

KhAI Research and Development Strategy for 2014-2020 Period

Following the EU experts' assessment of the University research activities and based on the provided recommendations, **KhAI has built an integral R&D Strategy that describes specific goals and activities planned for a 7-years period.** Its overall aim is to augment KhAI's research excellence at regional, national, and international levels.

Acting in line with the **overall mission to develop scientific and industrial potential of Ukrainian aerospace and high-technology sector and intensify sustainable development of the society and knowledge-based economy,** up to 2020 KhAI will have:

- **Up-to-date R&D infrastructure** in key priority areas (modern or upgraded facilities, instruments, measuring and computing devices, software, etc.)
- **Active research groups** in key priority areas with the **average age of 45**
- **Favourable research environment** which will constantly attract new researchers through the University's R&D infrastructure (especially research-oriented Master and PhD Students)
- **Stably developing international research cooperation** in all key priority areas (successful integration of KhAI research groups into international research networks)
- **Ongoing close cooperation with industry and business** (research contracts, joint research work)
- **Steady University system of intellectual rights protection and licensing** as an integral part of technology transfer system.

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To achieve successfully these strategic goals KhAI will realize research and education processes according to the **5 basic principles** that take into account KhAI extensive experience and current societal values, needs, and demands:

- ✓ Education through research
- ✓ Support and development of scientific schools
- ✓ Promotion and encouragement of research in priority areas
- ✓ Increased responsibility for research outputs
- ✓ Research through innovation



We believe that realisation of the prepared strategic document provisions will lead our University towards the centre of learning, research, and innovation whose excellence is acknowledged locally, nationally and globally.



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Full round of KhAI-ERA Special Sessions at International conferences

One of the KhAI-ERA dissemination activities is the organization of a major scientific conference covering all project research directions. Taking into account the diversity of the KhAI-ERA research topics, it was decided to promote project progress and results in each priority area at specific conference with wide international participation held in Ukraine annually. Thus, three KhAI-ERA special sessions were carried out in spring-summer 2013:

Special session of Research Topic A

Special session of Research Topic A **"KhAI-ERA project: Opportunities for EU-Ukraine Cooperation in Composites Area"** was organized in the frame of the 33rd Annual International Scientific-Practical Conference & Exhibition "Composite Materials in Industry" (Gurzuf, Ukraine on 27 – 31 May 2013). The Session included 18 reports focused on KhAI-ERA Project, nanocomposites, high-modulus carbon fibres, increasing of composite strength characteristics, contactless measuring, non-destructive diagnostics, composite articles and joints design and manufacturing, etc.



Special session of Research Topic B

The KhAI-ERA Special Session dedicated to the Research Topic B was held in the frame of the XVIII International Congress of Propulsion Engineering that was organized in Rybachye (Ukraine) in September 2013. The participants of the Congress were representatives of Ukraine, Russia, Azerbaijan, USA, France, Belarus, China, India, Poland, and Iran.



Special Session **"The KhAI-ERA project – mutually beneficial cooperation of Ukraine and EU in the field of aircraft technologies"** was held on 17-18 September 2013 and comprised 9 reports on aircraft structures assembly, riveting technology development, automated process engineering in assembling, morphing aircraft, etc.

Special session of Research Topic C

The KhAI-ERA Session was organized by the KhAI-ERA Topic C – Dependable Embedded Systems team as an embedded event of the **3rd International Workshop on Critical Infrastructure Safety and Security (CRISS2013)** that took place on **23-26 May, 2013** in Sevastopol, Ukraine.

A set of plenary talks related to the KhAI-ERA project Research Topic C were presented by KhAI and TUT representatives. In particular, they concerned dependable many-core architectures for mixed-criticality applications, embedded instrumentation infrastructure for ageing failure resilience, FPGA-based I&C systems cybersecurity and FPGA-based freeform signal shaper for testing of multichannel bioimpedance analyser.



