
Observatories of Kazan University (Russian Federation) No 1678

1 Basic information

Official name as proposed by the State Party

Astronomical Observatories of Kazan Federal University

Location

Kazan
Zelenodolsk municipal district
Republic of Tatarstan
Russian Federation

Brief description

The Astronomical Observatories of Kazan Federal University is a serial property comprised of two component parts: one is located in the historical centre of Kazan and one in a forested suburban area twenty-four kilometres west of the city. The Kazan City Astronomical Observatory, built in 1837, is situated within the University campus. The building, classical in its architecture, was purposely constructed to enable observations of the sky. It is characterised by a semi-circular façade and three towers with domes built to house astronomical instruments. The suburban Engelhardt Astronomical Observatory, where observation activities were transferred from the city, was completed in 1901. It is composed of several structures dedicated to sky observations as well as residential buildings, all located within a park. The observatories, which have been preserved complete with astronomical instruments, nowadays perform mainly educational functions. Both University observatories represent heritage associated with astronomy and observations of the sky, during a period of emergence and development of optical telescopes from the 19th to the early 20th century.

Category of property

In terms of categories of cultural property set out in Article I of the 1972 World Heritage Convention, this is a serial nomination of two *groups of buildings*.

Included in the Tentative List

11 December 2020

Background

This is a new nomination.

Consultations and technical evaluation mission

Desk reviews have been provided by ICOMOS International Scientific Committees, members and independent experts.

An ICOMOS technical evaluation mission visited the nominated property from 4 to 9 September 2022.

Additional information received by ICOMOS

A letter was sent to the State Party on 3 October 2022 requesting further information about the boundaries of the nominated property, the comparative analysis, the state of conservation, legal protection, management, and a request for documentation.

Additional information was received from the State Party on 9 November 2022.

An Interim Report was provided to the State Party on 21 December 2022, summarising the issues identified by the ICOMOS World Heritage Panel.

Further information was requested in the Interim Report including: the historic context of the Kazan Observatories' development, the functional links between the component parts and identification of attributes, conservation documentation for the nominated property, and development pressures, both existing and potential.

Additional information was received from the State Party on 22 February 2023.

All additional information received has been incorporated into the relevant sections of this evaluation report.

Date of ICOMOS approval of this report

10 March 2023

2 Description of the nominated property

Note: The nomination dossier and additional information contain detailed descriptions of this property, its history and its state of conservation. Due to limitations on the length of evaluation reports, this report provides only a short summary of the most relevant aspects.

Description and history

The nominated property, located in the Republic of Tatarstan, Russian Federation, is composed of two component parts, one situated in the historical centre of Kazan, and one in its suburbs, twenty-four kilometres west from the city.

The area of the two component parts totals 19.02 ha, and the buffer zones, as revised by the State Party in February 2023, total 454.81 ha.

The Kazan Imperial University, now Kazan Federal University (KFU), was founded by the Emperor Alexander I in 1804 and developed in the 1820-1830s. The University campus is located in the historical centre on the southwestern slope of the Kremlin hill facing the Volga River. The ensemble was designed by the architects P. Pyatnitsky and M.P. Korinsky, under the supervision of Nikolai Ivanovich Lobachevsky, Chairperson of the Construction Committee. Joseph Johann von Littrow, a renowned Austrian astronomer, organised the

Department of Astronomy of the University. Initially, the observatory was arranged in temporary buildings within the University complex. The current observatory was built in 1833-1837. As early as 1898, Emperor Nikolai II decreed the construction of new facilities at the suburban state-owned property. The Engelhardt Astronomical Observatory, named after Vasily Pavlovich Engelhardt, who donated his private observatory (instruments and library) to KFU, was completed in 1901 according to the designs of N.F. Malinovsky and K.L. Myufke, under the supervision of Dmitry Ivanovich Dubyago.

The teaching of astronomy in Kazan began at the Imperial Kazan Gymnasium (1758-1917). Astronomy was included in the curricula of gymnasium education as an integral part of teaching physics. However, the level of teaching was behind the development of astronomy in Europe. Therefore, renowned scholars and scientists were invited to Kazan to create a scientific institution with university status and international standing.

Component part 001: Kazan City Astronomical Observatory

This component part comprises two buildings, the astronomical observatory building, and a present-day laboratory, which marks the site of, and retains some remains of, the former Littrow Observatory used for observations of the sky before construction of the astronomical observatory.

The astronomical observatory is located on the west edge of the University complex, on a hillside at an elevation of 77.5 metres, at the highest point of the University complex, in order to get a clear horizon for sky observations. The brick building, raised on a terrace-like white stone foundation, has a complex plan. The north-eastern two-storey part of the building is rectangular. The south-western higher part of the building, covered with a flat roof, is part of a wide arc with its ends protruding beyond the rectangular part. The East and West halls were intended for observing the stars. These halls have a cylindrical shape, partly protruding from the side facades of the observatory. The flat roof, also devoted to sky observations, has three round and multifaceted towers with rotating domes. The central one dominating the building contains the large refractor telescope.

The building is compositionally aligned with the main axes and buildings of the University complex; however, its composition and arrangement are determined by the position of the meridian circle.

The laboratory building is converted from parts of the former Littrow Observatory. It marks the location of the first astronomical observation at the University and, at present, houses the administration of the Geographical Society.

Component part 002: Engelhardt Astronomical Observatory

Located in a flat, forested area at an altitude of fifty-five metres above the Volga River (ninety-four metres above sea level), it includes several buildings and structures dedicated to the observation of the sky, and some which are of residential character, located within an area historically composed as a landscaped park. The main feature is the observatory building with the refractor and the meridian circle pavilions placed in the centre of the site. The heliometer and telescope pavilions, the Meteor Department pavilion, the library and administrative buildings are also part of the nominated property as well as the northern and southern marks and a necropolis associated with the meridian circle. Other buildings and structures within the boundaries are not considered in the nomination dossier as part of the nominated property; however, they are part of the observatory features and facilities.

