

National contact point “AERONAUTICS”

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*Factsheet*¹

Opportunities for the Development of EU-Russia Science and Technology Cooperation in Aeronautics

Central Institute of Aviation Motors named after P.I. Baranov – CIAM

In order to maintain and develop the scientific and technological EU-Russia cooperation in the field of aeronautics, **Russian National Contact Point for aeronautical research – NCP “Aeronautics”** informs you about Russian organizations/institutions conducting their activities in the field of aeronautics and being effective partners for international cooperative activities in this field.

At the present time **Central Institute of Aviation Motors named after P.I. Baranov (CIAM)** is one of the leading research organizations in the field of aeronautics in Russia.

About the Institute

Being the Russian Federation’s State Research Center, CIAM is a world-class research center, an organization conducting **all studies necessary for designing aircraft engines and gas turbine units based on them.**

On behalf of the Russian Federation, the rights of the Institute's founder and owner of the Institute's property are exercised by National Research Center “Zhukovsky Institute”.

Established in 1930, the Institute conducts fundamental research and participates in the development of future aircraft engines, their systems and components. All Russian engines and many foreign engines were developed with the CIAM direct participation and were refined at the CIAM rigs.

CIAM researchers carry out work for establishing an **advanced research foundation** for designing aircraft, marine, and stationary engines; development of new lubricants; renewable energy source studies, including hydrogen energetics; conduct unique altitude and environmental testing of aircraft and aerospace engines; carry out work enabling energy efficiency and energy saving.

The Institute has a **unique, Europe's largest facility for ground and altitude testing** of engines, their systems and components. Rigs of the facility can be used for all types of testing of full-scale engines, their systems and components. The **CIAM Research and Test Center** is the only facility in Europe where the most complex and power-consuming types of mandatory aircraft engine tests reproducing full-scale operating conditions (altitude, speed, temperature, humidity, etc.) can be conducted.

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A large group of prominent researchers, heads of research schools, works at CIAM, whose efforts in the fields of physical and technical issues of the power industry, hypersonic technology, boundary layer theory, turbulence, combustion and heat conductivity, conductive gas flow, gas dynamics of impeller machines, dynamics and strength, engine theory, high-level mathematical modeling, high-energy fuels, aircraft chemotology, and other disciplines are well known to the world's scientific community.

CIAM areas of activity:

- Fundamental research in the gas dynamics, mechanical strength, heat exchange, combustion, and acoustics fields;
- Testing of aircraft engines, their systems and components in actual operating conditions;
- Forecast and development of the main areas of aircraft engine development based on the world's leading aircraft science and engineering studies;
- Engine development methodology;
- Applied research for conceptual design of various aircraft engine types; aircraft system and component design, as well as ensuring reliability and failure-free performance;
- Rig equipment and instrumentation design;
- Design of high-performance gas turbine units for the power and gas transfer industries.

International Collaboration

The Institute has established long-term relationships with global research centers and institutes, such as DLR (Germany), ONERA (France), NRL (the Netherlands), the European Space Agency (ESA), as well as with leading European and American aerospace and engine manufacturers: Airbus Group, Safran Group, Dassault Aviation, Boeing, Rolls-Royce, Pratt & Whitney Canada, MDS Aero, Avio Aero, MTU Aero, MAN Diesel & Turbo SE, and Shell.

CIAM also extends its collaboration with Asian research organizations: GTRE and DRDL (India); SEDRI, GTE, and CAPI (China), etc. Besides this, the Institute continues cooperating with its traditional partners from the CIS countries.

Only during the last 15 years, the Institute has completed over 350 contracts.

On a contractual basis, the Institute provides foreign customers with the following services:

- Calculation and experimental studies of engine components and engines in general;
- Studies of relevant environmental and noise problems;
- Design and development studies of engines and engine components;
- Design and development studies of test rigs and rig components;
- Certification testing;
- Fuel and oil analysis.

The Institute participates in the international programme for the harmonization of aircraft design and manufacture standards.

