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REMOTE SENSING AND LAND MONITORING AS A TOOL FOR ECONOMIC PLANNING, DIGITAL TRANSFORMATION AND SUSTAINABLE DEVELOPMENT OF TERRITORIAL COMMUNITIES

Abstract. *The article examines the theoretical, methodological, and applied aspects of using remote sensing (RS) and geospatial monitoring systems in the context of digital transformation and sustainable development of territorial communities. The role of geoinformation approaches in creating an integrated information and analytical environment for supporting management decisions at local and regional levels is substantiated.*

The study analyzes satellite observation technologies, geographic information systems (GIS), digital geoplatforms, unmanned aerial vehicles, and spatial data analysis methods. It is shown that remote sensing provides timely, objective, and spatially referenced information on natural resources, land use, infrastructure, ecosystems, and economic activity, improving the monitoring of territorial processes.

Particular attention is paid to integrating geospatial data into economic planning, land management, urban development, environmental monitoring, and assessment of territorial potential. GIS technologies are identified as effective tools for modeling development scenarios, assessing risks, detecting territorial disparities, and optimizing infrastructure management.

The research proves that combining remote sensing with digital data platforms supports the implementation of «data-driven governance», where decisions rely on analytical data, spatial modeling, and forecasting. Integration of remote monitoring into local government activities enhances transparency, resource efficiency, investment attractiveness, and sustainable development management.

The prospects for developing digital communities, geoanalytical centers, and unified spatial information environments integrated with e-governance systems are highlighted. The findings confirm that geospatial technologies are becoming a key component of the digital economy and an important tool for strengthening the resilience of territorial communities to environmental, economic, and social challenges.

Keywords: *remote sensing of the Earth, geographic information systems, digital transformation, economic planning, territorial communities, sustainable development, satellite monitoring, digital governance.*

ДИСТАНЦІЙНЕ ЗОНДУВАННЯ ТА МОНІТОРИНГ ЗЕМЛІ ЯК ІНСТРУМЕНТ ЕКОНОМІЧНОГО ПЛАНУВАННЯ, ЦИФРОВОЇ ТРАНСФОРМАЦІЇ ТА СТАЛОГО РОЗВИТКУ ТЕРИТОРІАЛЬНИХ ГРОМАД

Анотація. *У статті комплексно досліджено теоретико-методологічні та прикладні аспекти використання дистанційного зондування Землі (ДЗЗ) і систем геопросторового моніторингу в умовах цифрової трансформації публічного управління та переходу до моделі сталого розвитку територіальних громад. Обґрунтовано наукове значення геоінформаційного підходу як інструменту формування інтегрованого інформаційно-аналітичного середовища для підтримки управлінських рішень на локальному та регіональному рівнях.*

Проаналізовано сучасні технології супутникового спостереження, геоінформаційні системи (ГІС), цифрові геоплатформи, безпілотні літальні апарати, а також методи просторового аналізу й обробки великих масивів геоданих у контексті соціально-економічного прогнозування та стратегічного планування розвитку територій. Визначено, що застосування даних ДЗЗ забезпечує оперативне отримання об'єктивної, просторово прив'язаної та багатоспектральної інформації про стан природних ресурсів, земельного фонду, інфраструктури, екосистем і господарської діяльності, що суттєво підвищує якість моніторингу територіальних процесів.

Особливу увагу приділено науковим підходам до інтеграції геопросторових даних у системи економічного планування, управління земельними ресурсами, містобудування, екологічного контролю та оцінювання ефективності використання територіального потенціалу громад. Розкрито можливості застосування ГІС-технологій для моделювання сценаріїв просторового розвитку, оцінки ризиків, виявлення диспропорцій у територіальному розвитку та оптимізації управління інфраструктурними об'єктами.

Доведено, що поєднання інструментів ДЗЗ із цифровими платформами управління даними створює передумови для впровадження концепції «data-driven governance», у межах якої управлінські рішення базуються на оперативних аналітичних даних, результатах просторового моделювання та прогнозних оцінках. Встановлено, що інтеграція систем дистанційного моніторингу у діяльність органів місцевого самоврядування сприяє підвищенню прозорості та обґрунтованості управлінських рішень, ефективності використання бюджетних ресурсів, інвестиційної привабливості територій і результативності реалізації стратегій сталого розвитку.

