

KhAI-ERA project

Publishable Summary for the 2nd Reporting Period (2013/06/01 – 2015/05/31)

Project acronym: KhAI-ERA

Project title: Integrating the National Aerospace University "KhAI" into ERA

Funding Scheme: Coordination and Support Action

Consortium:

- National Aerospace University "Kharkiv Aviation Institute" (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 Engineering, Tallinn University of Technology
www.cebe.ttu.ee
- Intelligentsia Consultants
www.intelligentsia-consultants.com



Summary description of project context and objectives

The overall aim of the KhAI-ERA project was to integrate the National Aerospace University (KhAI) into the European Research Area (ERA), by reinforcing its cooperation capacities and twinning with European research and innovation organisations in its three strongest aerospace and IT research topics, which are also highly relevant to the FP7 Transport, Space, ICT and Research for SMEs work programmes:

- A) Composite materials
- B) Advanced manufacturing for aircraft assembly
- C) Dependable embedded systems.

KhAI is the only university in Ukraine providing the full cycle of higher education in aerospace science and engineering. It has over 1146 researchers, 700 teachers and 12,000 students. KhAI is also a major research centre with a high potential for integration into ERA as demonstrated by its participation in many national and international projects.

The KhAI-ERA project was built upon KhAI's existing strengths as a high-quality research institution via knowledge exchange, setting up joint experiments, and training development with the following 4 excellent European research and innovation organizations: Institute of Aerospace Engineering, Brno University of Technology (IAE-BUT), Fraunhofer Institute for Factory Operation and Automation (Fraunhofer-IFF), Centre for Integrated Electronic Systems and Biomedical Engineering, Tallinn University of Technology (CEBE-TUT) and Intelligentsia Consultants (Intelligentsia).

Specific **project objectives** were:

- ✓ To develop KhAI's research partnerships
- ✓ To increase KhAI's scientific visibility
- ✓ To increase KhAI's human potential
- ✓ To develop medium to long term KhAI Research Strategy

As a result of the KhAI-ERA project implementation both KhAI involvement into ERA (incl. EU R&D Programmes participation) and regional socio-economic impacts were increased.

Work performed and the main results achieved so far

During the Period 2 of the KhAI-ERA project implementation the following results have been achieved:

WP2 – Twinning

In order to achieve a progress in KhAI research teams twinning with the EU partners within three Research Topics, Ukrainian and European researchers held 11 bilateral meetings (during 9 of them specific research-focused workshops were organized). Intensive knowledge exchange and setting up of joint experiments were also realized during the KhAI researchers long-term trainings in EU partners institutions (3 for young researchers + 2 for experienced researchers). As a result, KhAI-ERA partners jointly prepared 5 peer-reviewed research articles that are already published now or submitted to internationally-recognized scientific journals as well as 7 joint publications in the proceedings of international conferences and workshops.



**Workshop on Research Topic A
(Brno, November 2013)**



**Workshop on Research Topic B
(Magdeburg, May 2013)**



**Workshop on Research Topic C
(Tallinn, February 2014)**

In order to establish new links with European research community beyond the KhAI-ERA project and to promote KhAI capabilities in relevant research fields, the Research Topics teams actively participated in thematic European conferences and workshops. In total, during the Period 2 KhAI researchers took part in 13 valuable international conferences relevant to KhAI-ERA Research Topics.



**KhAI and IAE-BUT joint
presentation at NTCA 2013
(Žilina, June 2013)**



**KhAI-ERA Local Workshop
(Kharkiv, November 2013)**



**KhAI and CEBE-TUT joint
presentation at DES group WS
(Tallinn, November 2014)**

During the same period, to increase University international visibility, widen cooperation with European research community and be aware of recent changes and state-of-the-art in international cooperation policies, the KhAI administrative staff took part in 6 relevant events dedicated to facilitation of international collaboration. In the context of networking relevant to Horizon 2020, KhAI staff actively participated in national, international and EU-organized networking and brokerage events (in total, 5 such kind events were visited during Period 2).



EEP2013 Conference
(Vilnius, September 2013)



BEAWARE Workshop
(Bucharest, September 2014)



AIR DAYS 2014
(Lisbon, October 2014)

Due to these activities of KhAI research and management staff, during the 2014 and 2015 rounds of H2020 calls 9 proposals with KhAI participation were submitted for evaluation. 2 of these proposals were based on KhAI's project ideas, in 7 – KhAI has as a role of partner, in 2 – a role of Coordinator.

WP3 – Dissemination and Promotion

Activities under this WP were aimed on KhAI, as well as KhAI-ERA project, promotion in Europe and Ukraine. Results achieved for the Period 2 were:

- KhAI-ERA project website (<http://khai-era.khai.edu>) regularly maintained and all info updated in 3 languages (English, Ukrainian and Russian).
- Two issues of KhAI-ERA newsletter prepared and disseminated among EU and Ukrainian contacts of KhAI and its EU partners.