Major results of KhAI-ERA Special Sessions:

- ✓ KhAI-ERA project information (goals, objectives, activities performed and planned) was disseminated among nearly 250 participants from more than 15 countries
- ✓ KhAI R&D activities and major research results of KhAI-ERA Research Teams (incl. achieved in cooperation with KhAI-ERA partners) were presented
- ✓ KhAI representatives had a perfect opportunity to create new links with EU and CIS countries researchers and discuss directions and models of further cooperation

Project Events

18-month KhAI-ERA Consortium Meeting



The KhAI-ERA 18-month meeting took place in Magdeburg on 12-13 June 2013. This meeting was dedicated to the discussion of the KhAI-ERA team success during the first half of the project implementation. Project partners presented and jointly discussed results achieved during the mentioned period in twinning through the efficient knowledge exchange, human potential increasing through the tailored trainings organized by both KhAI and EU experts, and strengthening of KhAI presence and visibility at EU research market. Specific attention was paid to the discussion of KhAI Evaluation Report prepared by the independent EU experts on the base of KhAI's research outputs, environment, and esteems evaluation.

KhAI-ERA Local Workshops

✓ The KhAI-ERA Local Workshop dedicated to the **Research Topic A «KhAI Achievements in Composite Aeronautics Structures Design and Manufacturing»** was organized at the KhAI premises on 24 May 2013. The Aviation Material Science Department presented its research and developments in the area of composite materials for more than 30 representatives of Ukrainian aeronautic community. This event was a good place to discuss future prospects and arising problems of composites research and to present the KhAI-ERA project. The WS was beneficial for KhAI due to the possibility to disseminate the University's capacities and to promote KhAI as a reliable partner for cooperation thus increasing its regional coverage.



✓ The KhAI-ERA Local Workshop dedicated to the **Research Topic B «Advanced Manufacturing for Aircraft Assembly»** was held on November 14, 2013 at KhAI. The Rector of KhAI Prof. V. Krivtsov opened the Science & Technical WS that was attended by over 60 researchers, academic staff, PhD and Master students of KhAI, as well as representatives of aviation enterprises of Ukraine (KSAMC, Motor Sich, Design office "VZLET", etc.), German Light-Sport Aircraft producer Flight Design and Ukrainian technical Universities. 11 reports were presented during the Workshop and followed by the fruitful discussion among industry representatives and University research and academic staff.



Research Topic A Bilateral Workshops

During the last 6 month Research Topic A Team have conducted two bilateral Workshops relevant to composite materials. The first one was held by Ass. Prof Pavel Gagauz in May 2013 in Brno and was focused on the problems of design of composite structures joints, currently using approaches in joints analysis, and feasible methods for increasing joints' load-carrying capacity. Late May, IAE-BUT representatives Ass. Prof. Jaroslav Juračka and Dr. Tomáš Urík visited KhAI and delivered the workshop dedicated to the EU regulations, procedures, equipment and methodologies for test results analysis applied for composite structures and components testing.

Research Topic B Workshop at KhAI

To support KhAI and Fraunhofer IFF twinning the research seminar on "Energy-efficient manufacturing technologies" was organized at KhAI premises on 23 May 2013 with the participation of Fraunhofer IFF experts: IFF Deputy Director Prof. Gerhard Müller and the Head of Process and Plant Engineering Department Dr. Matthias Gohla. KhAI Master and PhD students, academic and research staff involved into relevant research attended the workshop. Main topics covered were: energy processes for aircraft resource-efficient production, methods and tools for quality monitoring of aircraft structures automated assembly, advanced tools and techniques for industrial wastes recycling.

Project News

Mid-Term KhAI-ERA Results



Fruitful collaboration of KhAI-ERA partners during the 18-month of the project implementation resulted in:

- 17 bilateral partners meetings
- 9 Research Workshops
- 3 Special Sessions of the KhAI-ERA project at International conferences
- 2 KhAI-ERA Local Workshops for Ukrainian Researchers
- 18 Training Modules relevant to the project Research Topics
- 3 Training Modules relevant to FP7 projects participation
- 1 Training Module dedicated to a new EU programme HORIZON 2020
- 12 joint research papers + 4 joint participations in international conferences
- 24 relevant EU conferences, workshops, etc. attended by KhAI researchers
- 4 EU events dedicated to FP7 attended by the Transport NCP staff
- 8 FP7 proposals preparation and submission with KhAI participation
- 1 new FP7 project started in 2013 with the KhAI participation
- Publication of "Aerospace Research and Education at KhAI" Brochure and "Ukrainian Aeronautics: Research and Technology Groups Brochure"
- Comprehensive KhAI Evaluation by EU experts
- 2014-2020 KhAI Research and Development Strategy

Involvement into PEGASUS community

Today KhAI is the only Ukrainian University that has a status of Associated Partner in PEGASUS (Partnership of a European Group of Aeronautics and Space Universities) that includes 27 Institutions from 10 European countries.