Обґрунтовано перспективність використання технологій ДЗЗ у контексті розвитку цифрових громад, формування геоаналітичних центрів управління територіями та створення єдиного просторового інформаційного середовища, інтегрованого з національними системами електронного врядування й моніторингу. Отримані результати підтверджують, що геопросторові технології стають важливим елементом сучасної цифрової економіки та інструментом підвищення адаптивності територіальних громад до екологічних, економічних і соціальних викликів.

Ключові слова: *дистанційне зондування Землі, геоінформаційні системи, цифрова трансформація, економічне планування, територіальні громади, сталий розвиток, супутниковий моніторинг, цифрове управління.*

Formulation of the problem. Modern processes of decentralization, digital transformation of public administration and implementation of the concept of sustainable development actualize the need for the implementation of innovative tools for monitoring and analyzing territorial processes. Territorial communities operate in conditions of growing environmental, economic and social challenges, which requires prompt receipt of reliable information about the state of land resources, infrastructure, natural ecosystems and economic activity. Traditional methods of data collection and processing often do not provide the necessary efficiency, spatial detail and complexity of information for making informed management decisions. In this regard, remote sensing technologies (RS), geographic information systems and digital spatial data platforms are of particular importance, which allow forming a holistic information and analytical environment for territorial development management.

At the same time, in the practice of local government, there are still a number of problems associated with insufficient integration of geospatial data into the processes of economic planning, land management, urban development and environmental monitoring. The issues of using remote sensing data to forecast the socio-economic development of communities, assess the effectiveness of the use of territorial potential and support management decisions based on the concept of «data-driven governance» remain insufficiently

researched. This necessitates the deepening of scientific research on the theoretical foundations, methodological approaches, and practical mechanisms for applying remote sensing and geospatial monitoring technologies as tools for digital transformation, economic planning, and ensuring the sustainable development of territorial communities.

Analysis of recent research and publications. In modern scientific research, considerable attention is paid to the application of remote sensing of the Earth (RS), GIS and geospatial monitoring in land management. Scientists [1–6] in the fields of geoinformatics, spatial analysis and regional development substantiate the effectiveness of satellite data for monitoring land use, natural resources, environmental status and supporting management decisions.

Recently, the focus of research has shifted to the digital transformation of territorial governance, the concept of «smart territories» and «data-driven governance» approaches. At the same time, the issues of comprehensive integration of remote sensing into economic planning systems and strategic community management, in particular regarding the assessment of territorial potential and the implementation of sustainable development goals, remain underdeveloped.

The purpose of the article is to study the theoretical and methodological foundations and practical aspects of using remote sensing technologies and geospatial monitoring systems as tools for the digital transformation of public administration, economic planning and ensuring the sustainable development of territorial communities, as well as to substantiate the possibilities of integrating geospatial data into the processes of managerial decision-making, spatial analysis, forecasting and effective management of territorial resources.

The main material presentation. The current stage of development of the digital society is characterized by the introduction of information and communication technologies into public administration and the transformation of mechanisms for strategic planning of territories. In the context of decentralization, urbanization changes and the growth of anthropogenic load, digital tools for analyzing and forecasting spatial processes, in particular geoinformation technologies and remote sensing systems of the Earth as a component of modern management infrastructure, are becoming particularly relevant.

In scientific discourse, remote sensing of the Earth [7] is considered as a key element of geospatial support for the digital economy and the «data-driven governance» approach, which is based on the use of large spatial data sets, analytical modeling and forecasting. The use of satellite systems, UAVs and GIS provides rapid receipt of accurate information about the state of land, infrastructure, ecosystems and economic activity, increasing the validity of management decisions and the quality of spatial analysis of territorial development.

Remote sensing technologies are of particular importance for the implementation of the concept of sustainable community development, as they provide a combination of environmental, economic and social indicators in a single monitoring system. The obtained satellite data serve as the basis for assessing natural resource potential, monitoring land use changes, identifying environmental risks and modeling territorial development, as well as contributing to increasing the transparency of management and the development of digital platforms for interaction between authorities, business and the public.

