



Rzeczpospolita  
Polska



NARODOWE CENTRUM NAUKI

artiQ

ARTIQ

## ARTIQ - AI Centres of Excellence

Application for a Host Institution

<b>Institution</b>	National Centre for Research and Development, National Science Centre
<b>Project Joint National Project:</b>	ARTIQ – AI Centres of Excellence
<b>Deadline for the submission of applications</b>	8th of April-11th of May 2021

### I. HOST INSTITUTION DATA

#### Identification data of the Host Institution

<b>Name (full)</b>	Research and Academic Computer Network - National Research Institute
<b>Name (short)</b>	NASK - PIB
<b>Name of the main organisational unit</b> (where applicable)	
<b>Address of the registered office</b>	
Street	Kolska
Building No.	12
Office No.	
Postal code	01-045
City/district	Warsaw/ Wola
Post office	Warsaw
Municipality	Warsaw
County	Warsaw

Province	Masovian
<b>Correspondence address (if different than the address of the registered office)</b>	
Street	Kolska
Building No.	12
Office No.	
Postal code	01-045
City/district	Warsaw
Post office	Warsaw
Municipality	Warsaw
County	Warsaw
Province	Masovian
EPUAP [Electronic Platform for Public Administration Services] mailbox	/NASK-Institut/SkrytkaESP
<b>Legal form</b>	<b>Research Institute</b>
<b>The person appointed for contact with NCBR and with the potential Leader/Project Manager</b>	
First name	<b>Paweł</b>
Last name	<b>Stępnia</b>
Position	<b>Artificial intelligence application specialist</b>
Phone number	+48539530845
E-mail address	<b>pawel.stepniak@nask.pl</b>
<b>The person authorised to represent the applicant</b>	
First name	<b>Wojciech</b>
Last name	<b>Pawlak</b>
Function/Position	<b>Acting General Director</b>

## II. CAPACITY OF THE HOST INSTITUTION TO PERFORM THE PROJECT

1. Description of major research achievements in the scope of implementation of R&D projects, as well as the commercialisation of deliverables of such projects regarding artificial intelligence for the last 5 years prior to or in the year of the application along with a list of the most important publications and patents of the applicant (max. 1 A4 page).

In 2014-2019, NASK carried out 32 research projects focused on practical applications (including 14 international ones), commercialized 22 new solutions and 11 services (in the field of ICT), obtained 7 licenses and filed 2 patent applications in the field of ICT. NASK PIB co-creates an IT product certification system compliant with the Common Criteria.

### **Achievements:**

BotSense 2.0; budget: PLN 950,000; Development of the functionality of the BotSense solution that detects in real time, including attempts to take over accounts and unauthorized financial transactions caused by the malware on the computers of bank customers using the e-banking service.

BotSense Mobile; budget: PLN 1,100,000; main effect of the project: development of a solution to protect against banking threats of mobile applications.

NASK's commercial products (ARAKIS GOV and ARAKIS ENTERPRISE) protect networks of state administration units, the critical infrastructure of Poland and banks ("Teraz Polska" 2010 award). BotSense and CTI protect 7 Polish banks and their 2 foreign branches.

Selected innovative products and implementations from the last 5 years: BioPKI (Biometric Techniques and PKI) in modern identity documents and protection of information systems (PW, NASK, PWr, Asseco), BioWIZ - development and creation of a system aimed at identifying people based on the image (PW, AGH, NASK and PPHS).

### **Publications:**

1. Mateusz Trokielewicz (NASK), Adam Czajka (USA), Piotr Maciejewicz, Post-mortem Iris Recognition with Deep-Learning-based Image Segmentation Image and Vision Computing, 2020, vol. 94, Article 103866, Online: 13/12/2019, published on: February 2020, DOI: 10.1016 / j.imavis.2019.103866
2. Inez Okulska (NASK), Much more than Google Translate, i.e. natural language computer processing (NLP) in translation and translation, "Porównania" 2020, 1 (26), pp. 283-297, DOI: 10.14746 / see 2020.1. 16
3. Mohammadreza Azimi, Seyed Ahmad Rasoulinejad, Andrzej Pacut (NASK), Age dependency of the diabetes effects on the iris recognition systems performance evaluation results Biomedical Engineering / Biomedizinische Technik, vol. 65, DOI: 10.1515 / bmt-2019-0246
4. Konrad Ciecierski (NASK), Mariusz Kamola (NASK), Comparison of text classification methods for government documents, Material accepted for the ICAISC 2020 Conference, International Conference on Artificial Intelligence and Soft
5. Konrad Ciecierski (NASK), Neural Spike Sorting Using Unsupervised Adversarial Learning, International Symposium on Foundations of Intelligent Systems (ISMIS 2020), Foundations of Intelligent Systems pp 192-202, series: Lecture Notes in Computer Science (LNCS, vol 12117), Ed.: Springer, Cham, ISBN: 978-3-030-59490-9, DOI: 10.1007/978-3-030-59491-6\_18
6. Inez Okulska, GAN and GPT-2 neural networks, worn words and creativity, namely literary second-hand, "Forum of Poetics", Fall 2019, No. 18, p. 28, DOI: 10.14746 / fp.2019.18.21436
7. Konrad Ciecierski (NASK), Methods of Automatic Artifact Removal in Neurobiological Signals, [in:] Advances in Intelligent Systems and Computing, vol. 743, edited by Szewczyk R., Zieliński C., Kaliczyńska M., Ed. Springer, Cham, pp. 72-81, AUTOMATION 2018 Conference, ISBN: 978-3-319-77178-6, DOI: 10.1007 / 978-3-319-77179-3\_7
8. Mateusz Trokielewicz (NASK), Mateusz Szadkowski (University of Life Sciences in Lublin), Iris and periocular recognition in arabian race horses using deep convolutional neural networks, IEEE Joint International Conference on Biometrics (IJCB 2017), DOI: 10.1109 / BTAS.2017.82727