This April KhAI representative Dr. Lina Smovziuk took part in the 30th PEGASUS Council Meeting that was held in the premises of Politecnico di Milano. The meeting was dedicated to the discussion of the last PEGASUS activities and planning of further actions to promote European aerospace education, enhance cooperation between PEGASUS partners, and establish new connections with EU aerospace industry.

Involvement into the PEGASUS network is of great importance for KhAI as it provides a perfect opportunity for direct and close cooperation with European Aeronautic and Space Universities.

KhAI activities as FP7 Transport NCP in Ukraine

As a Head of FP7 Transport NCP in Ukraine the KhAI-ERA Coordinator Mr. Igor Rybalchenko with the support of EU Directorate General Research and Innovation and Mission of Ukraine to the European Union organized a Special experts Session «New EU Programme HORIZON 2020: Development of EU-Ukraine cooperation in aeronautic research and innovation». It took place in the premises of National Technical University of Ukraine in Kiev on 23 May 2013.

The core of this event was the presentation of a new EU Programme Horizon2020 made by Pablo Perez-Illana, Policy and Programme Officer, EU DG R&I - Aeronautics. It was followed by the discussion of new elements of H2020 Programme, strategy of international cooperation, potential of Ukraine and possible topics of collaborative aeronautic research.



Results of this discussion were jointly presented by Mr. Igor Rybalchenko and Mr. Pablo Perez-Illana at the Second Meeting of the Joint EU-Ukraine S&T Committee involving State Agency on Science, Innovation and Informatization of Ukraine (SASII) and DG Research and Innovation of the European Commission (24 May 2013, Kiev, Ukraine).



By analysing the Ukrainian entities' successful involvement into FP7 aeronautic projects and available prospects for further cooperation in this area, it was clearly demonstrated that EU and Ukrainian parties have mutual interest in research collaboration dedicated to Aeronautics.

KhAI preparation for the HORIZON 2020 Programme launch in 2014

To be in line with the recent news concerning the H2020 programme and to create a solid background for KhAI researchers involvement into H2020 proposals, the KhAI-ERA Coordinator Mr. Igor Rybalchenko took part in the following information and communication events:

- HERMES Workshop «International Collaboration on Transportation Research» (25-26 April 2013, Paris)**
 The workshop was aimed at identifying the opportunities for closer cross border collaboration in transportation research and at exploring the policies and measures that should be in place in order to enable the creation of a truly international collaborative transportation research network.
- EEP2013 Conference «Enhancement of European International Cooperation and Eastern Partnership in R&D&I» (30 September -1 October 2013, Vilnius)**
 The Conference was focused on cooperation in R&D&I at the

international level with special emphasis on Eastern Partnership (Ukraine, Belarus, Moldova, Georgia, Armenia and Azerbaijan) in the context of European Research Area, Innovation Union, Europe 2020 and Eastern Partnership Roadmap. It brought together the main stakeholders, policy makers and broad research community interested in international dimension of R&D&I cooperation.

- 8th ILN Workshop «How to foster international cooperation: bridging the gap between research and innovation» (7-8 November 2013, Budapest)**

The Workshop was organized for the coordinators of ERANET, INCONET and BILAT projects in order to facilitate experience exchange, share views, foster mutual learning and develop synergies. Main attention was paid to the different dimensions of innovation and on the role of international cooperation to foster innovation.



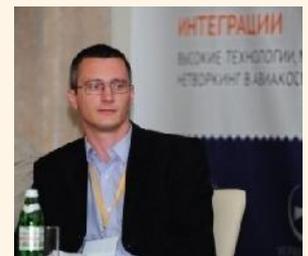
New Joint Project between KhAI and Tallinn University of Technology

Fruitful collaboration within the KhAI-ERA Research Topic C between KhAI and TUT resulted in the initiation and submission of a new joint project dedicated to the development of MSc and PhD training courses for curriculum on dependable, secure, and resilient computing and communication. SEREIN project has been selected by the European Commission for funding under the TEMPUS Programme for the period 2013-2016 and will start in December 2013.