In the context of the digital transformation of government bodies [8], the integration of remote monitoring systems increases the efficiency of public administration, the investment attractiveness of regions and the competitiveness of communities. Geoanalytical tools provide not only operational control over territories, but also modeling of development scenarios, optimization of resources and increased adaptability to environmental, economic and security challenges.

Remote sensing of the Earth (RS) is an interdisciplinary field that combines aerospace observation, digital data processing, and spatial analysis to obtain information about natural and anthropogenic objects without direct contact. In modern science, RS is considered a basic tool for digital spatial management, providing operational monitoring of resources, infrastructure, urban areas, and socio-economic processes [9].

The technological basis of remote sensing is based on the registration of electromagnetic radiation reflected or emitted by objects on the earth's surface in different spectral ranges. The obtained data undergo digital processing, classification and spatial interpretation, which allows you to form accurate geospatial models of territories. The scientific value of remote sensing lies in the possibility of obtaining systematized multispectral and multitemporal information, which is used to analyze territorial processes and predict changes in the natural and socio-economic environment.

The main technologies of remote sensing of the Earth include (Fig. 1):

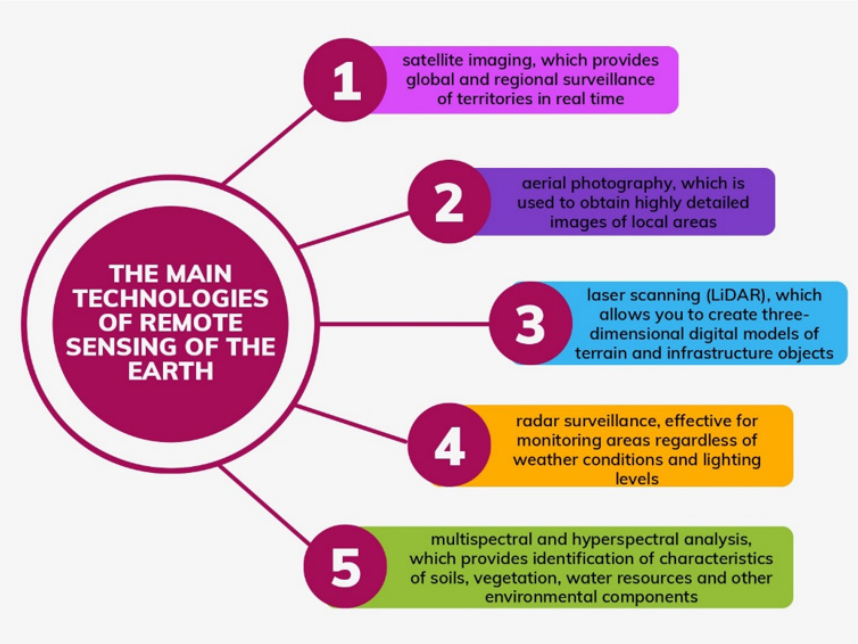

Fig. 1. The main technologies of remote sensing of the Earth
Source: compiled by the authors based on data from [10]

An important theoretical element of modern geospatial monitoring is the integration of remote sensing data into geographic information systems (GIS), which provide comprehensive processing and management of spatial information. GIS act as an analytical environment that combines cartographic materials, statistical data, satellite monitoring results, and spatial development models.

The functional capabilities of modern GIS include [10]:

- accumulation, systematization and updating of spatial data;
- analysis of territorial processes and spatial relationships;
- creation of digital thematic maps and geoanalytical models;
- modeling of territorial development scenarios;
- forecasting socio-economic and environmental changes;
- risk assessment and support for management decision-making.

In the context of the digital transformation of public administration, geospatial technologies form the basis of smart governance and «data-driven management», where spatial data is a key resource for territorial management [11]. The integration of remote sensing and GIS creates a single digital geospatial environment for strategic planning, monitoring of sustainable development, management of infrastructure, land resources and environmental security. Thus, remote sensing and geospatial monitoring are not only means of data collection, but also components of a modern territorial development management system that increase the efficiency of public administration, the validity of decisions, and the adaptability of communities to the challenges of the digital economy.

Digital transformation of public administration is a key direction of modernization of state and local administration in the context of the development of the digital economy [12]. It involves the introduction of ICT, digital platforms and big data analysis systems into decision-making processes. In this context, remote sensing is an important tool of digital infrastructure, providing authorities with operational spatial information about territories, resources and socio-economic processes.