2. A list of 5 research and development projects within national and international competitions in the area of artificial intelligence and implemented within the last 5 years prior to or in the year of the application (title, manager, source of financing, amount of financing) (max. 1 A4 page).

No.	Title	Manager	Source of financing	Grant value
1	A cybersecurity framework to GUArantee Reliability and trust for Digital service chains (GUARD)	PhD DSc PhD in Computer Science, Joanna Kołodziej	Horizon 2020	4 684 700,00 EUR
2	Remote mobile biometric authentication system using non-specialized mobile devices	Professor Andrzej Pacut	CyberSecIdent – Cyberbezpieczeństwo i e-Tożsamość NCBiR	7 126 788,00 PLN
3	Mobile Threat Defense (MTD) platform for continuous, automated and multidimensional assessment of the level of threat to the security of mobile devices	PhD Andrzej Sikora	The Intelligent Development Operational Programme	3 627 819,06 PLN
4	Platform for identifying and exchanging information about security threats and frauds based on monitoring and correlation of various Anti-Fraud IQ communication channels	Professor Andrzej Pacut	The Intelligent Development Operational Programme	3 526 546,81 PLN

3. Available research equipment, apparatus/infrastructure and intangible assets held in the context of implementation of a project regarding artificial intelligence (max. 1 A4 page).

NASK PIB has established a separate **Artificial Intelligence & Data Analysis (AIDA) Center**, which houses, among others, the Department of Artificial Intelligence Applications and Large Harvest Analysis.

This department employs: specialists for data analysis, specialists in the application of Artificial Intelligence as well as researchers and experts in the AI subject. This department organizes AI seminars with experts in a field. The latest ones are shared on YouTube. AIDA employees often appear as experts, advisors and mentors.

NASK PIB has the following equipment/infrastructure to conduct research in the field of Artificial Intelligence:

1. Servers with GPGUs:
  - a. nVidia DGX-1 server with 8 V100 cards (processing power 1 PFLOPS)
    - i. 2x Intel Xeon E5-2698 (80 cores total)
    - ii. 512GB RAM
    - iii. 7.2 TB SSD NVMe
  - b. DELL C4140 server with 4 V100 cards (computing power 0.5 PFLOPS)
    - i. 2x Intel Xeon Gold 6240R
    - ii. 384GB RAM
2. Juniper network infrastructure for 25Gb and 100Gb Ethernet computing
3. High-speed All-flash NVME disk resource for data storage > 100TB

There are plans to expand with new server resources equipped with nVidia A100/AMD Instinct MI100 cards.

4. Facilities or incentives to establish an AI Centre of Excellence in the entity (max. 1 A4 page).

The organizational structure, potential and experience of NASK-PIB are conducive to building the AI ecosystem that facilitates the creation and operation of the AI Center of Excellence.

NASK-PIB has specialized unit in its structure called The Artificial Intelligence & Data Analysis Centre (AIDA), which is one of our four management centres, focusing on coordinating, initiating and developing projects involving artificial intelligence applications, taking into account the needs of the administration, cybersecurity, education and the media. The goal of AIDA is to become a Central European centre of excellence specialising in Artificial Intelligence.

Developing AI together with the Centre for Research and Technology Transfer, Centre for Administrative and Educational Projects and the Centre for Cybersecurity and Infrastructure.

Implementation of the project „Telemetry - construction and implementation of the RPD panel” (TELRPD) for the National Broadcasting Council, which involves analysing large sets of data collected in real time from digital receivers (including cable TV decoders, IPTV decoders, OTT devices, SmartTV devices) capable of sending back data via the Internet.

- Providing the IT infrastructure necessary for big data analyses.
- Formation of a professional team of experts on data science and interactive media technologies.
- Conducting research on artificial intelligence and promoting the importance of artificial intelligence in society.
- Carrying our tasks assigned by the Ministry of Digital Affairs as part of the national artificial intelligence development plan.
- Networking activity – building a cross-border network of connections with other institutions specialising in AI.

