Royal Eise Eisinga Planetarium (Netherlands) No 1683

1 Basic information

Official name as proposed by the State Party
Koninklijk Eise Eisinga Planetarium (Royal Eise Eisinga Planetarium)

Location
Municipality of Waadhoeke
Province of Fryslân (Friesland)
Netherlands

Brief description
Built between 1774 and 1781, the nominated property is a moving mechanical scale model of the solar system as it was known at the time. Conceived and built by an ordinary citizen – the wool manufacturer Eise Eisinga – the model is built into the ceiling and south wall of the former living room/bedroom of its creator. Powered by one single pendulum clock, it provides a realistic image of the positions of the Sun, the Moon, the Earth and five other planets (Mercury, Venus, Mars, Jupiter and Saturn). The planets revolve around the Sun in real time and the distance between the planets are at scale. The model fills the entire ceiling of the room, making it one of the earliest predecessors of the ceiling and projection planetariums of the 20th and 21st centuries.

Category of property
In terms of categories of cultural property set out in Article I of the 1972 World Heritage Convention, this is a *monument.*

Included in the Tentative List
17 August 2011 as "Eise Eisinga Planetarium"

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 5 to 8 September 2022.

Additional information received by ICOMOS
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 boundary of the nominated property, the buffer zone, and the name of the nominated property.

Additional information was received from the State Party on 9 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
By the mid-17th century, heliocentrism (that is, the notion that the Earth revolves around the Sun) was generally accepted in scholarly circles. In the 18th century, numerous mechanisms and moving models of the solar system were built as visual aids to show the movements of the planets and sometimes their moons. Known in English-speaking nations as 'orreries', these models were expensive to make and required considerable technical and scientific knowledge. Hence, they were often built by specialised clockmakers (sometimes in collaboration with scholars) and used for demonstration purposes in academic settings or as items owned by prestigious collectors for the upper classes of society. Those orreries were usually portable, small-scale representations of the solar system.

'Room planetariums' were less common and it is unclear from where the design of the nominated property derived. While Danish astronomer Ole Rømer had installed a planetarium in the ceiling of the Round Tower (Rundetårn) in Copenhagen (Denmark) as early as 1697, measuring nearly two metres in diameter, the mechanism built by Eise Eisinga between 1774 and 1781 was even larger. The scale model of the nominated property has a diameter of 3.2 metres – a size that is largely dictated by the width of the room (4.07 metres). The design of the model by Eise Eisinga is also very different from that of Ole Rømer. The latter was driven by a crank mechanism and represented a compromise between the old geocentric worldview and the heliocentric one. The model by Rømer was damaged by fire in 1728 and later reconstructed following a different design.

Eise Eisinga was not a scholar but a wool manufacturer with an aptitude for mathematics and mechanics, and a special interest in astronomy. While most 18th century planetariums employed fine mechanical gear trains, Eisinga used mainly wooden disks with inserted iron pins. Based on his experience of hand-held combs for wool

combing, he knew the construction would be solid and lasting.

Eise Eisinga needed a large surface area to show the planetary orbits in their correct proportions, therefore he used the ceiling of his living room to install his orrery. On the Prussian Blue and gold painted ceiling, the Sun is painted in the middle, and around it, in six circular slots, the six planets known at the time (Mercury, Venus, Earth, Mars, Jupiter and Saturn) revolve around it. The distances between the planets are at scale (one millimetre on the ceiling corresponds to one million kilometres), but the dimensions of the planetary globes are not, otherwise the Earth model would have been invisibly small.

Made by a local clockmaker, the pendulum clock that controls the mechanism is housed in the space above the ceiling of the closet-bed. Composed of four cogwheels with an escapement and a pendulum with a length of seventy centimetres, the cogwheel mechanism is driven by nine slowly moving weights that must be raised manually, at intervals of five days to six months. The cogwheels are accessible via a short staircase opposite the entrance door of the room.

Because the planets revolve in real time, the mechanism seems to stand still; Mercury, the planet closest to the Sun, goes around in eighty-eight days whereas Saturn, the outermost planet, takes more than twenty-nine years.

Eise Eisinga started building the planetarium in 1774 after popular rumours that the conjunction of four planets (Mercury, Venus, Mars and Jupiter) and the Moon, which took place that year, could cause the Earth and those other planets to depart from their orbits and burn up in the Sun. He wanted to show there was no reason for alarm and that such a conjunction of planets is in fact based on an optical illusion: the planets may appear to be close to each other, but, in reality, they are a long way away from each other.

Historical research shows that as early as 1778, the planetarium could already rotate. In 1780, Jean Henri van Swinden – a renowned professor of philosophy, logic, metaphysics and physics at the University of Franeker – published a booklet where he described the planetarium. He also informed several well-known foreign scholars about it, even though the planetarium was not fully completed at the time. Eise Eisinga completed the planetarium in 1781, although he made some improvements some years later.