The scientific and applied role of remote sensing is to ensure continuous monitoring of territories, automate data collection and analysis, and integrate them into e-government systems. The use of satellite technologies, UAVs, and GIS contributes to the transition to «smart governance» and «data-driven management», where management is based on the principles of openness, efficiency, and analytics.

Remote sensing technologies provide [13]:

- automation of monitoring of territories and spatial processes;
- digitalization of land cadastre and resource accounting;
- integration of geospatial data into e-government systems;
- prompt updating of information on the condition of territories and infrastructure;

- support for strategic planning for the development of communities and regions;
- formation of digital platforms for territorial management;
- analytical modeling of socio-economic and environmental processes.

The use of satellite data and geoinformation technologies allows local governments to obtain up-to-date spatial information without significant costs for field research and geodetic work [14]. This increases the efficiency of management processes, optimizes the use of budgetary resources and ensures objectivity in the analysis of territories. In addition, digital monitoring systems provide a prompt response to changes in land use, the state of the environment and the infrastructure of communities.

One of the key areas of application of remote sensing is land management and control of land use efficiency. In the context of digitalization of land relations, geospatial monitoring provides transparent land accounting and control of their use, contributing to rational environmental management. Satellite technologies and GIS allow for a comprehensive analysis of the land fund, track the dynamics of changes in territories and identify violations in the field of land use [15].

Satellite monitoring provides the ability to:

- detection of illegal or irrational land use;
- control of changes in the purpose of land plots;
- conducting a digital inventory of territories;
- assessing the efficiency of agricultural land use;
- monitoring soil degradation and vegetation cover changes;
- analysis of the dynamics of urbanization and landscape transformation.

Digitalization of land resources increases the transparency of land relations, reduces corruption risks, and contributes to the growth of local budget revenues through effective control of land use. The integration of cadastral systems with geospatial platforms forms the basis of a single digital environment for territorial management. An important area of application of GIS and remote sensing is the monitoring and management of community infrastructure. In the spatial planning system, these technologies are used to assess the state of transport, engineering and social infrastructure, predict the needs of territorial development and improve urban planning policy [16].

Geographic information systems provide (Fig. 2):

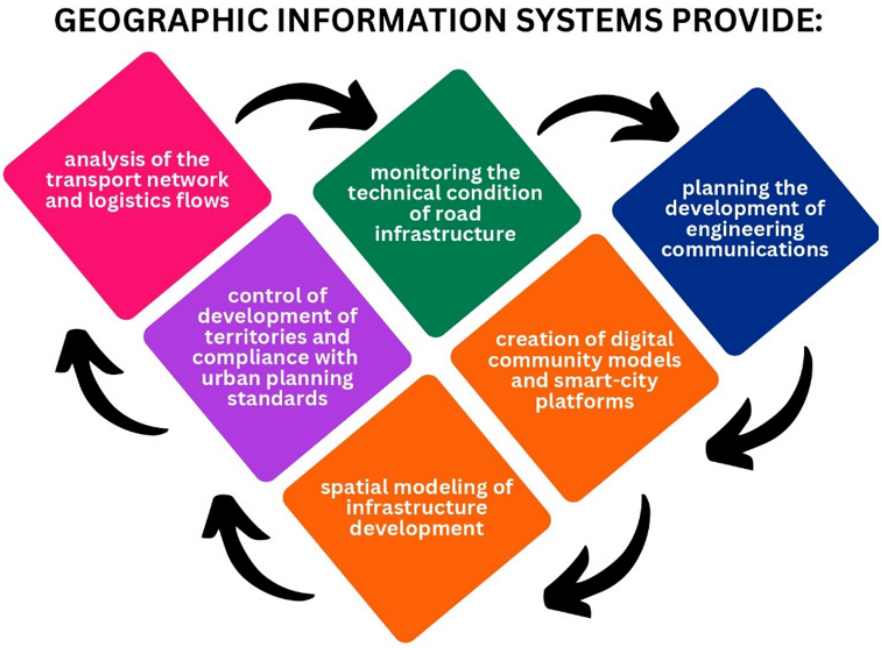

Fig. 2. Functional capabilities of GIS
Source: compiled by the authors based on data from [16]

The use of digital maps, 3D models of territories, and analytical geoplatforms simplifies urban planning, increases the efficiency of infrastructure project management, and provides forecasting of territorial development based on spatial scenarios [17]. Integration of remote sensing and GIS into the activities of local self-government contributes to the formation of digital communities capable of responding promptly to economic, environmental and social challenges. In the context of decentralization and digital transformation

of public administration, economic planning requires the use of high-precision analytical tools to assess the resource potential of territories and forecast their development. Remote sensing provides up-to-date spatial information on natural resources, infrastructure, economic activity and the dynamics of territorial changes.