The observatory building is a forty-metre-long, six-metre-high brick building, with its longer axis being oriented east-west. The eleven-metre tower for the twelve-inch Engelhardt Equatorial telescope, made by Howard Grubb in 1875, is adjoined to the west. The rotating, 6.6-metre in diameter dome for the telescope tower was designed by Gustav Heide and made in the Patsig workshop in Dresden specially for the Engelhardt Astronomical Observatory. It is made of wood with iron parts. The telescope, used to observe the brightness of variable stars and the position of minor planets and comets, went into operation in 1901. In 1965 the twelve-inch refractor was modernised and converted into a sixteen-inch astrograph.

The seven-metre high pavilion, adjoined to the observatory building to the east, was constructed to house the meridian circle produced in 1845 in Hamburg by Repsold. The pavilion is made of double shell corrugated iron, with an air layer between to balance the temperature. The roof of the pavilion is sliding with hatches on the southern and northern sides. The meridian circle, dedicated to determining the coordinates of the stars, was installed in the Engelhardt observatory in 1903 after rebuilding and modernisation. This date marks the beginning of systematic observations there.

Two marks, built in 1904-1905, are connected to the location of the meridian circle to ensure its alignment. The marks are precisely positioned at a certain height and distance in relation to the meridian. The northern mark is covered with a pavilion made of corrugated iron; the southern one, also made of iron, received a decorated design, serving at the same time as a chapel with a crypt, located on the hill, at the central point of the necropolis, where astronomers Dmitry Ivanovich Dubyago and Vasily Pavlovich Engelhardt are buried.

The heliometer pavilion houses the only heliometer telescope in the world that still operates today. It was manufactured in Hamburg in 1874, and first installed at

the city observatory in 1891 before being transferred to the suburban observatory in 1908 and housed in a specially built round brick pavilion with a rotating spherical dome. The research data collected throughout its operation have been fundamental for studying the Moon's rotation.

The development of the observatory depended directly on the availability of instruments for sky observations and their quality. Purchase of a nine-inch refractor from the Fraunhofer workshop (Munich, Germany) and its subsequent installation in the Kazan City Astronomical Observatory in 1838 made it possible to start regular sky surveys. The development of the suburban Engelhardt Astronomical Observatory was initiated by the donation of a collection of instruments in 1897. Then, in the 1950s and later, it was equipped with a set of new instruments by the USSR Academy of Sciences. One of them is the AZT-14 mirror telescope, purchased in 1966 to improve photometry research work carried out at Engelhardt Astronomical Observatory since the 1930s. It is installed in a specially-built two-storey brick pavilion with a rotating dome. In the last ten years, the telescope has been modernised and equipped with new systems.

Both observatories were the place of work of renowned scientists and their scientific achievements. These include the creation of a celestial Fundamental Coordinate System in 1935, the first in the history of astronomy, which was made possible through cooperation with many other observatories around the world over a long period of time. Other important contributions to the development of science are the studies of the Sun and the Moon.

Both urban and suburban observatories continue to be places of activities related to astronomical research and education. The historic optical telescopes of the nominated property are used mainly for educational purposes. The scientific research is carried out with the use of modern radio telescopes and their networks located within (AZT-14 mirror telescope included) and outside the nominated property in different places in the world, either belonging to the KFU or to other universities or scientific institutions.

State of conservation

The building of the Kazan City Astronomical Observatory, completed in 1837, was badly damaged by fire in 1842, and then repaired according to its original conception. It has not been subjected to large structural intervention except for the small side tower, which was redesigned during the 20th century to accommodate modern instruments. There is no information provided in the nomination dossier on any conservation works done until 2004, when restoration and repair works were carried out in the building. At that time remodelling of the immediate setting of the building was also undertaken.

The Engelhardt Astronomical Observatory was completed in 1901. In October 1918, battles of the Russian Civil War took place near Engelhardt observatory, but no damage was done to the buildings and instruments of the

observatory. Conservation and some completion works were carried out in 1934 and after a fire in 1942. In 2001 and 2009 some restoration works were carried out in Engelhardt observatory: the largest operating optical telescope (refractor) was revived, modern security and communication systems were installed, and the surrounding area was landscaped. In 2013, the planetarium and Astro Park located within the boundaries of the nominated property were opened to the public.

The Kazan City Astronomical Observatory is well preserved. Nevertheless, some visible structural and conservation issues should be resolved. In the case of the Engelhardt Astronomical Observatory most of the buildings, except for the Meteor Department pavilion, are maintained. According to the photographic documentation in the nomination dossier and that provided by the ICOMOS mission expert, the state of conservation of buildings requires some interventions. The park also requires some research and conservation work.

Based on the information provided by the State Party and the observations of the ICOMOS technical evaluation mission, ICOMOS considers that the state of conservation is satisfactory. Nevertheless, a conservation policy and a programme for the nominated property should be further developed and implemented.

Factors affecting the nominated property

Based on the information provided by the State Party and the observations of the ICOMOS technical evaluation mission, ICOMOS considers that the main factors affecting the nominated property are pollution and development pressure.

Obscuration of the sky, light pollution, electromagnetic oscillations, and other man-made interferences have a negative impact on the functioning of observatories. The Kazan City Astronomical Observatory is used nowadays only for educational purposes; therefore, the impact of these negative factors is not detrimental to its function, as it is in the case of the suburban Engelhardt Astronomical Observatory. Changes in the setting were one of the reasons why the sky observations were moved from the city to the forested area in the suburbs, and then to mountains in the Caucasus and Türkiye.

The Kazan City Astronomical Observatory stands within the KFU complex in a densely built-up urban area. Apart from 1970s high-rise buildings located in the direct vicinity of the observatory with a negative visual impact, no further significant impacts on this component part are observed. On the other hand, active development of the neighbouring settlements is happening near to the Engelhardt Astronomical Observatory. Orekhovka village, Novaya Tura Technopolis, and Oktyabrsky village, located respectively north and south of the nominated property, are likely to expand. The possibility of a new railroad construction within the proposed buffer zone south of the nominated property is also a concern. ICOMOS recommends that Heritage Impact Assessments are implemented to assess the potential

negative impact of urban encroachments into the forested setting of the Engelhardt Astronomical Observatory.