CIAM's participation in international scientific cooperation – EU Framework Programmes

Since 2005, the Institute participates in research projects according to European framework programmes relating to aircraft environmental impact studies; studies for reducing the time and costs of aircraft development, manufacture, and operation; meeting customers' demand and ensuring customers' safety; providing aircraft and passenger protection; developing new ideas and technologies for the future air transport.

As a partner, CIAM has made a **significant contribution to projects of the 6th and 7th Framework Programmes of the European Union:**

- HISAC – Environmentally Friendly High-Speed Aircraft;
- CESAR – Cost-Effective Small Aircraft;
- VITAL – Environmentally Friendly Aero-Engine;
- DREAM – Validation of Radical Engine Architecture Systems;

- ORINOCO – Cooperation with Russia in the Field of Advanced Engine Noise Control Based on Plasma Actuators;
- ICE-TRACK – Support of Icing Tests (Runback-Ice Behaviour of Surfaces) and Icing Mechanisms – a project of the Clean Sky Joint Technology Initiative;
- DisPURSAL – Distributed Propulsion and Ultra-high Bypass Rotor Study at Aircraft Level;
- X3-NOISE – Aircraft External Noise Research Network and Coordination;
- LEMCOTEC – Low Emissions Core Engine Technologies;
- ESPOSA – Efficient Systems and Propulsion for Small Aircraft.

CIAM continues intensive cooperation with its European partners within the framework of **international projects of the 7th and 8th Framework Programmes** of the European Union:

- ENOVAL – Engine Module Validators (low pressure system of ultra-high bypass ratio propulsion systems);
- COBRA – Innovative Counter Rotating Fan System for High Bypass Ratio Aircraft Engine;
- HEXAFly-INT – High-Speed Experimental Fly Vehicles;
- AGILE – Aircraft 3rd Generation MDO for Innovative Collaboration of Heterogeneous Teams of Experts.

These projects deal with various aspects of development of components of future engines that would meet the target indicators established by the European strategy documents Vision 2020 and FlightPath 2050.

The Institute has also taken part in cooperation projects with Germany (the Berlin-Brandenburg Aerospace Alliance – BBAA) and France (the French Aerospace Lab – ONERA).

Conferences, Exhibitions, Airshows

CIAM's researchers represent Russia **in the foreign research societies** ISABE, ICAS, ASME, AIAA, SAE, as well as in the International Civil Aviation Organization (ICAO).

The Institute **organizes international conferences and seminars**, among which is “The Aircraft Engines of the 21st century”, a scientific/technical congress on engine building within the framework of the International Engine Building Forum; seminars on seeking innovative solutions to reduce pollutant, soot, and aerosol emissions; alternative fuels and combustion process control; aircraft engine problems; non-equilibrium processes; plasma; combustion; atmospheric phenomena, etc.

CIAM regularly participates **in international airshows and exhibitions**:

- International Aerospace Show [MAKS](#) (Russia),
- International Helicopter Exhibition [HeliRussia](#) (Russia),
- International Hydroaviation Exhibition [GIDROAVIASALON](#) (Russia),
- International Engine Building Forum [MFD](#) (Russia),
- Paris Air Show at Le Bourget (France),
- Farnborough International Airshow (UK),
- ILA Berlin Air Show (Germany),
- Airshow China (Zhuhai, China),
- Aviation Expo China (Beijing, China),
- International Aerospace Show Aero India (India),
- and others.

During such airshows, the Institute showcases advanced high-tech products and solutions to current engine building problems at foreign markets.

CIAM is always open for international cooperation, which is vitally important today to realize the scientific potential of Russia on the world stage.²

² Prepared using the materials of the CIAM official website: <http://www.ciam.ru/>.

More information you can find here:

- ✓ CIAM official website: <http://www.ciam.ru/en/>;
- ✓ Russian NCP "Aeronautics" support: +7 495 556 31 62, +7 498 483 29 09, <http://ncp.tsagi.ru/en/>.