

Report
about the scientific activity of the Department "Communication Technologies and Systems" for the 2nd half of 2022

1. Выполняемые Research projects performed

1) **Title of the topic:** «"Research of signals and features of their transmission in monitoring systems of construction objects and environmental monitoring".

Basis for implementation: initiative theme for 2023-2025

Scientific supervisor: N. B. Kaliaskarov

Direct results: a general structural diagram of the work of bridge structures and construction buildings is developed. *результаты:* PC computer modeling was performed in MATLAB/Simulink software environments and the nature of the behavior and changes in the speed of the generated signal was studied (in general, mathematical operations are based on an equation describing the data transfer rate over a wireless communication channel and, accordingly, all elements of the computer model comply with the requirements that are pre-declared when forming the final signal).

Uploaded results:

Scope of work performed on this topic:

a) Number of submitted articles – 2 (No. 2.2-1.2)

b) Number of published articles – 1 (No. 2.3-1)

c) Number of reports at conferences – 99 (Nos. 2.4 1,2,3,5,6,8,9,10,11,2,3,5,6,8,9,10,11)

2) **Name of the topic:** "Electrical engineering and electronics"

Basis for implementation: research plan of the department for 2022-2023 academic year

Scientific supervisor: N. B. Kaliaskarov

Direct results: смоделированы и собраны the following devices were modeled and assembled устройства: a device for automatic window control; an electronic key for learning Morse code; and a two-wire acoustic device.

Indirect results:

Scope of work performed on this topic:

a) Number of published articles – 1 (No. 2.3-1)

b) Number of utility model patents – 1 (No. 4.2 1)

c) Number of prepared utility model applications – 2 (No. 4.1-1.2)

d) Number of reports at conferences – 2 (Nos. 2.4-4.7)

3) **Name of the topic:** "Improving the technical level of structural parts of electromechanical equipment in order to ensure their reliability and service life"

Basis for implementation: research plan of the department for the 2022-2023 academic year

Scientific supervisor: N. B. Kaliaskarov

Direct results: analytical studies based on a system approach for the development of new designs and circuit solutions for the design of mine lifting machine braking devices based on an experimental setup were carried out.

Indirect results:

a) Number of published articles – 1 (No. 2.3-1)

b) Number of utility model patents – 1 (No. 4.2 1)

c) Number of prepared utility model applications – 1 (No. 4.1.3)

d) Number of reports at conferences – 3 (No. 2.4 14,15,16,15,16)

4) **Title of the topic:** "Use of energy-saving and high-tech technologies in energy supply systems"

Basis for implementation: research plan of the department for the 2022-2023 academic year

Scientific supervisor: Yessenzholov U. S.

Direct results: спроектирована device for automatic window control has been designed, which allows for temporary adjustment for a pre-programmed time for airing the room. The device is based on the Ducunew I2ecoder.

Indirect results:

Scope of work performed on this topic:

a) Number of prepared utility model applications – 1 (No. 4.1 1)

b) Number of reports at conferences – 3 (Nos. 2.4 4,12,13)

2. Publication of research results

2.1 Books (monographs) (none)

2.2 Submitted articles for publication in journals

N o n/	a Full name of the author (s)*	Article title	Country, journal title	Scientometric indicators of the journal
1.	Kaliaskarov N. B.; Сағындық Sagyndyk A. B. (Toraigyrov University); Serik A. S. (RET 18-1); Esenzholov U. S.; Gavrilova M. A.	Computerlik modeldeu komegimen signaldy zhiberudin sandyk zhuyesin zho balau	Kazakhstan, Bulletin of Toraigyrov University	KOKSON
2.	ON Kaliaskarov N. B.; Sagyndyk A. B. (Toraigyrov University); Bulatbaev F. N. (ES); Bulatbayeva Yu. F. (APP); Esenzholov U. S..	Development of a structural and functional scheme of a distributed wi-fi monitoring system for bridge structures and construction buildings	Kazakhstan, "Proceedings of the University"	KOKSON