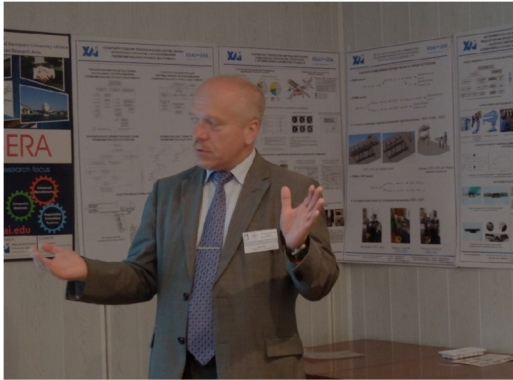
KhAI-ERA Newsletter – 3rd Issue
(November 2013)



KhAI-ERA Final Newsletter – 4th Issue
(May 2015)

- [Promo Brochure “Aerospace Research and Education at KhAI”](#) and [Promo Brochure “Ukrainian Aeronautics: Research and Technology Groups”](#) were actively disseminated among Ukrainian and European research community at different relevant events.

- Local Workshop “Advanced Manufacturing for Aircraft Assembly” dedicated to Research Topic B was held in Ukraine in November 2013.
- Special Session related to KhAI-ERA research Topic B* was held in the frame of XVIII International Congress of Propulsion Engineering (incl. presentation of project progress and results)



KhAI-ERA Special Session at International XVIII International Congress of Propulsion Engineering (September 2013)

- KhAI-ERA Final Workshop for Ukrainian scientists, researchers and engineers was held in Kyiv, Ukraine in May 2015.



KhAI-ERA Final Workshop (May 2015)

WP4 – Training Development

During the Period 2 each of the KhAI-ERA Research Topic teams prepared Training Modules Collections for master students, young and experienced researchers dedicate to composite materials, aircraft assembly processes and equipment, and dependable embedded systems. They are:

- Research Topic A (5 Training Modules)
 - Technological aspects of composite structures manufacturing and bonding repair
 - Advances in composite structures design and simulation (Volume 3)
- Research Topic B (3 Training Modules):
 - Single-impact Self-Pierce Riveting
 - Single-impact Mandrelling of Holes
 - Single-impact Installation of Lock Bolts

* Special Sessions for other KhAI-ERA Research Topics were held in the frame of internationally-recognized conferences during the Period 1

- Research Topic C (6 Training Modules):
 - Dependable embedded systems (Volume 2)

Also, one Training Modules Collection dedicated to H2020 issues was prepared for general Ukrainian research community. All Training Modules Collections are available at the project web-site <http://khai-era.khai.edu/en/site/training-modules.html>).



KhAI-ERA Training Module Collections prepared during the Period 2

WP5 – Strategy Development

Based on the KhAI Evaluation Report (prepared during Period 1) and taking into account EU experts recommendations, the University Research and Development Strategy for 2014-2020 period was developed under the leadership of the KhAI Vice-Rector on Science Prof. Olexandr Gaydachuk. Also, following the spirit of KhAI R&D Strategy, KhAI Research Topics Leaders prepared more specific Strategies of their Departments and Research Topic Teams taking into account current level of research and international activities, available personnel, facilities, etc.

Taking into account radical political, economic and social changes in Ukraine during 2014-2015 years, the University Administration recognizes the necessity to modify developed KhAI R&D Strategy according to the new Ukrainian R&D&I framework. However, as the new legislation is still under development and/or approval on governmental level, it has not been done during the project implementation. Strategy will be updated after project completion as far as new regulation come in force, thus long-term impact of KhAI-ERA project will be ensured.

Assessment of the KhAI-ERA project efficiency was performed by means of collection, processing and comparison of results achieved by Research Topic teams for 3-years period before the KhAI-ERA project start (2009-2011) and 3-years period of the KhAI-ERA project implementation (2012-2014). Analysis demonstrates positive influence of the KhAI-ERA project implementation on research potential of all members of Research Topic A, B and C teams, which is quantitatively equivalent to 12%, 56% and 37% respectively.

The expected final results and their potential impact and use

- **Contribution to RTD capacity building in Ukraine** due to KhAI successful twinning with European excellent R&D organizations, University human potential increasing and KhAI Research Strategy preparation for the next 5+ years.
- **Enhanced participation of the Ukrainian researchers in the 7th Framework Programme and HORIZON 2020** resulted from: KhAI active networking with EU research centres; promotion of KhAI and other Ukrainian organizations as potential partners for H2020 and raising Ukrainian researchers awareness on H2020, as a result of Ukrainian Transport NCP activities supported by the project.
- **Enhanced scope of the KhAI research activities with increased linkage with economic and social environment:** due to KhAI location in a specific aerospace cluster of Ukraine, the KhAI-ERA activities created positive socio-economic impact via increasing local community awareness in EU research activities and programs (through the specialized FP7/H2020 and thematic trainings), introducing KhAI and EU joint research results to local RTD companies (incl. SMEs), and cooperation with local authorities for widening cooperation with EU.
- **Networking with other research centres in Member States or Associated Countries,** provided by participation in key European conferences/workshops related to the project research areas and use of other significant European opportunities for networking and contacts establishing (e.g. EU InfoDays, EASN events, ETNA brokerage sessions, and others).
- **Increased job opportunities in the country for young scientists:** Young KhAI researchers were closely involved in scientific knowledge exchange and joint experiments setting up, and participated in the training development in collaboration with EU partners. University Strategy was also aimed on KhAI sustainability, which would involve determining ways to attract, train and retain young scientists.

Project public website

All information about the project objectives and results, recent news and advance announcements are available on the KhAI-ERA website: <http://khai-era.khai.edu>

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