Conservation, adaptation, and development plans for the Engelhardt Astronomical Observatory are critically needed as the construction of the KFU planetarium has already had a detrimental impact on the nominated property and the way it functions (the planetarium has become a dominant space and function). Further development of educational and tourist infrastructure, such as the Scientific and Educational Center for Space Research and Technology project which started in 2008, together with upgrading of the territory and buildings, including the reconstruction of some residential buildings, may threaten the proposed Outstanding Universal Value of the nominated property. ICOMOS considers the potential impacts of such development proposals should be assessed through a Heritage Impact Assessment.

ICOMOS considers that the state of conservation is satisfactory and that factors affecting the nominated property are mainly borne by the development pressure. Current and future developments within the nominated property as well as in its setting may increase the vulnerability of the attributes associated with the proposed Outstanding Universal Value.

3 Proposed justification for inscription

Proposed justification

The nominated property is considered by the State Party to be of Outstanding Universal Value as a cultural property for the following reasons:

- It illustrates the development and evolution of optical astronomy in the world between the 19th and early 20th century. It is an outstanding testimony of the development and gradual transition from positional astronomy to astrophysics and reflects the milestones in the development of the astronomical sciences worldwide over an extended period.
- It represents an outstanding example of unique architectural ensembles, which reflect the development of advanced engineering and design organically incorporated into the surrounding landscape.
- The collection of authentic historic instruments, semi-movable and movable, bears exceptional testimony to the evolution of optical astronomy and space geodesy during the period under consideration.
- It is the place of remarkable achievements of outstanding astronomers and other scientists, the place of ground-breaking, innovative and other important inventions and achievements in the field.

It is stated in the nomination dossier that the Kazan observatories played an important role in the development of optical astronomy in the world in the 19th and early 20th century, and subsequently played a key role

in the transition from classical astronomy to radio astronomy and modern astrophysics.

ICOMOS notes that there is an important distinction between two different periods in the history of Kazan Federal University (KFU). The Imperial period the justification for inscription refers to was characterised by the deep involvement of the Russian scientists in European science, and many facets show some notable contributions and important exchanges by some notable personalities of KFU. However, it should be noted that they were working mostly in parallel scientific fields such as geography, mathematics, or geophysics. The Communist period shows a change in the scientific links with Western European science. At that time, efforts were pursued more independently at the observatories of Kazan with some notable results, especially in spectroscopy and associated technologies. After World War II, the efforts were also prominent in the context of the Russian conquest of space, although mainly through the suburban observatory and a new station in the mountains of the North Caucasus.

The *Operational Guidelines for the Implementation of the World Heritage Convention* state, in paragraph 48, that “[n]ominations of immovable heritage which are likely to become movable will not be considered”. A significant part of the features of the nominated property constitutes movable heritage and cannot be considered as elements supporting the proposed justification for inscription of the nominated property. Consequently, the importance of component part 001 cannot depend on the 19th-century movable instruments. Only the key semi-movable instruments, for which buildings and structures were specially constructed or dedicated, are considered as an integral part of the nominated property.

Based on the nomination dossier and the additional information provided, the key attributes of the nominated property are the characteristic classical 19th-century architecture of the Kazan City Astronomical Observatory and its location, the landscape composition of the Engelhardt Observatory and its engineered buildings and structures with still-operating authentic semi-movable instruments, and the cutting-edge research and discoveries that occurred there.

Comparative analysis

The comparative analysis has been developed on the ground that the nominated property contains observatories and optical astronomical research centres from the 19th and 20th centuries, which forms part of the vast heritage associated with astronomy and astronomical observations. It is carried out at a global level with the emphasis on the development of astronomical observatories in urban areas in Europe and Eurasia. The analysis is divided into three sections: properties on the World Heritage List; architecture of astronomical observatories; and instruments.

ICOMOS notes that there is a UNESCO Thematic Initiative on Astronomy and World Heritage created in

2003. Two ICOMOS-IAU Thematic Studies on “Heritage Sites of Astronomy and Archaeoastronomy in the context of the UNESCO World Heritage Convention” were published in 2010 and 2017. Another important element for the identification of this type of properties was the creation of the online Portal to the Heritage of Astronomy (UNESCO-IAU).

In the comparison, the State Party recalls that there are observatories inscribed on the World Heritage List but in the framework of larger nominations. The nominated property is compared, among others, to the Greenwich Royal Observatory (Maritime Greenwich, UK, 1997, criteria (i), (ii), (iv) and (vi)); Tartu University Observatory in Estonia (Struve Geodetic Arc, Belarus, Estonia, Finland, Latvia, Lithuania, Norway, Republic of Moldova, Russian Federation, Sweden, Ukraine, 2005, criteria (ii), (iv) and (vi)); and Pulkovo Observatory (Historic Centre of Saint Petersburg and Related Groups of Monuments, Russian Federation, 1990, criteria (i), (ii), (iv) and (vi)). However, the comparison is not exhaustive, and there are several omissions, for example: the Royal Observatory of Madrid, part of the property Paseo del Prado and Buen Retiro, a landscape of Arts and Sciences (Spain, 2021, criteria (ii), (iv) and (vi)).

Although the comparison should be made against similar properties whether on the World Heritage List or not, the analysis does not include observatories on the Tentative Lists such as the astronomical observatory in the University City of Bogotá (Colombia, Tentative List) and the Astronomical Observatories of Ukraine (Ukraine, Tentative List).

In its first letter requesting additional information sent in October 2022, ICOMOS asked for an expanded comparative analysis. The State Party responded that given the large number of observatories of the optical period in the world, providing comparative analysis of all of them would not be possible within the given timeframe. Nonetheless a more in-depth analysis was carried out for three observatories inscribed on the World Heritage List: Pulkovo, Greenwich and Tartu, and four other sites: Paris Observatory (France), First Moscow Observatory (Russian Federation), National Observatory in Athens (Greece), Observatory in Quito (Ecuador). However, even in light of this expanded analysis, the reasons that make the nominated property stand out are still unclear.