The scientific and practical significance of remote sensing in economic planning lies in the creation of an integrated geoinformation base that provides spatial analysis of economic processes, assessment of resource use and modeling of community development scenarios. The combination of satellite technologies and GIS contributes to the transition to «evidence-based planning», where strategic decisions are based on the results of digital monitoring and geoanalytics. One of the key areas is the assessment of the natural resource and economic potential of territories. Remote sensing allows for a comprehensive analysis of the state of resources, the level of their use, and the identification of spatial disparities in development, while multispectral data processing ensures the formation of scientifically sound community development programs [18].

Satellite systems provide assessment of the condition and productivity of agricultural lands, water resources and the level of water supply of territories, forest areas and the ecological state of natural ecosystems, the energy potential of territories, in particular the opportunities for the development of renewable energy, the level of urbanization and intensity of development, as well as the spatial structure of economic activity and the use of land.

The obtained geospatial data are used to develop strategies for socio-economic development, plan the use of natural resources and optimize the territorial organization of the economy, which ensures environmentally balanced development of communities [19]. Integration of remote sensing results into strategic planning increases the validity of management decisions and the adaptability of communities to economic and climatic challenges. An important direction is the formation of a digital investment environment for communities. The use of open geospatial data and digital maps increases the transparency of management and provides investors with up-to-date information about the resource, infrastructure and logistics potential of territories.

The openness of geoinformation resources increases investor confidence, the level of transparency of communities and creates conditions for the development of the local economy. Digital spatial platforms also provide territorial marketing and contribute to a more effective positioning of communities in the national and international investment environment. Remote sensing technologies are of particular importance in the agricultural sector, where they are the basis of precision agriculture. The use of satellite data, UAVs and GIS provides constant monitoring of agricultural landscapes, assessment of crop conditions and optimization of agro-technological processes.

In agriculture, remote sensing (RS) technologies are widely used to monitor crop status and plant growth, predict crop yields, control soil moisture levels, detect land degradation and erosion processes. In addition, they help optimize the use of fertilizers and plant protection products, and analyze the impact of climate factors on agricultural production, which increases the efficiency of agricultural resource management [20].

The use of precision agriculture technologies increases the productivity of the agricultural sector, reduces production costs and minimizes the negative impact on the environment. The use of geoanalytical systems ensures rational land use, strengthens food security and contributes to the formation of sustainable development of rural areas. Thus, remote sensing is an important tool for the digitalization of economic planning of communities, ensuring the integration of spatial data into the strategic management of territorial development. Geoinformation technologies form the basis of a competitive, investment-attractive and environmentally balanced development model in the digital economy.

The concept of sustainable development provides for balanced development of economic, social and environmental spheres taking into account the needs of the current generation without threatening the future. In the context of digitalization of public administration, remote sensing and geoinformation technologies are becoming key tools for achieving sustainable development goals at the local and regional levels, ensuring a comprehensive assessment of territories, environmental control and effective resource management. [21]. The scientific significance of remote sensing lies in the integration of spatial data into the process of making management decisions. Geospatial monitoring provides objective information about natural, socio-economic and infrastructure processes, forming the basis of «evidence-based policy» and «smart governance», and GIS acts as an environment for analysis, forecasting and modeling of sustainable development of territories.

One of the key areas of application of remote sensing is ecological monitoring of territories. Satellite systems provide continuous monitoring of the state of the environment, allowing timely detection of environmental threats and assessment of the consequences of anthropogenic impact on ecosystems. The use of multispectral and hyperspectral analysis ensures obtaining accurate data on air quality, the state of water resources, vegetation cover and land.