In 1784, he drew up a detailed description of the planetarium for his two sons. This instruction book described the functioning of the mechanism and gave directions for maintenance and repairs. Now kept in the municipal archives in Franeker (as well as in a digital version), those instructions play an important role in the conservation of the planetarium.

Eise Eisinga kept guest books from 1783 onwards, attesting to the educational purpose of the planetarium and providing proof that it attracted considerable numbers of visitors.

In 1825, the planetarium was taken over by the State by royal decree, although Eise Eisinga received assurance of free lodging in the house for him and his descendants. When he died in 1828, his son Jacobus succeeded him in keeping the planetarium in operation. During the custodianship of Jacobus, the house underwent at least two architectural adjustments in 1838 and 1848.

After the death of Jacobus Eisinga in 1858, the State donated the planetarium to the municipality of Franeker, under the obligation to maintain and conserve the mechanism for all time.

Since 1930, the house has been uninhabited but always open to visitors. To this day, it is open to the public and used as an astronomical education centre. From the time that the planetarium was completed, the room itself has continuously served as a reception and presentation area. Since 2008 and 2016 respectively, two neighbouring buildings play a supporting role in the functioning of the planetarium.

The planetarium mechanism (and its functioning) is inextricably linked to the building in which it is located. The description of the planetarium, drawn up by Eise Eisinga in 1784 for his sons and the guest books, kept since 1783, are important sources of information both to the understanding of the nominated property and its conservation.

The original boundaries of the nominated property as proposed in the nomination dossier had an area of 0.00271 ha, and a buffer zone of 2.12539 ha.

State of conservation

The planetarium has been in operation almost continuously since 1781, except for a brief period between 1790 and 1797, during the Patriot Revolution which led Eise Eisinga and other insurgents to flee abroad.

Based on two illustrations from the early 19th century, it is possible to see that the doors on either side of the closet-bed, which had originally been fitted with windows with glazing-bars, are later depicted as fully-panelled doors.

In 1838, adjustments to facilitate access to the mechanism came at the expense of the former small study of Eise Eisinga. In 1848, larger windows were added in the northern facade to allow more light into the planetarium room and the floor above the mechanism was replaced by loose planks, in order to facilitate annual maintenance.

During a bombing raid in World War II, a bomb fell about 150 metres from the planetarium, which led the cogwheel mechanism to come to a standstill and the Mercury wheel

broke in two. It was replaced by an identical one, after which the mechanism was put back into operation.

A year after the State took over in 1825, it assumed the costs of maintaining the building. The State donated the planetarium to the municipality of Franeker, under the obligation to maintain and conserve the planetarium mechanism for all time. In 1967, the building was designated as a protected national monument. In 2006, the planetarium received the right to bear the designation 'Royal'; this designation is only awarded to Dutch institutions that occupy a very important place in their field, are of national significance, and have existed for at least a hundred years.

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 very good. Extensive maintenance is undertaken approximately every twelve to fifteen years, when the mechanism is taken apart, cleaned and readjusted. The most recent intervention took place in 2013; the previous one happened in 1997-1998. Such interventions are well documented and the reports are kept in the planetarium library.

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 fire hazards, flooding and spatial pressure due to visitor numbers. These factors are mainly potential, not current. A gas extinguishing system has been installed near the mechanism, which ensures that in the event of a fire, a gas mixture is blown into the room, which mixes with the air present, extinguishing the fire without water. In the event of a fire alarm, based on drills, fire brigades can reach the planetarium within an average time of eight minutes.

The risk of flooding in Franeker is considered minimal and several measures are laid down by law to deal with extreme climate effects. Windows were installed on the corridor side of the cogwheel mechanism to prevent visitors from touching the cogwheels and to optimise the operation of the gas extinguishing system.

Risks resulting from large visitor flows have been mapped in an analysis undertaken by the National Heritage Laboratory. Several visitor-related scenarios were selected from that risk analysis. Visitors, either individually or in groups, can only access the planetarium room under the supervision of planetarium staff.

ICOMOS considers that the state of conservation is very good and that factors affecting the nominated property are potential risks from fire, flooding, and large visitor flows.

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:

- Built between 1774 and 1781, the nominated property is considered to be the oldest continuously operating planetarium in the world.
- The nominated property provides an accurate working model of our solar system, as it was known at the time, bearing testimony to the cultural tradition of presenting and providing insight into celestial phenomena, using technology.
- The planetarium is an outstanding example of a technological ensemble illustrating the democratisation of science and the transfer of knowledge to a wider audience in the 18th century.

Based on the nomination dossier, the key attributes of the nominated property are: the mechanism of wooden hoops and discs; the pendulum clock with nine weights that powers the mechanism; the Prussian Blue and gold painted ceiling along which the planets move, including the spheres of the Sun and the Earth, attached to cords, and in which five dials are fitted; the closet-bed wall, in which seven dials are fitted and the weights of the pendulum clock are hanging ; the space above the ceiling, housing the combination of pendulum clock and cogwheels; the room itself in which the planetarium instrument is installed, which serves as the reception and presentation area; the maintenance processes described in the handwritten document by Eise Eisinga; the handwritten document, itself; and the guest books, kept since 1783. In addition, the planetarium instrument is inextricably linked to the building in which it is located.