One of the major attributes identified in the nomination dossier is the creation of the Engelhardt Astronomical Observatory as an advanced astronomical park. However, in the comparative analysis, the State Party indicates that several similar sites were created at the same time or even earlier (La Plata in Argentina, Nice in France, Brussels in Belgium), while recalling that the idea of an astronomical park observatory was born in Hamburg. There are other similar sites that could have been considered as well, particularly the Albert Einstein Science Park in Potsdam.

The selection of component parts is not supported by the comparative analysis either. According to information

provided in the response to the Interim Report there are four observatories belonging to the KFU. Their functional and historical interrelationship as complementary elements of an evolutionary process in scientific, cultural and technological terms, is not clearly explained and their selection is not justified. The fact that they belong to the same University and are administratively connected is not sufficient to justify the series, as each part should contribute to the proposed Outstanding Universal Value of the nominated property as a whole in a substantial, scientific, readily defined and discernible way, as prescribed by paragraph 137 of the *Operational Guidelines for the Implementation of the World Heritage Convention*.

The observatories operated over a long period of time and in different historical contexts. For almost sixty-four years, until the foundation of the suburban observatory in 1901, the city observatory was the main centre for research and international cooperation in the field of astronomy. Then, the suburban observatory became active, in particular during the period of its second infrastructural development in the 1950-1970s, and with notable achievements in research. The Russian Revolution of 1917, the two world wars and geo-political changes had an impact on the framework for cooperation and development of science in the USSR. This reflects potential timeframes for comparison and areas of significance.

ICOMOS considers that the comparative analysis, including its supplement, proves that there is a large number of optical observatories expressing the same values as the nominated property in the world. It does not prove that the Astronomical Observatories of Kazan Federal University stands out as being representative in its geo-cultural context over a given period of time.

ICOMOS does not consider that the comparative analysis justifies consideration of this property for the World Heritage List at this stage.

Criteria under which inscription is proposed

The property is nominated on the basis of cultural criteria (i), (ii) and (iv).

Criterion (i): represent a masterpiece of human creative genius;

This criterion is justified by the State Party on the grounds that the Astronomical Observatories of Kazan Federal University as a “collective tool” are a masterpiece of human creative genius of eminent scientists who revolutionised the understanding of space and the Universe. It is argued that the nominated property showcases revolutionary advances in culture and science, being a research centre and the easternmost observatory in the world where innovative observation instruments at that time were installed.

The work of the astronomers and other scientists who worked in the KFU does not support the conclusion that

the nominated property represents a masterpiece of human creative genius. To justify this criterion, the nominated property itself should embody the human creativity and, as a historic monument/site, be an outstanding example representing a high level of intellectual, artistic, technical, or technological achievement.

ICOMOS considers that the significance and technological advancement of the semi-movable instruments for which the buildings and structures were constructed have not been demonstrated either. The instruments were technically advanced, but they were not pioneering devices and were used in parallel with similar ones at other facilities and even secondarily as acquired from other observatories.

ICOMOS considers that criterion (i) has not been justified.

ICOMOS notes that the significance of ideas and events directly associated with the observatories of Kazan, especially those during the Soviet period, might be more relevant for criterion (vi).

Criterion (ii): exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design;

This criterion is justified by the State Party on the grounds that the Astronomical Observatories of Kazan Federal University demonstrate important changes in human values and are vivid evidence of the synthesis of scientific and cultural traditions, mutual influence of human values, and the mutual enrichment of cultures. The long history of the two observatories is marked by exchanges with other universities and observatories, as well as other scientists, in Russia and elsewhere in Europe.

Exchanges between universities and observatories and individual scientists concern the great majority of research centres, including astronomical observatories. The work, observations, and research in the astronomical observatories of KFU could be considered as an example of an interchange of human values related to the development of optical sciences in the 19th and 20th centuries, that marks an international exchange of scientific knowledge and a worldwide collaboration for the development of science. However, it has not been demonstrated that any cultural or scientific exchange has produced an outstanding creative response with a physical or functional representation.

ICOMOS considers that criterion (ii) has not been justified at this stage.

Criterion (iv): be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;

This criterion is justified by the State Party on the grounds that the Astronomical Observatories of Kazan Federal

University are unique examples of classical and neoclassical buildings together with their setting, linked with the technological ensemble represented by the set of instruments aimed at astronomical research and discoveries, that illustrate more than 200 years of human history. Orientation with respect to cardinal points and engineering solutions in the construction of pavilions make the observatories unique monuments that combine architecture, engineering, science and the genius of the place. The State Party states that architectural solutions responding to the requirements for the functioning of astronomical observatories allowed the correct placement of volumetric tools in the buildings of the observatories and ensured the maximum accuracy of the conducted research.

The development of the observatories as a unit in correlation with the development of sky observations over a given period is not presented clearly. Their functional interrelations, the typological features of the unit and its outstanding qualities are not demonstrated at this stage.

ICOMOS considers that criterion (iv) is not justified at this stage with respect to the proposed series.

ICOMOS considers that criterion (iv) may have potential to be justified in the case of the Kazan City Astronomical Observatory as this component part represents an exceptional design of an innovative observatory for the time and an early example of purpose-built buildings for astronomical observations that responded to the new needs of observational instruments.

Criterion (iv) could also be considered if a serial approach is undertaken to represent the wide spectrum of optical observatories present in Europe and their technological development for science and research.

ICOMOS does not consider that any of the cultural criteria have been demonstrated at this stage.

Integrity and authenticity

Integrity

The integrity of the nominated property is based on the design, structure and function of the observatories. Integrity is also a measure of the intactness of the attributes, and the way major pressures on these are managed.

The boundaries of component part 001 encompass the observatory and laboratory buildings. The immediate setting of the observatory building together with the natural hill with its slope on which it is located are important attributes which should be included in the proposed boundaries.

The boundaries of the component part 002 are following the historic boundaries of the site with exceptions to the north and east of the perimeter of the site, but they still

encompass all key elements necessary to express the value of the property.