Total articles prepared, total – 2, of which: in rating journals- 2

Д/З – -

CIS – -

RC- 2, including TUTY– 1 Kar

By students / with students – - /1

Undergraduates / with undergraduates – -/-

Doctoral students / with doctoral students - -/-

2.33 Published articles in journals

№	Full name of the author (s)	Article title	Country journal title, issue year	Scientometric indicators of the journal
1.	Neshina E. G. (ES) Мехтиев A.D. Mehdiyev (S. Seifullin KATU)) Kaliaskarov N. B. Alkina A.D. (ITB) Yugay V. V. (APP)	Геотехникалық жағдайды мониторингтеудің талшықты-оптикалық жүйесін құру негіздері	Казахстан, Труды университета»	KOKCON

Итого: опубликовано статей, всего – 1

из них: в рейтинговых журналах – 1

КарТУ – 1

ПК – 1

СНГ – -

Д/З – -

Студентами / with -/-

undergraduate students / undergraduates – no /no

2.44 Published reports (abstracts) at conferences

№	Full name of the author (s)	Article title	Country, status and title of the conference, date and venue
1.	Gavrilova M. A.	System of accounting and control of equipment operability on the example of a city local network	Kazakhstan, International Scientific and Practical Conference " Integration of science, education and production-the basis for implementing the National Plan "(Sagin Readings No. 14), June 16-17, 2022
2.	Gavrilova M. A.A. Kabiden A. (RET 18-2)	Private virtual networks based on IP/MPLS technology.	Kazakhstan, International Scientific and Practical Conference " Integration of Science, Education and production-the basis for implementing the National Plan "(Sagin Readings No. 14), June 16-17, 2022
3.	Kaliaskarov N. B. Еркебұланқызы Yerkebulankyzy N. (RET 18-1)	MATLAB / SIMULINK bagdarlamalyk ortasynda tasymaldaushy terbelictst i kalpyna keltiru ju yesiniyesin modeldeu	Kazakhstan, International Scientific and Practical Conference " Integration of Science, Education and production-the basis for implementing the National Plan "(Sagin Readings No. 14), June 16-17, 2022
4.	Kaliaskarov N. B. Zhamelov Zh. Zhamelov Zh. (RET 19sk)	Microcontrollerden baskarylatyn FM radio kabyldagyshurylygysyn zho balau	Kazakhstan, International Scientific and Practical Conference " Integration of Science, Education and production-the basis for implementing the National Plan "(Sagin Readings No. 14), June 16-17, 2022
5.	Kaliaskarov N.	Компьютерлік модельдеу	Казахстан, Международная научно-практическая