#### **EDUCATIONAL ACTIVITIES CONCERNING AI**

Seminars: AIDA also offers a series of interdisciplinary seminars on artificial intelligence and data analysis.

Conferences: AIDA organised NASK's first international conference on artificial intelligence: „Artificial Intelligence Conference: Dimensions of AI – NASK, DIGITAL REALITY, POLAND”, which took place on 9 September 2019.

5. Other information concerning internationalisation of the entity, foreign scientists employed in this institution, availability of seminars in English, etc. (max. 1 A4 page).

In 2020, NASK-PIB continued cooperation with many institutions and organizations (over 80) as part of implemented projects, joint ventures or organized events for the promotion of science and cybersecurity. The cooperation included, among others 20 public administration bodies, 35 academic centers and institutes, including 15 foreign ones, 16 associations, chambers, foundations and other organizations, and many educational institutions and media. NASK employees are members of numerous committees, associations, councils, competition chapters, national and international organizations, editorial committees of scientific journals and program councils of national and international scientific and industry conferences.

Membership of NASK - PIB employees in PAN Committees, Scientific Councils and managerial functions in international organizations:

- ENISA: Deputy Chair of the ENISA Management Board, Member of the Executive Board, Member of the Management Board (Krzysztof Silicki),
- ENISA: Alternate Member, Management Board (Przemek Jaroszewski),
- ENISA: National Liason Officer (Magdalena Wrzosek).

International scientific and industry conferences organized/co-organized by NASK in 2020:

1. International Conference on Military Communications and Information Systems (ICMCIS) 12-13 May 2020 ICMCIS.
2. The 1st International Workshop on Secure Mobile Cloud Computing (IWSeMC-20), 11-14 May 2020, Melbourne, Australia.
3. SECURE 2020 Conference - The SECURE Conference is the largest event organized annually by NASK with the participation of international experts as speakers, 6-7 October 2020.

Foreign scientists employed at NASK-PIB:

Ilona Urbaniak, PhD (Canada, Poland) – experience:

- a) Head of the Department of Artificial Intelligence Applications and Big Data Analysis, Center for Artificial Intelligence Applications and Data Analysis, NASK, 01/2021 - now
- b) Assistant professor, Department of Computer Science, Faculty of Computer Science and Telecommunications, Cracow University of Technology, 10/2018 - now
- c) Expert of Artificial Intelligence Digital Education Tools, Digital Education Tools Team, OSE Ecosystem Department, NASK, 08.2019-12.2020
- d) Research Scientist, Image processing, Client Outlook Inc., Waterloo, ON, Canada, 09.2015-08.2017

In addition, NASK PIB, as part of seminars organized by AIDA, invited scientists from around the world: Dimitris Politis (PhD at University of California in San Diego), Patrice Bertail (PhD at Telecom Tech Paris) and Piotr S. Kokoszka (PhD at Colorado State University), professor Janusz Tanas (Australian Catholic University), professor Hernando Ombao (King Abdullah University).

6. Other significant information confirming the experience and resources of the institution (max. 1 A4 page).

NASK-PIB has project experience, so far has completed or is currently implementing a number of IT projects involving the implementation and maintenance of ICT systems for public entities, including:

**Completed projects:**

- Implementation of Cross-border node system,
- Implementation of the Digital Library of Scientific Publications project,
- mDokumenty in private sector (mDOK-PIL),
- Development of mDokumenty (mDOK-LEG) system,
- Development of a methodology for dynamic risk assessment (DSR),
- Analysis of selected Data Processing Centers (CPD) together with the teletransmission network based on the technological assessment model prepared by NASK-PIB, with particular emphasis on the aspects of security and business continuity (RKB),
- Development of Information Security Management System in the Ministry of Digitization in accordance with applicable laws and regulations in order to implement (SZBI),
- Actions aimed at increasing the competences of polish public administration staff in the area of cybersecurity (BIWMP),
- Development of the concept and executive design of the backbone network for the Narodowa Platforma Cyberbezpieczeństwa with the executive design for its implementation for three entities and guidelines (NPCnet);

**Projects implemented:**

- Development of the system to support the Government Legislative Process (eRPL 2.0),
- Popularization of electronic document management in polish public administration (EZD PUW),
- Acting as the OSE provider - Nationwide Educational Network (OSE) - currently an ongoing task,
- Acting as eIDAS node provider/operator (WT-BIW),
- Building, implementation and development of Platforma Innowacyjnej Administracji (PIA).

NASK-PIB has extensive experience in the implementation of co-financed projects, including those commissioned on the basis of a targeted subsidy:

- co-financed by the European Union (for example Connecting Europe Facility),
- co-financed by Narodowe Centrum Badań i Rozwoju funds.