The physical fabric of the Astronomical Observatories of Kazan Federal University, both its nominated parts and their significant features, is maintained in a good condition. Buildings, instruments and related scientific archival documents and publications are preserved. Exceptions are the Meteor Department pavilion and the landscaped park in the case of component part 002. In addition to the changes within the historic residential part of the site located on its outskirts, there are also current changes to the composition of the site, in particular the recently-built planetarium which could be considered as a development of the place in line with its historic function but which still constitutes an important alteration to the historic composition of the park, claimed by the State Party as unique and supporting the proposed Outstanding Universal Value of the nominated property. Although some elements are preserved, the park has also suffered from neglect.

The city component part is located within a densely built-up part of the town. The high-rise building from the 1970s, located in the direct vicinity of the nominated property, that houses the Institute of Physics of KFU, has a detrimental impact on the visual integrity of this component part. The Engelhardt Astronomical Observatory is in the suburban area, with active development of the neighbouring settlements and transport routes. Their development may have an impact on the setting of the nominated property and, therefore, its integrity.

The nominated property is a series of two sites. The nomination dossier does not offer a justification of the rationale for the selection of the component parts, which could provide a basis for assessing the integrity of the series.

Since the criteria for justifying the proposed Outstanding Universal Value have not been demonstrated at this stage, attributes of Outstanding Universal Value cannot be confirmed, so integrity, as defined by the *Operational Guidelines for the Implementation of the World Heritage Convention*, is not demonstrated at this stage.

Authenticity

The authenticity of the nominated property, as explained in the nomination dossier, relates to the physical aspects and function of the nominated property. Its assessment is based on the availability of information on the history and state of conservation of the nominated property.

ICOMOS notes that the building of the Kazan City Astronomical Observatory and the buildings and structures of the Engelhardt Astronomical Observatory are preserved in their original state. The buildings have been kept together with most of their original finishes and key astronomical instruments. They have not been subjected to extensive reconstruction and modernisation except for the side tower with a dome of the city

observatory. Authentic mechanical techniques are still preserved in many of the buildings. Many of the original instruments of the buildings and structures have been preserved complete and are used *in situ*. The locations and the settings of the component parts have undergone some changes due to development pressure but still retain their character.

Both component parts of the nominated property continue to be used for sky observations, research, and education.

Since the criteria for justifying the proposed Outstanding Universal Value have not been demonstrated at this stage, attributes of Outstanding Universal Value cannot be confirmed and authenticity, as defined by the *Operational Guidelines for the Implementation of the World Heritage Convention*, is not demonstrated at this stage.

In conclusion, ICOMOS considers that the conditions of integrity and authenticity of the whole series and of the individual component parts have not been met at this stage.

Boundaries

The delineation of the boundaries of component part 001 encompasses the observatory and laboratory buildings and covers only a small area directly adjacent to them without the hill and immediate setting. They are illegible on the ground and lack legal status.

The proposed buffer zone covers the area of the historic KFU campus complex within its historic main quarter. The observatory, located in the southwest corner of the complex, thus receives a buffer zone only on the north and east sides. In the response to the ICOMOS Interim Report, the State Party proposed an extension of the buffer zone. Its boundaries have been extended to include quarters located below and above the main historic part of the University campus. They also include the tall buildings in the vicinity of the observatory building. The proposed buffer zone has no legal status yet. ICOMOS considers that the buffer zone should be formally adopted.

There are no inhabitants living in this component part, either within the nominated property component part or in its buffer zone.

The delineation of the boundaries of component part 002 follows the historical boundaries of the site and covers the cadastral land provided in perpetuity to the KFU.

The proposed buffer zone covers vast areas, mostly forested, around the nominated property and follows the delineation of the protection zone introduced into the Territorial Planning Regulations and Spatial Planning Scheme of the Republic of Tatarstan in 2018. The protection zone should introduce restrictions for the height of new developments, but the regulations are not fully in force. The proposed buffer zone does not include the built-up recreation area located 160 to 170 metres from the boundary, nor Oktyabrsky and Orekhovka villages,

nor Novaya Tura Technopolis situated in the vicinity. Their development could potentially have a detrimental impact on the nominated property and should, therefore, be controlled. ICOMOS considers that the buffer zone should be extended to control these potential developments and should be formally adopted.

There are 67 people living within the boundaries of the nominated component part, and 3,234 people in the buffer zone (as of January 2022).

Evaluation of the proposed justification for inscription

In summary, ICOMOS considers that although the architectural and landscape qualities of the two component parts of the serial nominated property, as well as the importance of the research carried out there, are undeniable, it has not been demonstrated through the description, justification and the comparative analysis that the nominated property can be considered outstanding or representative in its typological and geo-cultural frameworks. Therefore, consideration of this property for the World Heritage List is not justified at this stage. ICOMOS considers that none of the proposed cultural criteria have been demonstrated at this stage. Therefore, neither the attributes supporting the proposed Outstanding Universal Value nor the conditions of integrity and authenticity can be confirmed at this stage.

4 Conservation measures and monitoring

Documentation

Detailed baseline documentation of all the attributes of the proposed Outstanding Universal Value is important for any future management, conservation arrangements and monitoring, as well as for risk preparedness and in case of disasters. The nomination dossier refers to archival documents but there is no documentation that clearly illustrates the history of the buildings and landscapes as they progressively developed and changed from the 19th century to the present day. There is no conservation documentation that has been provided, apart from the results of an architectural survey of some of the buildings conducted between 2001-2003. Despite the description, conservation documentation concerning the instruments is not provided either.

Conservation measures

The current heritage protection law specifies the rules for carrying out conservation works and the corresponding measures for registered monuments. The nominated property is managed by the Kazan Federal University (KFU) which is responsible for the protection and conservation of the sites. Funding for the conservation of the nominated property is guaranteed from the state budget.

The nominated property is maintained and regularly repaired. Some conservation works have already been carried out for the city observatory building, and its setting,

and some works are scheduled and already implemented in the suburban component part. In general, their results are positive but some structural cracks, dampness and salinisation on the walls, as well as the use of inappropriate materials during repairs, or changes in the landscape, have been observed. Therefore, there is a need to develop a conservation plan and take appropriate conservation measures to minimise the negative effects and future deterioration of the sites. There is a "Strategy for the Conservation and Use of Astronomical Observatory Complexes of Kazan University" mentioned in the management plan, but no details are provided.

