Brief information about the project

Title	AP25794929 «Visualizing PT service quality scenarios based on spatial GIS statistics using the example of Almaty in the context of SDG»
Relevance	The problem of climate change is one of the most pressing global problems of our time. One of the key aspects of the fight against climate change is the reduction of emissions (carbon footprint) from vehicles within the urban fabric. Public transport plays an important role in reducing the number of personal vehicles, and brings to citizens an understanding of the mechanisms that affect the state of the urban environment, which is critical for the development of effective strategies to reduce the impact within the environmental situation of the city of Almaty.
Goal	The main goal of the project is to visualize elements of the public transport system of the city of Almaty and adjacent territories using spatial models (e.g. GTFS) based on statistical data.
Tasks	1. Adapt spatial models to the study area with subsequent verification using field measurement data and introducing a number of statistical parameters to systematize the process of analyzing quality indicators. Adaptation of spatial models will allow taking into account the specific features taking into account the conditions of the study area, as well as ensure the reliability and accuracy of the visualization results. 2. Analyze the input parameters of network units with the inclusion of cartographic materials and remote sensing data (RSD) of the study area. This analysis will provide the necessary information for the high-quality functioning of spatial models with the subsequent determination of parameters that can affect the quality of services provided in the field of public transport. 3. Develop cartographic material that will contain quantitative indicators and qualitative indicators that will allow an assessment and will allow determining the prospects for subsequent step-by-step changes in order to improve the level of service.
Expected and Achieved Results	1) *publication of articles in foreign peer-reviewed scientific journals* The expected results will include at least two publications in peer-reviewed international scientific journals ranked Q1-Q3 in the Web of Science database or with a CiteScore percentile in Scopus of at least 50. Each article will contain information about this grant as a source of funding. 2) *publication of monographs, books and (or) chapters in books of foreign and (or) Kazakh publishing houses* Not planned

	3) *obtaining patents in foreign patent offices (European, American, Japanese), in the Kazakhstan or Eurasian patent office* Not planned 4) *development of scientific, technical and design documentation* Not planned 5) *dissemination of work results among potential users, the scientific community and the general public* The results of this project will be disseminated among potential users, the scientific community and the general public. Throughout the duration of the project, university-level workshops will be organized to disseminate the main results with a series of events aimed at studying spatial modeling systems for undergraduate, graduate and doctoral students of Al-Farabi KazNU. In addition, the project results will be published in international journals and presented at international conferences. 6) *other measurable results in accordance with the requirements of the tender documentation and the specifics of the project* 1) *the scope and target consumers of each of the expected results* The target consumers of the obtained results may be researchers, decision-makers, city leaders (representatives of the local executive body) and residents of Almaty. 2) *the impact of expected results on the development of the main scientific direction and related areas of science and technology* The results obtained from this project contribute to the core scientific field of transport planning by improving our understanding of the dynamics of public transport development taking into account the specific terrain of Almaty. 3) *applicability and/or possibility of commercialization of the obtained scientific results* The project's results have the potential to be used in developing advanced public transport modelling, contributing to sustainable urban development and environmental conservation efforts. 4) *social, economic, environmental, scientific, technical, multiplier and (or) other effect of the project results with justification* The project will bring various benefits, including improved transport infrastructure and general welfare, as well as reduced travel time costs due to improved network performance. From an environmental perspective, the project aims to study the impact of pollution on the urban environment. From a scientific perspective, the use of the transport model expands our understanding of the structure of public transport service management processes, spreading