	V. Musa A. S. (RET 18-1)	қеменгімен арналарды жиілікпен бөлетін сигналды жіберудің аналогтық жүйесін әзірлеу	конференция «Интеграция науки, образования и производства – основа реализации Плана нации» (Сагиновские чтения № 14), 16-17 июня 2022 г.
6.	Калиаскаров Н.Б. Сағындық Ә.Б. (Торайғыров Университет)	CISCO PACKET TRACER ortasynda statikalyk bagdarlaudy rettep zhelini modeldeu	Kazakhstan, International Scientific and Practical Conference " Integration of science, education and production-the basis for implementing the National Plan "(Sagin Readings No. 14), June 16-17, 2022
7.	Kaliaskarov N. B. Kuikishova A. O. (RET 19sk)	Цифрлық ақпаратты жіберу жүйесінің байланыс арнасындағы сигналға аддитивті Ақ Гаусс шуының әсерін зерттеу	Казахстан, Международная научно-практическая конференция «Интеграция науки, образования и производства – основа реализации Плана нации» (Сагиновские чтения № 14), 16-17 июня 2022 г.
8.	Kaliaskarov N. B. Latypov S. I. (SKU im. Kozybaeva) Kashevkin A. A. (SKU im. Kozybaeva)	CISCO PACKET TRACER ortasynda zhelini modeldeu kezynde routerdyn negizgi parameterlerin configurationalau	Kazakhstan, International Scientific and Practical Conference " Integration of Science, Education and production-the basis for implementing the National Plan "(Sagin Readings No. 14), June 16-17, 2022
9.	Kaliaskarov N. B. Petrov P. A. (SKU im. Kozybaeva)	CISCO PACKET TRACER ortasynda dinamikalyk bagdarlaudy rettep zhelini modeldeu	Kazakhstan, International Scientific and Practical Conference " Integration of science, education and production-the basis for the implementation of the National Plan "(Sagin Readings No. 14), June 16-17, 2022
10.	Omirkhan D. B. (RET 18-1)	TACACS + authentication proto - logynagizdelgen zhelini modeldeu zhne	konfiguratsiyalau Kazakhstan, International Scientific and Practical Conference " Integration of science, education and production-the basis for the implementation of the National Plan "(Sagin Readings No. 14), June 16-17, 2022
11.	Serik A. S. (RET 18-1)	MATLAB / SIMULINK бағдарламасында компьютерлік модельдеу арқылы сигналды жіберудің сандық жүйесін жобалау	Казахстан, Международная научно-практическая конференция «Интеграция науки, образования и производства – основа реализации Плана нации» (Сагиновские чтения № 14), 16-17 июня 2022 г.
12.	Taghiev R. (RET 18-1)	Virtualdy zheke zheli	Kazakhstan, International scientific and practical Conference " Integration of science, education and production-the basis for the implementation of the National Plan "(Sagin Readings No. 14), June 16-17, 2022
13.	. Shaikenov E. D. (RET 18-1)	Corporate Active Directory functionsyn configurationalau	Kazakhstan, International Scientific and Practical Conference " Integration of science, education and production-the basis for implementing the National Plan "(Sagin Readings No. 14), June 16-17, 2022
14.	Shomen T. K. (Ret 18-1)	Виртуалды машиналарға негізделген корпоративтік желі аясында DHCP серверінің жұмыс принципі	Казахстан, Международная научно-практическая конференция «Интеграция науки, образования и производства – основа реализации Плана нации» (Сагиновские чтения № 14), 16-17 июня 2022 г.
15.	Yakovlev E. A. Zholmagambetov N. R. (RAIoT) Zinoviev L. A. (KarU im. Buketova) Arkabaev U. B. (RAIoT) Galimyanov I. R. (RET 19-2)	Modeling of plasmochemical reactions at low-voltage partial discharge	Kazakhstan, International Scientific and Practical Conference " Integration of Science, Education and production-the basis for implementing the National Plan "(Sagin Readings No. 14), June 16-17, 2022
16.	Yakovlev E.; Kaliaskarov N., Zholmagambetov N. (RAIoT), Zinoviev L.(KarU), Arkabaev Yu.. (RAIoT), Galimyanov I. (RET 19-2)	Partial discharge emission characteristics in the UV range	Proceedings of the 8th International Congress on Energy Fluxes and Radiation Effects (EFRE-2022) / Tomsk, Russia

Total: published reports, total - 16
of them: on international- 1
Map- 15
Kazakhstan- 15
CIS- 1-5
D/W- -
Students / with /8
undergraduate students / undergraduates -16 no/no

3. Participation in exhibitions - no

4. Inventive activity

4.1 Filing of patent applications

No n/	a Full name of the author(s)*	Name of the invention	Applicant	Registration number
1.	Belik G. A. Galimyanov I. R. (RET 19-2) Kaliaskarov N. B. Aldoshina O. V.	Pribor dlya avtomaticheskogo upravleniya oknom	Belik G. A.	№ 2022/0847.2 04.10.2022
2.	Galimyanov I. R. (RET 19-2) Kaliaskarov N. B. Salimzhanov R. A. (Military Department) Belik G. A.	Telegraph key for studying the Morse codee	Belik G. A.	No. 2022/0848. 2 04.10.2022
3.	Galimyanov I. R. (RET 19-2) Kaliaskarov N. B. Belik G. A. Sarsenbaev E. A. Esenzholov U. S.	Hidden communication device	Belik G. A.	No. 2022/0849. 2 04.10.2022

4.2 Obtaining patents

No n/	a Full name of the author (s)*	Title of the invention	Patent	holder Patent number
1	Yakovlev E. A. Esenzholov U. S. Kaliaskarov N. B.	Wireless acoustic device	Yakovlev E. A.	Utility model patent No. 7300 dated 22.07.2022

4.3 Obtaining certificates of state registration of rights to copyright objects – no.

5. Academic degrees, titles, election to the Academy of Sciences and there are no awards received by the faculty and staff of the department - *нет*

6. Participation in R & D funding competitions - *no*

7. Results of scientific work under cooperation agreements not with organizations in Kazakhstan - *нет*

8. Results of scientific work within the Corporate University

Together with KazakhtelecomJSC: we developed a joint work plan for the new academic year, appointed responsible persons from the TSS department and Kazakhtelecom JSC for writing articles and preparing patent applications, conducted preparatory work for the future industrial practice of full-time students.

