaplin, O. Mitrofanova, V. Gopanchuk, M. Bernikova, L. Grebenev, S. Olotin, E. Shiryaeva</td>
<td>The study of the operational process specific features in very low-power plasma accelerators</td>
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<td>15:20-15:40</td>
<td>V. Kim, V. Zarkharchenko, V. Kalyazin, D. Merkur'ev, G. Popov, E. Shilov</td>
<td>Development of the low power SPT experimental models operating with Krypton and Xenon with increased design lifetime</td>
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<td>15:40-16:00</td>
<td>S. Ivakhnenko, E. Vorobiov, S. Shilov, O. Plotnikova, A. Plokhikh, N. Vazhenin, D. Merkurev, V. Zakharchenko</td>
<td>Spectral-temporal characteristics of self emission from TAL in the radio-frequency band for different propellants</td>
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<td>16:00-16:20</td>
<td>V. She, S. Sannikova, D. Gladkov, Ya. Nazarova, A. Nasedkin, A. Berg</td>
<td>Mono-crystalline Lanthanum Hexaboride production peculiarities</td>
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## Technical Session B: Stationary plasma thrusters

**Moderators:**
Vladimir Kim - Prof. Dr., Chief researcher at RIAME  
Franz Georg Hey – Dr, Laboratory for Enabling Technologies, Airbus

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A. Nesterenko  
V. Sokolov  
R. Podgornyh | The new possibilities to increase the SPT-140D thruster reliability           |
| 10:20-10:40   | S. Shilov  
S. Ivahnenko  
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S. Olotin | Parametric-test of low power thruster with anode layer on krypton            |
| 10:40-11:00   | A. Plokhikh  
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A. Markov  
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O. Tolstel  | Development and research of parameters and characteristics of modified SPT-70M operates on xenon and krypton |
| 11:20 – 11:40 | K. Guskov  
A. Rumyantsev  
P. Chubov  
A. Sinitsin | Problems of measuring propellant flow rate on the test stands and their solution |
<p>| 11:40-12:00   | Coffee break                     |                                                                             |</p>
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<td>M.Collier-Wright, M.La Rosa Betancourt, D.Hindley, G.Hedrich, A.Behnke</td>
<td>High-Temperature Superconductor based Power System Architectures as enablers for High Power Missions</td>
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<td>A. Bogatyi, G. Dyakonov, N. Lyubinskaya, G. Popov, S. Semenikhin</td>
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### Technical Session D

#### Power sources and thruster-spacecraft conjunction

| Moderators: | Alexander Semenkin - Dr., Deputy General Director, Keldysh Research Center  
Frank Jansen – Dr, Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) |
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L. Zakharenkov  
E. Kuvshinova  
A. Lovtsov  
I. Ogloblina  
A. Semenkin  
A. Solodukhin | Modern trends in Spacecraft Power and Propulsion Systems and Electric Thrusters |
| 14:40-15:00 | A. Koroteev  
K. Gotovtsev  
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A. Karevskiy  
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Yu. Oshev  
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A. Solodukhin | Studies of joint operation of Electric Propulsion and Power Supply System based on closed Brayton cycle |
# Technical Session E

**Spacecraft with electric propulsions. Flight dynamics, propulsion control**

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<td>V. Salmin, K. Petrukhina, A. Kvetkin, Yu. Lazarev</td>
<td>Approximate method for calculating Interorbital Flights of a Spacecraft with low-thrust Engines</td>
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<td>Transfer of 433 EROS Comparison of Spacecraft with Non-Perfectly Reflecting Solar Sail And Low Thrust Engine</td>
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<td>M. Fain, O. Starinova</td>
<td>Spacecraft transfers between L1 and L2 libration points in the Earth-Moon system for a number of electric propulsion thrusters</td>
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<td>Design and ballistic Analysis of Spacecraft Missions with an Electric Propulsion System to an Asteroid</td>
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<td>V. Salmin, A. Chetverikov</td>
<td>Narrowing the area of deviation of the final trajectory parameters using the algorithm for refining the thrust of electric propulsion</td>
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<td>Three-dimensional microlithography as an enabling technology for miniaturised electrospray thrusters</td>
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<td>V. Salmin</td>
<td>Designing a transport module with low-thrust electric Propulsion engines</td>
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<td>Analysis of the Effective use of the SPD-50 engine to support the low orbit of the AIST-2 Small Spacecraft</td>
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<td>Analysis of the effect of rotation of small Spacecraft Solar Panels on low orbit correction using an Electric Jet Engine</td>
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<td>V. Bondarenko</td>
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<td>F. Jansen</td>
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<td>S. Wüst</td>
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<tr>
<td>Technical Session H</td>
<td>Electric propulsion application for utilization of space debris</td>
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<td>Moderators:</td>
<td>Ekaterina Tverdokhlebova - Dr., Head of department, TSNIMASH, Russia</td>
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<td>Frank Jansen – Dr, Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)</td>
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<tr>
<th>Time</th>
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<tr>
<td>14:40-15:00</td>
<td>J. Skalden, L. Ackermann, M. Ehresmann, G. Herdrich</td>
<td>Current Experimental Activities on developing an ARCJET Deorbit Module at IRS</td>
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<td>15:00-15:20</td>
<td>S. Ishkov, G. Filippov, P. Fadeenkov</td>
<td>Low-thrust Engines applying in problem of insertion and space debris disposing at geostationary orbit</td>
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