Monitoring

Annual inspections are carried out and provide general information on the individual monuments, the description of maintenance and repair interventions, including technical specifications, and budgets. Records of the existing monitoring, despite requests, were not provided for information, either within the nomination dossier or during the technical evaluation mission.

An adequate monitoring system, to inform the management of the nominated property and monitor its state of conservation, is yet to be developed. Its elaboration was included as one of the strategic goals in the management plan annexed to the nomination dossier.

ICOMOS considers that the nominated property lacks conservation research and documentation which is crucial to prepare a well-informed conservation policy and programmes. Such documentation should be prepared, and a comprehensive conservation plan should be developed and implemented as soon as possible to avoid future degradation of the complex. The elaboration of the monitoring system should be carried out and integrated into the management plan.

5 Protection and management

Legal protection

The main legal regulations concerning the protection of cultural heritage in the Russian Federation are the Federal Law of the Russian Federation of June 25, 2002 No. 73-FZ "On cultural heritage sites (historical and cultural monuments) of the peoples of the Russian Federation", and the Law of the Republic of Tatarstan of April 1, 2005 No. 60-ZRT "On cultural heritage property in the Republic of Tatarstan". In 2019, to implement obligations deriving from international legislation, the Law of the Republic of Tatarstan was amended regarding world cultural heritage sites on the territory of the republic. Protection of movable monuments and archival materials is regulated respectively by Federal Law of the Russian Federation of May 26, 1996 No.54-FZ "On the Museum Fund of the Russian Federation and the Museums in the Russian Federation" and the Federal Law of the Russian Federation of October, 2004 No. 125-FZ "On Archives in the Russian Federation."

The Kazan City Astronomical Observatory is of the highest federal significance (Resolution of the Council of Ministers of the Russian Soviet Federative Socialist Republic No. 1327, 1960; Decree of the President of Russia No. 176, 1995). At its individual level, the observatory building is also designated as a monument of urban planning and architecture of federal significance in accordance with the same regulation. The site is included in the Unified State Register of Cultural Heritage Sites (Historical and Cultural Monuments) of the Peoples of the Russian Federation and introduced into the national cadastral system of heritage properties. According to the documentation fiche (passport) of the astronomical observatory building, adopted by the Order of the Ministry of Culture of the Russian Federation (No. 1906, 2015), the territory of the monument covers the territory of the Kazan Federal University (KFU) designated area. In addition, the building of the astronomical observatory is also a monument of regional significance in accordance with the Resolution of the Cabinet of Ministers of the Republic of Tatarstan (No. 318, 2001).

ICOMOS notes that the territory of the Kazan City Astronomical Observatory building, as a legally protected monument at the federal level, includes the whole territory of the KFU and matches the boundaries of the proposed buffer zone for the nominated component part. At the same time, the boundaries of the component part, as they are proposed, are in contradiction to the legal recognition of the monument at the federal level.

The Engelhardt Astronomical Observatory is a monument of federal and regional significance in accordance with the Resolution of the Cabinet of Ministers of the Republic of Tatarstan (No. 318, 2001) with the subject of protection approved by the Decree of the Ministry of Culture of the Republic of Tatarstan (No.835, 2011). It is also designated as a monument of urban planning and architecture of federal significance. The boundaries of the cultural heritage property "the Engelhardt Astronomical Observatory Complex" are determined by the Decree of the Committee of the Republic of Tatarstan for the Protection of Cultural Heritage Sites (No. 360-P, 2022). They match the cadastral land provided in perpetuity to the KFU and are introduced into the national cadastral system of heritage properties. The complex includes: the main building, the heliometer pavilion, the pavilion of the AZT-14 telescope, the pavilion of the Meteor Department, the library, the observatory with the refractor, the meridian circle pavilions, and the necropolis with the graves of the directors of the Engelhardt Astronomical Observatory. The observatory, with the refractor pavilion and the necropolis, are also individually protected as monuments of regional significance.

According to the law, monuments or ensembles inscribed onto the national list/register must have defined elements and features. They are subject to mandatory preservation and monitoring (a subject of protection of a cultural heritage object – named in the nomination dossier "attributes of protection").

Subjects of protection of the Engelhardt Astronomical Observatory were adopted by the orders of the Minister of Culture of the Russian Federation in 2016, and included in the documentation fiches (passports) of the monuments. These lists focus mainly on the exteriors of the buildings and do not consider astronomical instruments. Specific structural elements like the northern mark or the landscape within the boundaries of the nominated property are not included in the passports.

According to the legislation there should be a protection zone adjacent to the monuments and ensembles included in the register established, within the boundaries of which the construction of capital development sites should be prohibited with an exception for linear objects. All projects within the boundaries of their protection zones also must receive relevant approval from the Committee of the Republic of Tatarstan for the Protection of Cultural Heritage Sites.

The works on the preservation of the cultural heritage property are carried out in accordance with the requirements of the Urban Planning Code of the Russian Federation (No. 190-FZ, 2004). Conducting of works on the legally protected properties are supervised by the Ministry of Culture of the Republic of Tatarstan. Only four types of work on cultural heritage sites, which are defined by the general term "preservation of cultural heritage sites" are allowed. They are conservation, repair, restoration and adaptation for modern use. All these works, from the project plan to its realisation, may be implemented only by entities licensed by the Ministry of Culture of the Russian Federation.

In the case of the historical astronomical instruments, some of them were formally transferred to the collection of the University museum and are taken under federal protection as a part of the Museum Fund of the Russian Federation. Semi-movable instruments, like the large nine-inch telescope or twelve-inch Engelhardt refractor, are not legally protected.

Management system

The Astronomical Observatories of Kazan Federal University are owned by the Russian Federation (the state) with the exception of two privately-owned residential buildings within the proposed boundaries of the suburban component part.