Work carried out jointly with the employees of Kazakhtelecom JSC:

- together with Altan Alikhan Maratuly, a leading engineer of the Karaganda DESD VOLS Association "Network Division" of the branch of KazakhtelecomJSC, and a student of the RET 19-2 group Galimyanov I. R., an abstract was written and sent on the topic "Induction heater for optical fiber", for participation in the International scientific and Practical Conference "Formation of intellectual capital in Kazakhstan". in the context of digital transformation: experience, challenges, prospects";

- together with Gulnar Yerezhepovna Korfeldisova (leading HR specialist of the Central RDT of KazakhtelecomJSC), work is being carried out on the initiative topic of the department "Development of a wireless monitoring system for ecology and construction facilities", the result of which will be an article of the same name for placement in journals included in the COXON database.

We have agreed on the list of proposed topics for publishing ICUs and patents:

- 1) Copyright Notice: "Results of a study on wireless measurement of the state of the environment"
- 2) Copyright Notice: "Results of monitoring the technical condition of research laboratories"
- 3) Utility model patent: "Laboratory security alarm system"
- 4) Utility model patent: "Automatic temperature controller"
- 5) Utility model patent: "Electronic distance measuring device"

We have developed an up-to-date list of topics for theses based on the results of guided tours at the Energy and Climate Engineering Center, as well as at the Local Network Maintenance Center for graduate students:

1. Development of software for capturing network traffic;
2. Development of a security system with a GSM communication channel;
3. Development of a distributed telecommunications infrastructure with clustering via WAN;
4. Scheme of organization of village communication based on dense wave multiplexing (DWDM) technology;
5. Development of a two-stage encoding device;
6. Performance analysis of TCP and SCTP protocols under congestion conditions;
7. Organization of a broadband access network based on GPON technology. Uralsk.

We conducted field practical classes, seminars on the basis of the branch of the TSS department, participated in training sessions, raised the issue of employment of young specialists, sent out invitations to the graduate fair.

9. Results of scientific work on projects and contracts about international cooperation-*no*

10. Scientific work with students and undergraduates

4 student circles are organized:

1) Problems of improving transport and communication systems

Supervisor: и. о. Acting Head of the TSS Department, PhD N. PhD B. Kaliaskarov H.Б.

Characteristics of the Research and Development Center: work is underway to develop laboratory and practical works on improving transport and communication systems, as well as to develop reference materials. Training is provided for conducting literature analysis on transport and communication systems.

2) Introduction of high-tech technologies in telecommunications systems, energy and energy saving

Supervisor: art. pRep. Yessenzholov U. S.

NIRS characteristics: A virtual model of a DHCP server in a corporate network based on virtual machines is built; work is underway on calculated data to improve the server's operation principle. The interim results of the research were published as abstracts at the International Scientific and Practical Conference "Integration of Science, Education and Production-the basis for implementing the National Plan" (Sagin Readings No. 14).

3) Improvement of communication technology and systems

Supervisor: art. pRep. department. SHH Gavrilova M. A.

Характеристика НИРС: R & D characteristics: anexperimental network model with dynamic routing distribution of a new generation is being developed, and the intermediate results of R & D are published as abstracts at the International Scientific and Practical Conference "Integration of Science, Education and Production-the basis for implementing the National Plan" (Sagin Readings No. 14).

4) UN7PWA Collective Station

Supervisor: Acting Head of the TSS Department, PhD N. PhD B. Kaliaskarov H.Б.

NIRS characteristics: Work is underway to adjust the radio channel to the frequencies of the collective station of the UN7PWA department and radioequipment. Materials are prepared for research projects with students. материалы для научных проектов со студентами.