Comparative analysis
The comparative analysis starts by placing planetariums in the broader context of astronomical heritage and of the ICOMOS Thematic Study *Heritage Sites of Astronomy and Archaeoastronomy in the context of the UNESCO World Heritage Convention* (2010, 2017). This study does not refer to planetariums as stand-alone entities. Regarding properties inscribed on the World Heritage List, only the Jodrell Bank Observatory (United Kingdom of Great Britain and Northern Ireland, 2019, criteria (i), (ii), (iv), (vi)) is mentioned. However, the mechanical planetarium installed there dates from 2013, and is in the Discovery Centre. There are no planetariums as stand-alone entities included on Tentative Lists.

The comparative analysis considers classical planetariums (or orreries) built in the Renaissance and early modern period. The following parameters were selected to identify potential comparisons: continuous and accurate realistic picture of the position of the planets and/or the starry sky; educational purpose; existence of a reception and presentation area; accessibility to a wide audience; regular explanations are/were given;

continuous function; and original state and location are maintained.

Against this framework, fourteen comparative mechanisms were identified: the Gottorp Globe (Germany/Russia, 1654); the Weigel Sphere (Germany, 1661); the Round Tower Planetarium (Denmark,1697); the Great Sphere (Great Britain,1758); the astronomical mechanisms of Jakob and Hüttig (what was then Prussia, around 1770); the Strasbourg Astronomical Clock/Planetarium (France, 1843); the Besançon Astronomical Clock/Planetarium (France, 1867); Perini's Planetarium (United Kingdom, 1879); the Atwood Sphere (United States of America, 1913); the Copernican Planetarium (Germany, 1923); the Messina Astronomical Clock/Planetarium (Italy, 1933); the Copernican Hall and Morehead Planetarium (United States of America, 1935); the *Horloge mère et Planétaire de Gresswiller* (France, 1999); and the Jodrell Bank Orrery (United Kingdom, 2013).

Many of these mechanisms have been destroyed, have been altered, or no longer function as originally built. As a result, the State Party concludes that the nominated property is the oldest permanently functioning mechanical planetarium.

ICOMOS considers that the comparative analysis is well-documented, structured adequately and that the conclusions presented are justified.

ICOMOS considers that the comparative analysis justifies consideration of this property for the World Heritage List.

Criteria under which inscription is proposed
The property is nominated on the basis of cultural criteria (i), (iii) and (iv).

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

This criterion is justified by the State Party on the grounds that the Royal Eise Eisinga Planetarium is an iconic example of an 18th-century orrery, representing exceptional creativity in both its extraordinary technical design and execution, and artistic expression.

ICOMOS acknowledges that the construction of the mechanical planetarium involved considerable technical skills and creativity. However, it cannot be considered a masterpiece. It was not the first mechanism of this kind to be built and there is insufficient evidence to show that it opened up unprecedented design solutions, as is argued by the State Party. ICOMOS also considers that the nominated property stands out today partly because it survived in a well-preserved state whereas other mechanisms built around the same period were destroyed or were significantly altered. ICOMOS considers that criterion (i) has not been justified on its own and that some of the arguments presented are best used to reinforce criterion (iv).

Criterion (iii): *bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared*;

This criterion is justified by the State Party on the grounds that the nominated property bears a unique testimony to the cultural tradition of presenting and providing insight into celestial phenomena, using technology.

ICOMOS considers that the arguments presented for justifying this criterion are largely related to the continuous function of the mechanical planetarium, its maintenance and presentation to the public, which in themselves do not justify the existence of a cultural tradition. A cultural tradition must be clearly related to processes which define a way of life or civilisation in a geo-cultural region in an exceptional way. ICOMOS also notes discrepancies in how the cultural tradition is defined in different parts of the nomination dossier. It is both presented as the tradition of presenting and providing insight into celestial phenomena, using technology, which is very broad, and the tradition of building planetariums, which would require different comparisons than the ones included in the comparative analysis. ICOMOS therefore considers that this criterion has not been justified.

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 Royal Eise Eisinga Planetarium is an outstanding example of a technological ensemble which illustrates a significant turning point in human history: the democratisation of science and the transfer of knowledge to a wider audience in 18th-century society.

ICOMOS considers that the nominated property is an outstanding example of a mechanical planetarium built by an ordinary citizen, not a scholar, and using ordinary materials. Thanks to the creativity of its creator and a strict maintenance regime, the mechanism has survived largely in its original state and is among the oldest functioning planetariums in the world.