The nominated property is managed by the Department of Astrophysics and Space Geodesy of the Institute of Physics and the Engelhardt Astronomical Observatory of KFU. The University, responsible for the protection and conservation of the sites, operates on the basis of regular plans and the federal budget. The other body responsible for the management of the nominated property is the Committee of the Republic of Tatarstan for the Protection of Cultural Heritage Sites, which issues permits and monitors the work.

There is no overall management of the nominated serial property; it takes place within the ownership and

competence of the individual units responsible for managing the component parts of the nominated property. In its additional information provided in November 2022, the State Party indicated that the Museum of Engelhardt Astronomical Observatory has been included in the Directorate of Museums of KFU, in order to improve the coordination. This transition is aimed at improving control over cultural, educational as well as scientific and restoration activities.

There are many other entities directly involved in the management of the nominated property, namely the administration of Kazan municipality, Zelenodolsk municipal district, Oktyabrsky rural settlement, the Center of Cultural Heritage of the Republic of Tatarstan, Academy of Sciences of the Republic of Tatarstan, the Russian National Committee of the World Heritage, and the Commission of the Russian Federation for UNESCO. They are members of the Coordination Committee for the management of the nominated property, which is planned to be established.

The development of the management plan for the Astronomical Observatories of Kazan Federal University was initiated at the time of the preparation of the nomination dossier. The document is conceived to run from 2023 to 2043, with 2023-2027 set as the priority period. It was approved by the Decree of the KFU Rector and the Supervisory Board of the KFU and adopted for implementation.

The document addresses a vast array of issues and problems related to the protection of the proposed Outstanding Universal Value of the nominated property and provides for a range of programmes and projects aimed at achieving the goals. Heritage Impact Assessment mechanisms and risk management are included.

Visitor management

A tourism development strategy is presented in some detail in the nomination dossier and the management plan. The city observatory and the University facilities will stay largely reserved for scientific and educational activities. The suburban observatory, which has been performing a touristic function for decades, will continue to develop it. For this purpose, it is planned to define functional zoning of the territory as a condition for the sustainable development of the nominated property. This would include an historical zone (with the buildings of the observatory), a learning zone (including the planetarium building, the UNIGRAD Science and Technology Palace and an open-air exhibition of scientific instruments), and a recreation and sports zone.

Community involvement

Local communities in the case of both component parts are considered to be the scientific community of researchers, teachers and students, and the families of scientists. Due to their engagement, especially in the 1990s, the suburban complex has been preserved. The local scientific community was the initiator of the

nomination process, and is highly invested in conserving the property, its functioning and presentation to the public.

There is no other public involvement reported. The management plan refers to a Community Engagement Strategy, which is yet to be developed.

Effectiveness of the protection and management of the nominated property

In summary, ICOMOS considers that the legal protection is rigorous, but still requires some amendments to reach a level of protection that would fully reflect the significance of the nominated property and its attributes. ICOMOS considers that the management of the nominated property is satisfactory and that the management authorities have enough human and financial capacities to manage the nominated property. The management plan provides clear strategic objectives and ICOMOS recommends that it is implemented as soon as possible. The objectives regarding conservation and community involvement should become a priority and be consequently pursued.

6 Conclusion

The Astronomical Observatories of Kazan Federal University, founded in 1837 and successively developed, has been nominated as a serial property to be included on the World Heritage List illustrating the development and evolution of optical astronomy and evidence of the gradual transition from positional astronomy to astrophysics. The observatories, as described by the State Party, represent, together with the collection of historic astronomical instruments, an interesting example of authentic architectural ensembles, a place of remarkable achievements of outstanding astronomers and other scientists.

Representing heritage associated with astronomy and observations of the sky, a type of heritage which, despite its richness, is not well represented on the World Heritage List, the observatories are an example of classical forms and organisation of the space made to allow sky observations through use of astronomical instruments. Natural conditions and accessible technologies were skilfully used to create a suitable environment dedicated to scientific research.

ICOMOS appreciates the intention by the State Party to present the Astronomical Observatories of Kazan Federal University and acknowledges the effort made in elaborating the nomination dossier and in investing the necessary resources for protection and presentation of the sites as heritage of science of national significance. A remarkable aspect of the observatories is the fact that they are preserved in their almost original condition and that they both were continuously places of activities related to astronomical research and education.

ICOMOS considers that the importance of the nominated property in the 19th and early 20th century lies in the

development of astronomical science in Eurasia and then, in the Soviet era, in its position as a leading research centre in Russia, particularly in the conquest of space, and in the fact that some of the historic astronomical instruments are still in working order. Simultaneously, the observatories, notwithstanding being part of the same University, were developed in different historic contexts due to global geopolitical shifts which led to a limiting of the exchange between Russia and Europe after the Russian Revolution. Therefore, the periods of comparison and areas of significance are potentially different, together with the nomination strategies that may be derived from them. This fact should be considered as an important stage or change in the development of the University and be reflected in the future nomination strategy.

In addition, ICOMOS considers that this nomination poses some key problems regarding its scope and the selection of its component parts and attributes.

The nomination dossier concentrates on the history and scientific achievements of individual scholars who worked at the Kazan Federal University (KFU) throughout its history. It refers to the significance of the University and its role in developing science but this cannot be considered as a justifying factor for inscription on the World Heritage List, unless cultural or scientific interchange between the scholars produced an outstanding creative response that has a physical or functional representation on site; or their achievements are proved to have outstanding universal significance and are directly or tangibly associated with the nominated property.

The nomination dossier also strongly underlines the importance of historic movable instruments used for sky observations in the 19th and beginning of the 20th century. They were commissioned especially for Kazan or transferred from other observatories, also between the nominated component parts. The *Operational Guidelines for the Implementation of the World Heritage Convention* state, in paragraph 48, that “[n]ominations of immovable heritage which are likely to become movable will not be considered”. Therefore, collections of movable objects are out of the scope of the World Heritage Convention and cannot be considered as attributes of Outstanding Universal Value.