KhAI and KhAI-ERA Promotion within Ukraine and EU

Aerospace Forum 2013, October 2013, Ukraine

Research Topic A Team member took part in the International Forum "Ukraine and the World: the Synergy of International Integration. High-tech, Marketing, Networking in Aerospace Industry" that was held in Kharkiv. Dr. Fedir Gagauz made the presentation on "Advanced structural solutions of joints for heavy-loaded aircraft composite structures" enabled to demonstrate widely KhAI's potential in composite structures design to the participants.



Joint Meeting at "Aviastar SP", October 2013, Russia

During the joint meeting of aeronautic engineers and researchers at the "Aviastar SP" premises (Ulyanovsk, Russia) the head of Research Topic B Prof. Yuriy Vorobyov presented the results of his team work in the area of new methods of aircraft assembly and hand-held impulse tool for assembly works development. Meeting participants have demonstrated great interest to the KhAI R&D results.



9th International Conference on Digital Technologies, May 2013, Slovakia

The DT2013 Conference took place in Žilina (Slovakia) on 29-31 May 2013. The event brought together researchers, developers, teachers from academy and industry working in all areas of digital technologies. Research Topic C Team Leader Prof. Vyacheslav Kharchenko took part in the Conference and presented information about the KhAI-ERA project and Research Topic C results.



KhAI-ERA Researchers at the Most Valuable European and Ukrainian Events

Lately, KhAI-ERA team has participated in numerous European and Ukrainian conferences and took advantages to disseminate project information and outcomes. Some of them are:

- International Theoretical and Practical Scientific Conference "Theoretical and experimental research in the technologies of modern materials science and engineering", Lutsk, Ukraine (3-7 June 2013)
- Conference "New Trends in Civil Aviation" NTCA2013, Zilina, Slovakia (21-22 June 2013)
- 21st International Conference on Nuclear Engineering, ICONE21, Chengdu, China (29 July – 2 August 2013)
- 8th International Conference on Dependability and Complex Systems, Poland (9-13 September 2013)
- XVI International Scientific and Technical Conference "Road Transport: Problems and Prospects" Sevastopol, Ukraine (16-21 September 2013)
- 5th International Workshop on Software Engineering for Resilient Systems, Kyiv, Ukraine (1-4 October 2013)
- Workshop on "Modern Technologies of aircraft structures assembly" to "Aviastar SP", Ulyanovsk, Russia, (22-24 October 2013)

Major EU events dedicated to H2020 KhAI plans to participate

HORIZON2020 Programme will be opened soon and the first calls for proposals will be announced. To support KhAI participation in EU-funded projects and learn more about the new programme, KhAI plans to visit targeted informative events in Europe relevant to the University's research priorities:

- **Horizon 2020 Space Information Day and COSMOS Brokerage Event**
11-12 December 2013, Brussels (Belgium)
<http://www.b2match.eu/h202ospacetour>
- **Information Days on the Research PPPs and EFFRA Brokerage Event**
16-17 December 2013, Brussels (Belgium)
http://ec.europa.eu/ndustrial_technologies/events-h2020.html
- **Information Day on Smart, Green and Integrated Transport and ETNA Plus Brokerage Event**
18 December 2013, Brussels (Belgium)
<http://ec.europa.eu/research/events/infoday2013.htm>

We will be happy to meet you there and set-up links for future successful collaboration!

We are happy to invite you to our website, where the project is presented in full details:

<http://khai-era.khai.edu>

KhAI-ERA Partners

-  National Aerospace University "KhAI"
www.khai.edu
-  Institute of Aerospace Engineering,
Brno University of Technology
www.lu.fme.vutbr.cz
-  Fraunhofer Institute for Factory Operation and Automation
www.iff.fraunhofer.de
-  Centre for Integrated Electronic Systems and Biomedical
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www.cebe.ttu.ee
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