By representing a moving mechanical scale model of the solar system as it was known at the time of its construction (1774-1781), it clearly illustrates a defined moment in the history of science and the understanding of the heliocentric model of the Universe. The precision of the mechanism in depicting the distance between the planets and their movements provides a realistic image of the positions of the Sun, the Moon, the Earth and the other planets that were known at the time. Therefore, ICOMOS considers that this criterion has been justified, and the elements presented in relation to criterion (i) reinforce its justification.

ICOMOS considers that the nominated property meets criterion (iv) but that criteria (i) and (iii) have not been demonstrated.

Integrity and authenticity

Integrity

The integrity of the nominated property is based on the extent to which the nominated property includes all constituent elements of the mechanical planetarium, including those that allow its functioning as well as those associated with its presentation.

ICOMOS considers that while all the mechanism elements and associated functioning elements are included within the boundaries of the nominated property, the planetarium is inextricably linked to the building. This interrelationship is recognised by the State Party in the nomination dossier but is not reflected in the proposed boundary of the nominated property, which is mainly limited to the living room area. Therefore, ICOMOS considered that the whole building must be included within the boundary of the nominated property and requested the State Party to change the boundary in its Interim Report. The understanding of the location of the mechanism within the building is important because of the educational purpose of the planetarium. How visitors perceive the location of the mechanism within the residence of a private citizen, and how they access it, contribute to the ability of people to comprehend the values of the nominated property.

In response to ICOMOS' request, the State Party extended the nominated property to include the entire original 15th century house. A new map was submitted accordingly as part of the additional information provided in February 2023.

The precise instructions left by Eise Eisinga about the functioning of the mechanism and how to maintain it, make it possible to identify that, with a few exceptions, the original parts of the planetarium have remained largely unchanged since its construction. Only minor adjustments have been made (e.g., fire prevention measures, climate control and electric lighting) concerning the contemporary safety requirements and for an optimal visitor flow. In the northern façade, larger windows were added to provide more natural light into the planetarium room.

ICOMOS considers that the integrity of the nominated property has been demonstrated.

Authenticity

The authenticity of the nominated property is based on whether the proposed Outstanding Universal Value is truthfully and credibly expressed, namely through use and function, form and design, materials, techniques and location. Knowledge and conservation of sources of information about the original characteristics of the nominated property and the transmission of its values over time are also essential for assessing all aspects of authenticity.

Except for a brief period between 1790 and 1797, the nominated property has been in operation since its creation. Its educational function has also been maintained.

Over time, some additions were made to the cogwheels to keep it going. During the interventions carried out in 1997-1998, some of those additions were removed. This is the case with a layer of wrongly composed Prussian Blue applied to the ceiling, which turned greener over time. Where possible, authentic materials were used and/or parts manufactured according to the original version. The most recent extensive maintenance took place in 2013. On both occasions, the works undertaken were adequately documented.

The instructions left by Eisinga form the basis of maintenance work. The cogwheels are cleaned, lubricated, and waxed annually; the wooden parts are checked every two years for the presence of woodworm and longhorn beetle; and major maintenance is undertaken approximately every twelve to fifteen years. The mechanical planetarium is inextricably linked to the building in which it is located and has been in its original position since its creation.

ICOMOS considers that the authenticity of the nominated property has been demonstrated.

In conclusion, ICOMOS considers that the conditions of integrity and authenticity of the nominated property have been met.

Boundaries

The boundary of the nominated property, as submitted in the nomination dossier, encompassed mainly the planetarium mechanism in the former living room of the building of Eise Eisinga. However, the mechanism is inseparable from the building notably because it is attached to the original beam construction of the building, which was specially adapted for this purpose. The space above the ceiling, housing the combination of pendulum clock and cogwheels, is accessible via the short staircase opposite the entrance door of the room. However, the staircase was not included in the nominated property. ICOMOS therefore asked the State Party to revise the boundary of the nominated property, as part of the Interim Report sent in December 2022.

In the additional information sent in February 2023, the State Party clarified that during the nomination process, the delineation of the nominated property as recommended by ICOMOS had been considered. Hence the State Party agreed to extend the boundary to include the whole building, which dates back to the 15th century. A new map was submitted accordingly.

The buffer zone is drawn to include the buildings and plots located in the vicinity of the nominated property. The area is part of a larger designation aimed at protecting the cityscape and inner city of Franeker. Hence, in its Interim Report, ICOMOS also asked the State Party about the rationale for delineating the buffer zone in that way and whether the possibility of matching the buffer zone

boundary with the protective cityscape area had been considered.

The State Party clarified that the delineation of the buffer zone is based on the sightlines in the city from where the nominated property can be seen. The protected cityscape is considered as an additional layer of protection to the wider setting regarding potential impacts from architectural projects.

Evaluation of the proposed justification for inscription

In summary, ICOMOS considers that the nominated property merits consideration for inscription on the World Heritage List, under criterion (iv). While criteria (i) and (iii) are considered not to be justified on their own, certain aspects presented for those criteria help reinforce the justification of criterion (iv). With the revisions made to the boundary of the nominated property, integrity, as defined by the *Operational Guidelines for the Implementation of the World Heritage Convention*, is demonstrated. Conditions of authenticity are also met.