Satellite systems make it possible to monitor the level of atmospheric pollution, to monitor the condition of water bodies, to detect illegal deforestation and to control the formation of unauthorized landfills. They are also used to assess the consequences of man-made accidents and industrial pollution, as well as to analyze the

dynamics of changes in natural ecosystems and landscapes, which contributes to the effective management of natural resources and environmental protection [22].

Environmental monitoring based on remote sensing provides a prompt response to environmental threats, increases the effectiveness of environmental policy and forms a system of environmental security of communities. Integration of geospatial data into digital management systems also creates conditions for the implementation of the principles of a green economy and environmentally balanced development of territories. An important component of sustainable development is increasing social integration, accessibility of public services and transparency of management. Geoinformation platforms and digital services contribute to the development of e-governance and the formation of a «smart community» model.

The openness of geospatial data and the introduction of digital services in local government activities form a new management model focused on community needs, increasing public participation and developing social capital. Digitalization of management processes also contributes to more efficient use of resources and improving the quality of life of the population. In the context of increasing natural, man-made and military threats, remote sensing is gaining special importance in risk management and ensuring the security of territories. Geospatial monitoring provides prompt receipt of data on emergencies, forecasting dangerous processes and assessing the consequences of crisis events [23].

Remote sensing technologies are actively used for (Fig. 3):

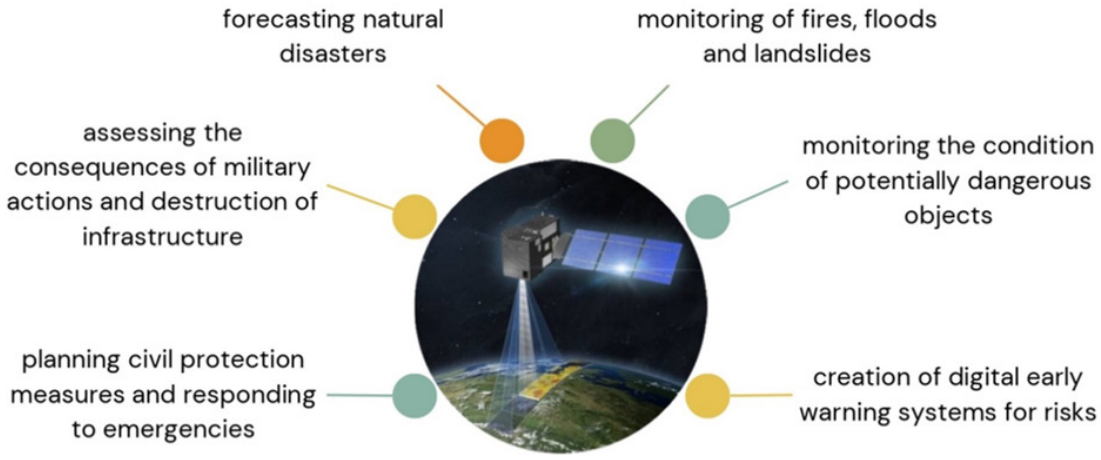

Fig. 3. Main areas of application of remote sensing technologies
Source: compiled by the authors based on data from [23]

Remote sensing becomes particularly relevant for Ukraine in conditions of military operations, destruction of infrastructure, and the need for rapid restoration of territories. Satellite monitoring and GIS allow assessing the extent of damage, monitoring the condition of critical infrastructure, and providing information support for the reconstruction of communities.

At the same time, despite the significant potential of remote sensing and geoinformation technologies in public administration, their integration into the activities of territorial communities is accompanied by organizational, financial, technological and personnel limitations. The effective use of such systems requires the development of an appropriate institutional, regulatory and technical framework, which is only being formed in many communities.

One of the key problems is insufficient funding for digital projects and modernization of the information infrastructure of local governments. The implementation of remote sensing, GIS, digital cadasters and spatial analysis systems requires significant investments in software, equipment, satellite data and maintenance, which is difficult for small and rural communities. An additional limitation is limited access to modern geoinformation software due to the high cost of licenses. Also, problems of system compatibility and the lack of unified standards for the exchange of geospatial data complicate the integration of digital platforms between different levels of government.