	the positive effect to related sectors of economic activity in Almaty. *5) other direct and indirect results of the project with an indication of their qualitative and quantitative characteristics* The result of the project is fundamental research in the field of transport planning and the results obtained will be published in journals with a high impact factor.
Names and Surnames of Research Group Members with Their Identifiers (Scopus Author ID, Researcher ID, ORCID, if available) and Links to Corresponding Profiles	Project supervisor: Kosherbay Kuanysh Zhomartuly, PhD (ORCID: 0000-0001-6631-8124, Scopus Author ID: 58043708600, Researcher ID: AEG-5439-2022) Scientific supervisor: Mussagaliyeva Aizhan Niazbekovna, PhD (ORCID: 0000-0001-6631-8124, Scopus Author ID: 58043708600, Researcher ID: AAG-9050-2019)
Publications list with links to them	Aliyeva Z., Assipova Z., Bazarbekova M., **Mussagaliyeva A.,** Sansyzbayeva A. - Urban area planning and environment in Kazakhstan's cities: Case of Almaty. International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM, 19 (5.2), pp. 775 – 782 (2019), https://doi.org/10.5593/sgem2019/5.2/S20.097 Sansyzbayeva A., Saipov A., Dunets A., **Mussagaliyeva A.,** Ramazan A. - Geography of natural and recreational facilities in the development of economic integration of the border areas of northern Kazakhstan and the Russian Federation. Geojournal of Tourism and Geosites (2021), 35 (2), pp. 499-506, https://doi.org/10.30892/gtg.35230-677 **Kosherbay K., Mussagaliyeva A.,** Nyussupova G. & Strobl J.: Analysis of the state of public transport in Almaty - GeoJournal of Tourism and Geosites, ISSN 2065-1198, E-ISSN 2065-0817, Year XV, vol. 45, no. 4spl, 2022, p. 1534-1542, https://doi.org/10.30892/gtg.454spl01-972 Ozgeldinova Z., Bektemirova A., Mukayev Z., Zhanguzhina A., **Mussagaliyeva A.** - Assessment of recreational load on forest landscapes of the Kostanay region in the Republic of Kazakhstan. Geojournal of Tourism and Geosites (2023), 47 (2), pp. 632-638, https://doi.org/10.30892/gtg.47231-1063 М.А. Аскарова, Ал.А. Медеу, Айг. Медеу, **Мусагалиева А.Н.** - Адаптивная модель влияния изменения климата на природно-хозяйственные системы Казахстана, Вестник КазНУ, Серия Географическая, Том 60 № 1 (2021), стр.52-60. https://doi.org/10.26577/JGEM.2021.v60.i1.05 **Кушербай К.Ж., Мусагалиева А.Н.** - Технический потенциал солнечной фотоэлектрической системы на крышах зданий в городе Алматы на базе ГИС. КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ

	УНИВЕРСИТЕТ имени АЛЬ-ФАРАБИ, ISSN 1563-0234, eISSN 2663-0397, Вестник. Серия географическая. №1 (64) 2022, стр. 61-73, https://doi.org/10.26577/JGEM.2022.v64.i1.06 **Kosherbay K., Mussagaliyeva A.** & Strobl J.: Analysis of green zones and heat islands of Almaty city based on satellite images - КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ УНИВЕРСИТЕТ имени АЛЬ-ФАРАБИ, ISSN 1563-0234, eISSN 2663-0397, Вестник. Серия географическая. №4 (67) 2022, стр. 80-93, https://doi.org/10.26577/JGEM.2022.v67.i4.07 **Кушербай К.Ж., Мусагалиева А.Н.** - Географический анализ охвата объектами образования города Алматы на примере Алмалинского района на базе ГИС, Вестник Карагандинского университета, Серия Биология. Медицина. География, №3 (111)/2023, стр. 224-240, https://doi.org/10.31489/2023BMG3/224-240 **Mussagaliyeva A.**, L.B. Kenespayeva, T.K. Rafikov - Analysis of the transport infrastructure of Almaty city using GIS-technologies. Вестник КазНУ. Серия Географическая. 2023; 70(3): стр. 34–44, https://doi.org/10.26577/JGEM.2022.v67.i4.07 M.A. Zhunussova, Z.M. Assipova, N.A. Kurbankozha, **Mussagaliyeva A., K.Z. Kosherbay** - Assessment of technogenic impact on the environment of the Karaganda region, Вестник КазНУ. Серия Географическая. 2024; 72(1): стр. 119-130, https://doi.org/10.26577/JGEM.2024.v72.i1.09 Г.О. Беркинбаева, Ж.Б. Чилдибаев, У.А. Токбергенова, Е.С. Сарыбаев, Б.М. Біләлов, **Мусагалиева А.Н.** - Іле-Алатау ұлттық паркінің географиялық ерекшеліктері негізінде студенттердің кәсіби құзыреттілігін қалыптастыру. Вестник КазНУ. Серия Географическая. 2024; 73(3): стр. 146-157, https://doi.org/10.26577/JGEM.2024.v73.i2-011
Patent information	Absent