4 Conservation measures and monitoring

Documentation

The booklet of Van Swinden, the instruction book and the guest books of Eise Eisinga are critical sources of information and documentation about the nominated property. The instruction book and the guest books (up to 15 September 1932) are kept in the Municipal Archives of Waadhoeke (Franeker) and have also been digitised; the later guest books are kept in the planetarium. Other important documentation sources such as historic photographs, audio-visual materials, and other records are held in the Municipal Archives of Waadhoeke (Franeker), at the Cultural Heritage Agency of the Netherlands (Amersfoort) and at Tresoar Friesland Historical and Literary Centre (Leeuwarden).

The major maintenance works carried out in 1997-1998 and 2013 were well documented and the reports are kept in the planetarium library.

Conservation measures

Regular and consistent maintenance, based on the instructions left by Eise Eisinga, have kept the planetarium in a good state of conservation over a period of almost 250 years. Since 1973, the Monument Watch Fryslân Foundation – an institution that provides inspection services to its affiliated members – technically examines the planetarium every two years; an inspection report on the results is drawn up.

The cogwheel mechanism is checked annually by a watchmaker. Where necessary, small parts, such as the bushings in which the shafts rotate, are replaced 'like-for-like'. Maintenance of the paintwork and cleaning of interior showcases and collections are carried out annually. Maintenance and inspection of the fire and intruder security system is done monthly. Approximately every twelve to fifteen years, extensive maintenance is undertaken, involving cleaning the ceiling and, if necessary, touching up deteriorated spots. The cogwheels are taken apart, cleaned, and readjusted. All this work is carried out under the supervision of the curator.

Monitoring

Maintenance processes are linked with monitoring processes. Regular observations by the staff of the planetarium are complemented by annual assessments of the condition of the nominated property and other inspections carried out throughout the year. Monitoring of visitor numbers and other visitation aspects are carried out annually.

ICOMOS considers that existing documentation, conservation measures and monitoring processes are adequate.

5 Protection and management

Legal protection

The building housing the planetarium is protected as a national monument, pursuant to article 3.3 of the Heritage Act, by ministerial decree of 21 February 1967. In 2006, at the time of its 225th anniversary, the planetarium received the right to bear the designation 'Royal'. This designation is only awarded to Dutch institutions that occupy a very important place in their field, are of national significance, and have existed for at least a hundred years.

A blue and white shield at the front of the planetarium building indicates that the building must be protected in times of war on account of its great cultural heritage value, as laid down in the 1954 Convention for the Protection of Cultural Property in the Event of Armed Conflict.

The buffer zone falls within the status of protected cityscape of the inner city of Franeker (now part of the municipality of Waadhoeke), established in 1979. This designation is not aimed directly at individual buildings, but mainly at the historical characteristics, the urban planning structure and the layout of the public spaces. In addition, the protection of the area must be given an explicit place in spatial planning and development; this is included in the Franeker – Inner City zoning plan, dating from 2016.

Based on the information provided in the nomination dossier, because of the transition from the Spatial Planning Act to the Environment and Planning Act, expected to come into force in July 2022, municipal zoning plans would become part of the environmental plans. Hence, the granting of permits for national monuments and the protection of protected cityscapes, townscapes and villagescapes have been transferred to the Environment and Planning Act.

Management system

The planetarium building has been owned by the municipality since 1859. Since 2001, the Royal Eise Eisinga Planetarium Foundation has been responsible for the management of the nominated property. The board of the foundation consists of five members from scientific fields (University of Groningen and scientific journalism), the financial world (accountancy) and local representatives. It bears administrative responsibility for aspects such as: reviewing and implementing the management plan based on a five-year cycle; preparing biennial monitoring reports on the implementation of planned actions; and identifying fundraising opportunities for specific conservation, maintenance and engagement projects and secure funding for these.

The day-to-day management is carried out by a managing director and nine staff members. While each member has a specific task in the organisation, great importance is attached to the explanation for visitors in the planetarium room, therefore they all contribute to it.

A comprehensive management plan was developed in 2021 to support the nomination dossier. The plan clearly defines the factors affecting the nominated property and establishes five guiding principles, each associated with a main objective. Each objective is linked to several policies, covering a very wide range of management aspects such as: inner city management; marketing and promotion; scientific research; traffic and parking; workshops; and active and accessible city. A series of actions are then defined to help operationalise the policies. These actions are subsequently included in a strategic timetable for the first five years covered by the plan.

ICOMOS considers that the diversity of policies covered in the management plan may affect its effectiveness. Some of the policies are defined too broadly without a clear rationale as to how they have been identified and why they are a priority. The same can be said for the actions defined. The timetable defined for implementation presents imbalances as to the number of actions to be implemented each year; for example, only one action is identified to be implemented in year 2 (2026). ICOMOS considers that a clearer structure should be considered in a future revision of the management plan.

