

State Parties: Property	<b>Belarus / Estonia / Finland / Latvia / Lithuania / Republic of Moldova / Norway / Russian Federation / Sweden / Ukraine: Struve Geodetic Arc</b>
Id. N°	1187
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### **Brief synthesis**

The determination of the size and shape of the world was one of the most important problems of natural philosophy since at least the 4th century B.C. The development, in the 16th century, of a measurement system called “triangulation” improved the ability to determine the size and shape of the world. In this system, long chains of triangles were measured, creating arcs that stretched along hundreds and thousands of kilometers.

The Struve Geodetic Arc is a chain of survey triangulations stretching from Hammerfest in Norway to the Black Sea, through ten countries and over 2,820 km. These are points of a survey, carried out between 1816 and 1855 by several scientists (surveyors) under leadership of the astronomer Friedrich Georg Wilhelm Struve, which represented the first accurate measuring of a long segment of a meridian. This helped to establish the exact size and shape of our planet and marked an important step in the development of earth sciences and topographic mapping. It is an extraordinary example of the development of sciences and of collaboration among scientists from different countries, as well as monarchs, for a common scientific cause.

Prior to the Struve Geodetic Arc, an arc of about 2,400 km had been measured in India by Lambton and Everest (completed in 1845), and a shorter arc in Lithuania by Carl Tenner. Struve, who was working at the Dorpat University (currently University of Tartu in Estonia), decided that he would establish an arc following a line of longitude (meridian) passing through the observatory of the university. The new long arc, later to be known as the Struve Geodetic Arc, was eventually created by connecting earlier, shorter arcs to the southern one measured by Tenner, and their extension to the north and south. The arc thus covered a line connecting Fuglenæs, near Hammerfest at the Arctic Ocean, with Staro-Nekrassowka, near Ismail, on the Black Sea shores, along more than 2,800 km. The original arc consisted of 258 main triangles with 265 main station points. The inscribed property includes 34 of the original station points established by Struve and his colleagues between 1816 and 1851 – four points in Norway, four in Sweden, six in Finland, two in Russia, three in Estonia, two in Latvia, three in Lithuania, five in Belarus, one in Moldova and four in Ukraine. Other preserved sites of the Arc are protected nationally.

These marks take different forms: small holes drilled in rock surfaces, and sometimes filled with lead; cross- shaped engraved marks on rock surfaces; solid stone or brick with a marker inset; rock structures (cairns) with a central stone or brick marked by a drilled hole; individual bricks; as well as especially constructed 'monuments' to commemorate the point and the arc.

The Struve Geodetic Arc is an extraordinary example of the interchange of human values in the form of international scientific collaboration, as well as an outstanding example of a technological ensemble.

**Criterion (ii):** The first accurate measuring of a long segment of a meridian, helping in the establishment of the exact size and shape of the world exhibits an important step in the development of earth sciences. It is also an extraordinary example for interchange of human values in the form of scientific collaboration among scientists from different countries. It is at the same time an example for collaboration between monarchs of different powers, for a scientific cause.

**Criterion (iv):** The Struve Geodetic Arc is undoubtedly an outstanding example of a technological ensemble - presenting the triangulation points of the measuring of the meridian, being the non-movable and non-tangible part of the measuring technology.

**Criterion (vi):** The measuring of the arc and its results are directly associated with humans wondering about their world, its shape and size. It is linked with Sir Isaac Newton’s theory that the world is not an exact sphere.

**Integrity**

The inscribed property consists of 34 components, which in total comprise an area of 0.6 ha, with buffer zones amounting to a total of 11 ha. All components of the Struve Geodetic Arc are linked to one chain and a number of the Arc sites belong to national state geodetic reference networks that confer integrity even with the geodetic measurements processed today.

**Authenticity**

The inscribed components of the property have special characteristics and significance on a technological and scientific level. All points are maintained in their original location and changes are limited to some later constructions marking the locations.

**Protection and management requirements**

For the inscription of the Struve Geodetic Arc, the ten countries involved collaborated in locating and investigating the sites of historical measurements by using available geodetic observation data and by means of the recent measurement methods as well as satellite geodesy. Upon identification of the component parts, each State Party provided legal protection in accordance with its national frameworks, which in practice entails that some points are covered by laws protecting geodetic points and also by laws for the protection of cultural heritage.

At the national level, each State authority, usually the national mapping authority with the involvement of local administrative authorities is responsible for the conservation and management of the Struve Geodetic Arc. At the international level, management is the responsibility of the Coordinating Committee, which meets every other year and is run according to management mechanisms agreed upon by all ten countries.

Based on the resolutions of the Coordinating Committee, national representative organizations actively promote the Struve Geodetic Arc via different tasks, such as the producing post stamps and envelopes (completed by Lithuania, Belarus, Moldova, Estonia, Finland, Latvia, Sweden, Ukraine); making promotional movies and educational leaflets, books and articles; preparing exhibitions; translating documentation; restoring geodetic instruments and other materials, and even minting commemorative coins for the Struve Geodetic Arc (Belarus, Moldova).