An important problem is the lack of qualified specialists in the field of GIS, remote sensing and spatial analytics. The effective use of satellite data requires knowledge in geoinformatics, cartography, digital image processing and big data analysis, but many communities lack the appropriate specialists or specialized departments. An additional challenge remains the low level of digital literacy of local government employees and the population. Insufficient digital competencies complicate the implementation of geographic information

systems and reduce the effectiveness of the use of remote sensing technologies in management processes [24].

A systemic problem is the lack of integrated geospatial databases and a single digital information environment. Spatial data is often stored in different formats, belongs to different institutions and is not interconnected, which leads to duplication of information, complicates interagency interaction and limits the comprehensive analysis of territorial processes. The lack of a single geoinformation infrastructure also reduces the effectiveness of strategic planning and monitoring of territorial development.

An additional problem is the lack of coordination between government agencies, local governments, scientific institutions, and businesses in the use of geospatial technologies. The lack of a coordinated state policy on the development of remote sensing and GIS complicates data exchange, reduces the effectiveness of digital projects, and limits the formation of a national spatial monitoring system.

In modern conditions, an important strategic task is the formation of a unified state policy for the development of geoinformation infrastructure and digital spatial environment for territorial management [25]. Such a policy should provide (Fig. 4):

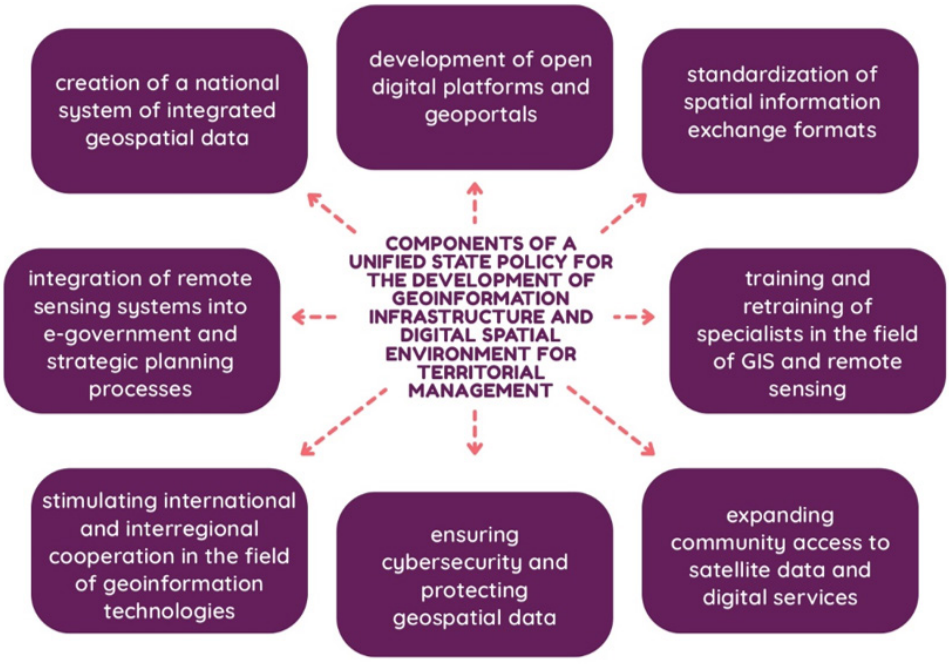

Fig. 4. The main components of a unified state policy for the development of geoinformation infrastructure and the digital spatial environment of territorial management
Source: compiled by the authors based on data from [25]

Thus, overcoming the problems of implementing remote sensing requires a comprehensive approach that includes the development of digital infrastructure, improving the regulatory framework, personnel training and institutional coordination. The integration of geoinformation technologies into public administration creates the prerequisites for the formation of a digital community capable of ensuring sustainable development, transparent resource management and adaptability to socio-economic and security challenges.

Current trends in the development of the digital economy, decentralization, and post-war territorial reconstruction are increasing the demand for the implementation of geospatial solutions in strategic planning, resource management, infrastructure development, and community security. In this context, geospatial technologies are becoming a key element of the state's digital infrastructure. A promising direction in the development of remote sensing is the use of artificial intelligence and machine learning for automated analysis of satellite data [26]. Intelligent processing of geodata increases the speed and accuracy of their interpretation, automates the classification of objects, and provides real-time forecasting of territorial changes.