Subsidy agreements are in force between the municipality of Waadhoeke and the planetarium, and between the province of Fryslân and the planetarium, on the basis of which the objectives of the planetarium are achieved.

Financial resources for protection and management of the nominated property are drawn from various public authorities.

Visitor management

The nominated property had an educational purpose from the beginning. The guest books kept since 1783 show that the planetarium attracted large numbers of visitors. To relieve pressure and facilitate visitor flows, the original entrance to the building was closed. Access is now possible from one of two neighbouring buildings that both play a supporting role in the functioning of the planetarium, since 2008 and 2016 respectively. These buildings accommodate a brasserie, an exhibition space, a visitor centre, and an auditorium/cinema. A garden at the back is used as an outdoor café.

In the planetarium room, small groups of visitors are given an explanation about the functioning of the instrument and of our solar system. Visitors are only granted access to the room under the supervision of a staff member. Currently, the planetarium attracts approximately 60,000 to 65,000 annual visitors. However, these numbers are expected to grow if the nominated property was to be inscribed on the World Heritage List. The State Party has designed measures to deal with the potential increase in visitor numbers, such as the potential extension of opening hours and the introduction of time slots.

In 2019, the city council adopted the Parking Vision for the inner city of Franeker, which shows that the parking capacity in and around the centre is sufficient at present. Parking requirements are monitored annually. In 2020, the State Party undertook research about the consequences of different levels of increase in visitor numbers (i.e., 80,000, 100,000 or 125,000 per year); the results of this work showed that the location of the various parking options, the parking capacity and the different access and walking routes to and from the planetarium are adequate and can accommodate a substantially growing number of visitors to the planetarium without public nuisance.

Community involvement

Based on the information provided in the nomination dossier, social support for the protection of the nominated property is strong. The influx of more than 60,000 visitors per year is seen as very important for local businesses. According to the State Party, there are no reports or indications that residents are inconvenienced by the large numbers of visitors to the planetarium. One of the five guiding principles that structure the management plan is community benefit.

Effectiveness of the protection and management of the nominated property

ICOMOS considers that the legislative and regulatory measures for the protection of the nominated property are adequate. The complementary measures that apply to the buffer zone give an added layer of protection to the nominated property, as required in the *Operational Guidelines for the Implementation of the World Heritage Convention.*

The sustainability of the financial resources available from the different actors, as well as from the income generated from visitation, guarantees that the management authorities can adequately plan and implement necessary actions. Visitor flows are controlled, and interpretation and presentation are of a high standard.

In summary, ICOMOS considers that the existing protection and management mechanisms are effective to address current and identified future management challenges.

6 Conclusion

The Koninklijk Eise Eisinga Planetarium (Royal Eise Eisinga Planetarium) represents an outstanding example of a technological ensemble, representing a moving mechanical scale model of the solar system as it was known at the time of its construction (1774-1781), and clearly illustrating a defined moment in the history of science and in the understanding of the heliocentric model of the Universe.

ICOMOS considers that the nominated property cannot be qualified as a masterpiece of an orrery or of a mechanical planetarium for two main reasons. Firstly, it was not the first mechanism of this kind to be installed in the ceiling of a room. Secondly, while the design and construction of the mechanism involved considerable creativity, there is insufficient evidence to show that it opened up unprecedented design solutions. ICOMOS considers that some of the aspects presented for the justification of criterion (i) are best used in supporting the justification for criterion (iv).

ICOMOS is also of the view that the argument put forward by the State Party to justify criterion (iii) on the ground that the nominated property bears a unique testimony to the cultural tradition of presenting and providing insight into celestial phenomena, using technology, is not supported by the evidence provided in the comparative analysis. To do so, the comparative analysis would have needed to be broader in terms of typological scope, geo-cultural context and temporal timeframe. In addition, criterion (iii) is about processes which define a way of life or civilisation in a geo-cultural region in an exceptional way. The justification provided by the State Party for this criterion revolves mainly around the educational purpose of the mechanical planetarium and the maintenance processes required to keep the mechanism functioning, which are not in themselves outstanding. Hence, ICOMOS concludes that the nominated property meets only criterion (iv).

Almost all of the original parts of the planetarium have remained largely unchanged since its construction and only minor adjustments have been made to keep the mechanism functioning; for these reasons, it is considered as one of the oldest continuously operating planetariums in the world. ICOMOS considers that the conditions of integrity and authenticity of the nominated property are fully demonstrated.

The delimitation of the boundaries, as adjusted and submitted with the additional information sent in February 2023, reinforces the inextricable relationship between the planetarium and the building in which it is located, emphasising that the nominated property is an immovable cultural property. In addition, the location of the planetarium within the building, and how people access and perceive it, are important attributes that convey the proposed Outstanding Universal Value.