11. Implementation of the Comprehensive University Development Program for 202.22 year based on the results of scientific activity for 202.22 year

Indicator of the Integrated University Development Program	ind	ica	tor	for	Ac	tua	I	sta	nta	ge	of	co
---	-----	-----	-----	-----	----	-----	---	-----	-----	----	----	----

for 2022 for 202.2 year				
Ensure financing of non-contractual R & D in the amount of at least		KZT 6 million tenge	0	0%
Ensure implementation of 1 projects financed by M & E and business partners		1	0	0%
Ensure participation of teaching staff in funded R	& D Teaching staff, at least	7	9	128.6 %
	of doctoral students, at least	-	-	-
	undergraduates, at least	-	-	-
Ensure participation of 1 teaching staff in international scientific and educational conferences, such as NAFSA, EAIE and others, in the amount of at least		1	0	0%
Ensure preparation of articles for publication in scientific journals included in	the Clarivate Analytics databases, at least	2	2	100%
	Scopus, not less	than 2	2	100%
	COXON, not less	than 3	6	200%
Ensure publication of monographs, not less		than 1	1	100%
Ensure that the number of citations of published articles in the Clarivate Analytics, database is at least		2	0	0%
Ensure the filing of patent applications, not less		than 2	5	250 %
Ensure the registration of rights to copyright objects (obtaining certificates), not less		than 4	4	100%
Ensure participation in competitions for grants for R & D (submit applications), not less		than 1	1	100 %
Ensure participation of students in R & D, not less		than 35	41	117.14
Ensure participation of young scientists (under 35 years of age) in R & D, not less		than 1	2	200%
Ensure that third-party organizations are invited to complete a scientific internship in the University Map, not less		than -	-	-

The item "Provide financing of non-contractual R & D in the amount of at least 6 million tenge" is not fulfilled due to the fact that the contract of MTU QUARTZ LLP was not concluded due to the lack of budget funds for this enterprise to finance non-contractual works.

The item "Ensure the implementation of 1 projects financed by M & E and business partners, at least 1" was not completed, due to the lack of the necessary topics at the department to attract M & E for co-financing.

The item "Ensure the number of citations of published articles in the Clarivate Analytics MB, at least 2" was not fulfilled, due to the lack of articles in the Web of Science database under the authorship of the Faculty of the department.

The item "Ensure the participation of 1 faculty member in international scientific and educational conferences, such as NAFSA, EAIE and others, in the amount of at least 1" was not fulfilled, due to the lack of topics suitable for participation in the above-listed conferences for the faculty of the department.

12. Analysis of the work of Research groups

The working group of the TSS department on the implementation of the initiative topic "Research of signals and features of their transmission in monitoring systems of construction objects and environmental monitoring" for 2023-2025 years includes 32 people, including: 7 people from among the teaching staff, 25 people from among students. In this area for the second half of 2022, the following work was carried out:

- In the course of the work, laboratory studies and literature, article and patent reviews were carried out, components for creating a test sample were prepared.

- Была опубликована статья под авторством: Нешиной Е. Г. (ЭС), Мехтиева А.Д. (КАТУ им. С.Сейфуллина), Калиаскарова Н.Б., Алькиной А.Д. (ИТБ), Югай В.В. (АПП); «Геотехникалық жағдайды мониторингтеудің талшықты-оптикалық жүйесін құру негіздері» «Труды университета» НАО «Карагандинский технический университет имени Абылкаса Сагинова»;

- Based on the research results, two articles were sent:

1) «Компьютерлік модельдеу көмегімен сигналды жіберудің сандық жүйесін жобалау» - Калиаскаров Н.Б., Сағындық Ә. Б. (Торайғыров Университет), Серік А.С. (РЭТ 18-1), Есенжолов У.С., Гаврилова М.А. (Вестник Торайғыров Университета - входит в перечень КОКСНВО (0,131));

2) "Development of a structural and functional scheme of a distributed wi-fi monitoring system for bridge structures and construction buildings " - Kaliaskarov N. B., Sagyndyk A. B. (Toraigyrov University), Bulatbaev F. N. (ES), Bulatbayeva Yu. F. (APP), Esenzholov U. S. (Proceedings of the University of NAO Karaganda Technical University named after Abylkas Saginov-included in the list of COKS NVO (0,059));

- Based on the results of scientific activities, participation in the International Scientific and Practical Conference "Integration of Science, education and production-the basis for implementing the National Plan" (Sagin Readings No. 14) was held.

Было опубликовано 9 abstracts were published.

13. Other scientific information

Acting Head of the TSU Department N. B. Kaliaskarov is a member of the commission for the competition of scientific projects for the grant of the Rector of Karaganda Technical University for young scientists.

N. B. Kaliaskarov applied for participation in the project State Scientific Scholarship for Talented Young Scientists (results not announced).

И. Acting Head of the TSS Department _____ Kaliaskarov N. B.

Зав. кафедрой _____ Гаврилова М. А.