Arguments justifying the proposed Outstanding Universal Value that fall outside the scope of the World Heritage Convention cannot be taken into account. The nominated property is composed of two of the oldest observatories of KFU, purpose-built for sky observations and the development of science. Their selection has not been justified and cultural, scientific, or functional links that provide connectivity demonstrated, as required by paragraph 137 of the *Operational Guidelines for the Implementation of the World Heritage Convention*. The way the individual component parts contribute to the proposed Outstanding Universal Value, as argued in the nomination dossier, is not presented in a logical and substantial manner.

Despite the additional information provided by the State Party, the claims expressed in the justification of the proposed Outstanding Universal Value are not convincingly supported by the comparative analysis. This did not sufficiently distinguish the Kazan observatories from other observatories of the same period and type that also participated in the development of optical astronomy and the gradual transition from positional astronomy to astrophysics, reflecting the milestones in the development of the astronomical sciences.

ICOMOS considers that none of the criteria have been demonstrated at this stage. Outcomes of interchange of values on development in architecture, technology in response to scientific research needs, and the representativeness of the type and direct association of the observatories with significant events or ideas, should be demonstrated in a clear, referenced way and supported by a compelling comparative analysis. They should also have a physical or functional representation in the form of attributes specified and clearly described to better understand the significance of the nominated property.

In addition, although the current state of conservation is acceptable, some significant issues concerning the evolution of the nominated property and its integrity have been identified. It should be noted that in the case of the Engelhardt Astronomical Observatory building, the planetarium, that dominates spatially and functionally the historic site, and existing development pressure in the setting, have a detrimental impact which undermines the integrity of this component part.

In conclusion, ICOMOS considers that the nominated property, or its component parts taken individually or in combination with other sites, might have the potential to justify consideration for the World Heritage List, but only once their potential outstanding significance is clearly presented in comparison with similar properties at the global level and within the relevant geo-cultural area.

ICOMOS considers that different nomination strategies for the Kazan observatories might be envisaged as well, based on a robust comparative analysis and further documentation and research. The State Party may need time to reconsider its approach and develop a new nomination, either individually or in cooperation with other States Parties.

A mission to the reconfigured property will be required once the nomination has been substantially revised.

7 Recommendations

Recommendations with respect to inscription

ICOMOS recommends that the examination of the nomination of the Astronomical Observatories of Kazan Federal University, Russian Federation, to the World Heritage List be **deferred** in order to allow the State Party, with the advice of ICOMOS and the World Heritage Centre, if requested, to:

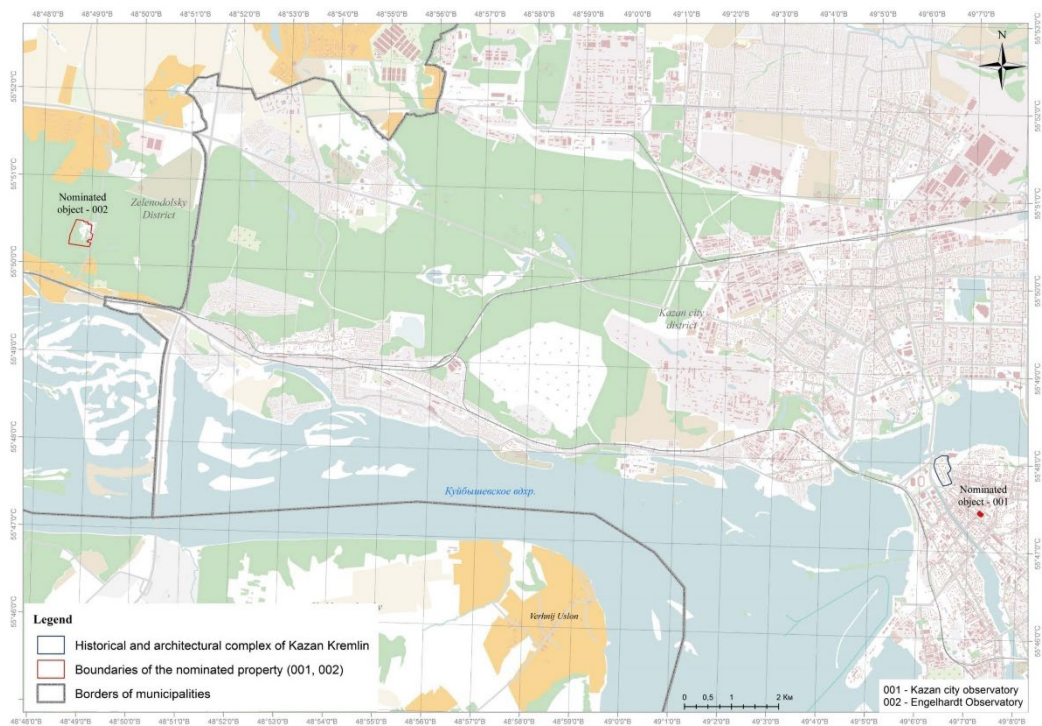
- Consider if a robust case can be made based on a global thematic framework of astronomical heritage, which would underpin a thorough and compelling comparative analysis in order to bring into focus the potential significance of the nominated property, or of its component parts taken individually or in combination with other sites, and of its historic, architectural, technological and scientific values;
- Reconsider, based on the above, the nomination strategy of the current nominated property;
- Develop conservation documentation with appropriate historical and functional/spatial analysis to better understand and present the evolution of the observatories in their architectural, functional and scientific aspects.

Any revised nomination should be visited by a mission to the site.

Additional recommendations

ICOMOS further recommends that the State Party give consideration to the following:

- a) Developing policy and comprehensive conservation plans for the Astronomical Observatories of Kazan Federal University,
- b) Implementing Heritage Impact Assessments at the Engelhardt Astronomical Observatory (component part 002) for development proposals, such as the creation of a Scientific and Educational Center for Space Research and Technology, and to assess the potential negative impact of urban encroachments into its forested setting,
- c) Extending the buffer zone of the Engelhardt Astronomical Observatory (component part 002) to control potential developments, especially at the Oktyabrsky and Orekhovka villages and Novaya Tura Technopolis,
- d) Providing a legal status to the two proposed buffer zones;



Map showing the location of the nominated components parts