The buffer zone is part of a larger designation aimed at protecting the cityscape and inner city of Franeker, which has complementary legal provisions, thus adding a layer of protection to the nominated property.

The state of conservation of the nominated property is very good. A well-conceived maintenance programme, based on the instructions left by Eise Eisinga, helps in maintaining the mechanism in its almost original state and functioning. The State Party has adopted measures to effectively deal with the main factors affecting the conservation of the nominated property, such as potential risks from fire, flooding and large visitor flows.

The governance arrangements are adequate and supported by appropriate legal provisions. The conservation measures in place, linked to the maintenance of the mechanism, are well defined both in terms of type and periodical implementation. The protection and management arrangements are also adequate. ICOMOS considers that the management plan would benefit from a clearer scope and structure, to effectively supplement existing management instruments.

Given the educational purpose of the nominated property, visitor management, interpretation and presentation are critical elements of the management system. The instruments and processes defined by the State Party in this regard are adequate to ensure the long-term protection of the nominated property whilst maintaining its educational function.

In its Interim Report, ICOMOS raised some concerns regarding the proposed name of the nominated property linked to its evaluation that criterion (i) was not justified, as well as regarding the use of the term “royal”, which refers to a designation dating from 2006. Therefore, ICOMOS asked if the State Party would agree to change the name of the nominated property. The State Party took into account ICOMOS’ concerns and suggested changing the name of the nominated property simply to “Eisinga Planetarium”; convincing arguments were presented to support this name. Nevertheless, ICOMOS considers that the location of the planetarium is important and notes that, under the new maps sent as part of the additional information, the nominated property is named as “Eisinga Planetarium in Franeker”. ICOMOS considers that this name should be retained.

In conclusion, ICOMOS considers that the property has demonstrated Outstanding Universal Value.

7 Recommendations

Recommendations with respect to inscription
ICOMOS recommends that the Koninklijk Eise Eisinga Planetarium (Royal Eise Eisinga Planetarium), Netherlands, be inscribed on the World Heritage List on the basis of **criterion (iv)**.

Recommended Statement of Outstanding Universal Value

Brief synthesis

Located in a modest house within the historic centre of Franeker, the Koninklijk Eise Eisinga Planetarium (Royal Eise Eisinga Planetarium) is the oldest continuously operating planetarium (i.e. orrery) in the world. Built between 1774 and 1781, this accurately working model of our solar system provides an up-to-date and realistic image of the positions of the Sun, the Moon, the Earth and the five other planets that were known at the time (Mercury, Venus, Mars, Jupiter and Saturn).

Conceived and largely built by an ordinary citizen – the wool manufacturer Eise Eisinga – the planetarium mechanism is ingeniously built into the ceiling and the closet-bed wall of the living room. Doing this made it possible to build a large orrery and to use the room beneath it as a reception and presentation area – just as in modern planetariums. To this day, it is open to the public and used as an educational centre dedicated to astronomy.

The fact that the mechanism is still in working order is evidence of the ingenuity and foresight of its maker, who left detailed instructions for its maintenance.

Criterion (iv): The Koninklijk Eise Eisinga Planetarium (Royal Eise Eisinga Planetarium) is an outstanding example of an 18th-century orrery, representing exceptional creativity in its technical design and execution. The orrery provides an up-to-date and realistic image of the positions of the Sun, the Moon, the Earth and the five other planets that were known at the time. The planetarium mechanism is ingeniously attached to the original beam construction of the house, which was specially adapted for this purpose. In operation almost continuously since 1781, it consists of simple but robust components, such as wooden hoops and discs, and iron pins. As a technological ensemble, it continues to contribute to the dissemination of astronomical knowledge, and in particular to the understanding of the heliocentric model of the Universe. The property is also associated with the transfer of scientific knowledge to a wider audience in 18th-century society.

Integrity

The property includes all constituent elements of the mechanical planetarium, including those that allow its functioning as well those associated with its presentation and the building in which it is located and to which the planetarium mechanism is inextricably linked. This 18th-century depiction of the solar system fills the entire ceiling of the former living room/bedroom of Eise Eisinga. The planets hang like wooden balls from metal rods that protrude through the slots in the ceiling. The mezzanine space above the ceiling houses the pendulum clock and the cogwheels. Despite being made of ordinary materials, such as wood, the mechanism is still in full use and continues to work according to its original design. Thanks to a very strict maintenance regime, almost all the original parts have been preserved.

Authenticity

In operation almost continuously since 1781, the planetarium instrument has retained a high level of authenticity. Aside from necessary repairs, the various components of the instrument have remained unchanged since its completion. Two important sources of information help confirm the authenticity of the property: the first complete description of it, published in 1780 by Franeker University professor Jean Henri van Swinden; and the description and maintenance instructions left by Eise Eisinga in 1784. The almost complete series of guest books that have been kept from the very beginning also attest to its educational significance.