The integration of artificial intelligence technologies into geospatial monitoring systems significantly expands the capabilities of spatial data analysis and interpretation. In particular, the use of machine learning algorithms and deep data analysis provides automatic detection of land use changes, forecasting of environmental risks and natural disasters, research of urbanization processes, assessment of the technical condition of infrastructure facilities, monitoring of agricultural lands, as well as the creation of early warning systems for emergencies. Scientists note that the combination of artificial intelligence with geographic

information systems and remote sensing technologies contributes to increasing the efficiency, accuracy and effectiveness of management decisions in the field of environmental management, urban planning and risk management [27].

The combination of remote sensing, artificial intelligence and Big Data forms the basis of intelligent territorial management systems that provide high efficiency, adaptability and analytical support for management decisions. An important prospect is the development of open geoinformation platforms and a national infrastructure of geospatial data. The openness of spatial information is becoming a key condition for transparent management, the development of e-governance and increasing the investment attractiveness of territories.

The formation of an open geoinformation environment contributes to the development of digital democracy, increased transparency of government activities and more effective use of the potential of territorial communities. A promising direction is the integration of geospatial data into e-government and digital administration systems of territories. [28]. Geographic information systems are increasingly used as a tool to support management decisions in the areas of land management, urban planning, infrastructure, environmental control, and emergency response.

Integrating geodata into digital management systems will allow:

- automate administrative processes;
- provide operational access to up-to-date spatial information;
- increase the effectiveness of strategic planning;
- improve the quality of public services;
- ensure transparency of management decisions.

In the future, geospatial platforms can become the basis for the functioning of digital territorial management centers and analytical systems supporting smart governance. One of the innovative trends is the creation of digital twins of territories and communities. They are integrated 3D models that combine geospatial data, information about infrastructure, demographic indicators, transport flows and the ecological state of territories [29].

The use of digital twin technology opens up new opportunities for territorial development and infrastructure management. In particular, digital twins allow you to model various scenarios for territorial development, predict the load on infrastructure systems, analyze the potential consequences of management decisions, optimize the use of material and financial resources, and effectively plan the reconstruction of territories and infrastructure facilities. Scientists emphasize that the use of digital twins in combination with geoinformation technologies helps to increase the validity of management decisions, provides the possibility of predictive analysis, and supports the implementation of the concept of «smart» and sustainable territories.

For Ukraine, this technology is especially relevant in the context of post-war reconstruction and the need to form a modern spatial planning system.

A promising direction of development is also the digitalization of the spatial planning system and urban development activities. The use of geoinformation technologies allows us to move from traditional paper schemes to interactive digital models of territories, which provide prompt data updates and the possibility of a comprehensive analysis of territorial development. [30].

Thus, innovative geospatial technologies should become the basis of a modern territorial development management system in Ukraine. The integration of remote sensing of the Earth, artificial intelligence, digital platforms and geoanalytical systems creates the prerequisites for the formation of an effective model of digital governance capable of ensuring the sustainable development of territorial communities, increasing the competitiveness of regions and adapting the state to modern global challenges.

Conclusions. The study found that remote sensing and geospatial monitoring systems are key tools for the digital transformation of public administration and sustainable development of communities. The development of satellite technologies, GIS and digital platforms forms a model of «data-driven governance», which is based on data openness and the integration of digital resources into the decision-making process.

It has been proven that remote sensing provides rapid spatial information on natural resources, infrastructure, and socio-economic processes, as well as enables comprehensive monitoring and risk forecasting. This increases the efficiency of management at various levels and makes these technologies an important tool for sustainable development.

Remote sensing technologies have significant potential in land management, infrastructure, the agricultural sector, environmental control and investment development, increasing transparency, quality of management and rational use of resources. They also contribute to the integration of economic, social and environmental indicators into a single monitoring system and increasing the security of territories.

At the same time, their implementation is hampered by insufficient funding, lack of personnel, limited access to software, and the lack of integrated databases, which requires government support and standardization

of geoinformation infrastructure.

Development prospects are associated with the use of artificial intelligence, Big Data, digital twins, and smart-city technologies, which should become the basis of modern territorial management.

Thus, the integration of remote sensing and GIS is a necessary condition for the formation of an effective model of digital governance that ensures transparency of management, sustainable development, and strengthening of state security.

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