Protection and management requirements

The planetarium building has been designated as a national monument since 1967. In addition, the property bears the blue and white shield, the international distinguishing mark to identify cultural heritage properties protected by the 1954 Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict.

The property and its buffer zone are part of the larger protected cityscape of the inner city of Franeker. The protection of this area falls under the Environment and Planning Act. World Heritage occupies a special state-controlled position under this Act. The State provides mandatory instruction rules for provinces and municipalities in order to regulate matters in their environmental ordinances or environmental plans. All the rules relating to the living environment are included in the environmental plan. This concerns a balanced allocation of functions to locations (comparable to the current designations), as well as rules in respect of activities with consequences for the living environment.

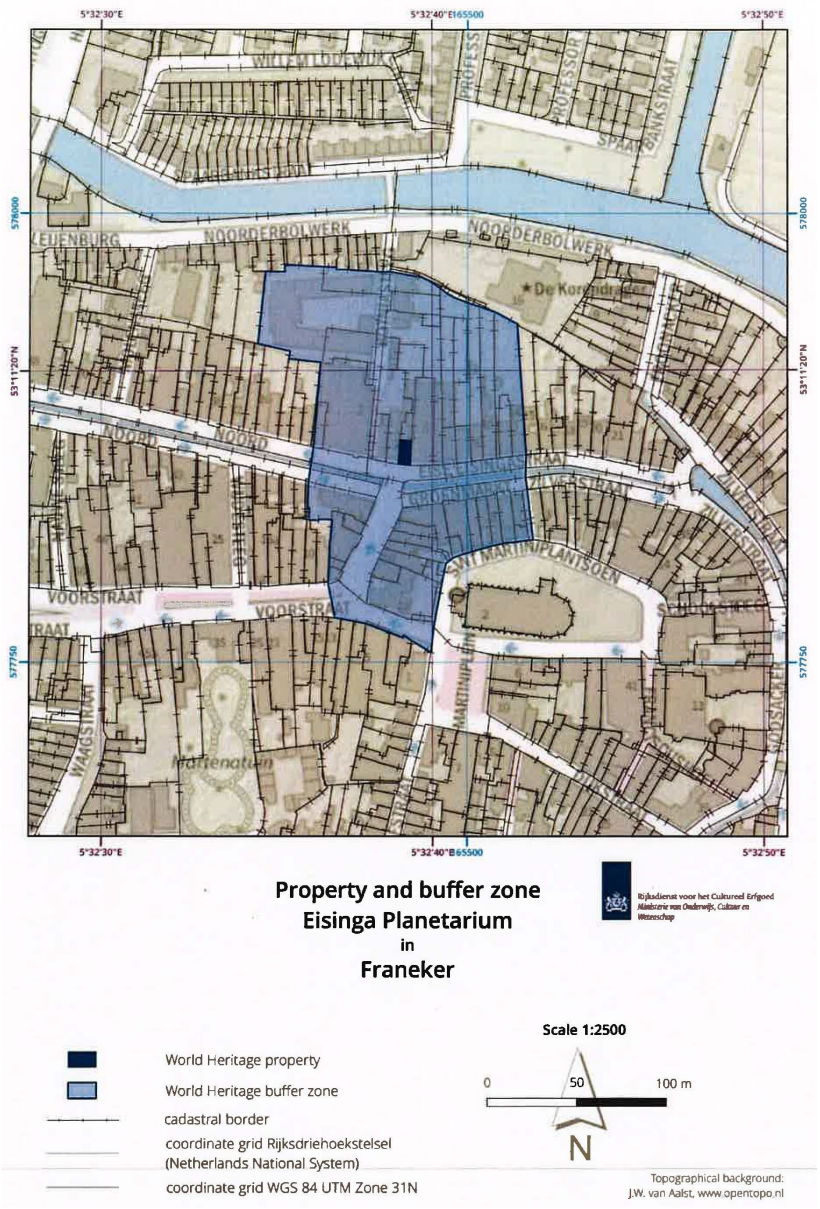
Since 2001, the management of the planetarium has been in the hands of the Royal Eise Eisinga Planetarium Foundation. The board of the foundation consists of five members from scientific fields (University of Groningen and scientific journalism), the financial sector (accountancy) and local representatives. The day-to-day business is carried out by a managing director and nine employees. The municipality of Waadhoeke has a structural subsidy relationship with the planetarium.

Since it came into operation in 1781, maintenance of the planetarium instrument has taken place on the basis of the instructions of its maker. Approximately every twelve to fifteen years, the planetarium mechanism undergoes major maintenance. In addition, the cogwheels are cleaned, lubricated and waxed annually. All this work is carried out

by regional professionals, under the supervision of the curator. Because the property consists mainly of wooden parts, these are checked every two years for the presence of woodworm and longhorn beetle.

Additional recommendations

ICOMOS recommends that the name of the property be changed to: Eisinga Planetarium in Franeker.



Revised map showing the boundaries of the nominated property (February 2023)