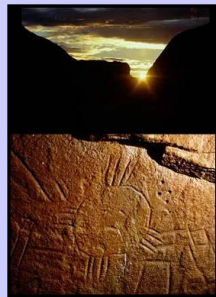


# Heritage Sites of Astronomy

in the context of the UNESCO World Heritage Convention



*Clive Ruggles*

*Chair, IAU Commission 41  
Working Group on Astronomy  
and World Heritage*





# World Heritage List

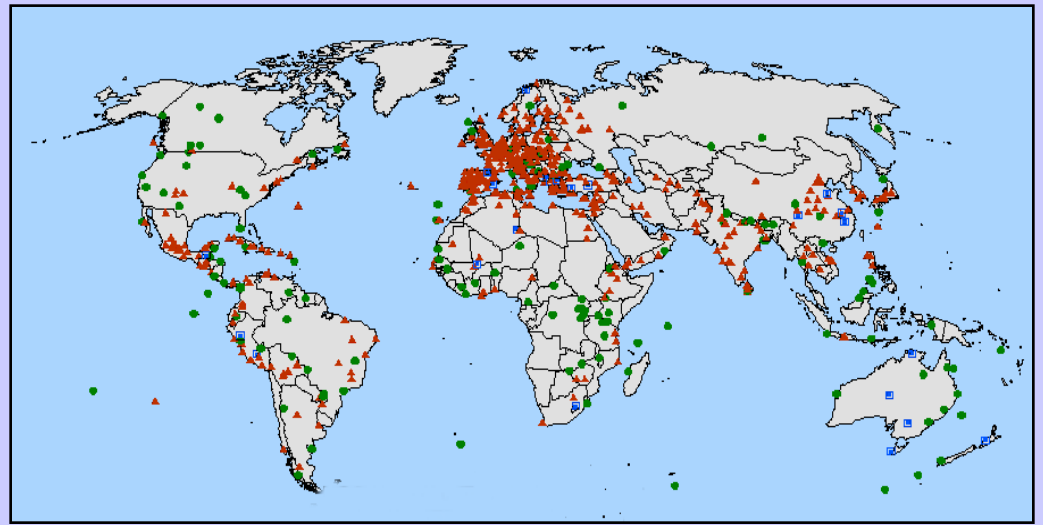
890 World Heritage sites (2009)

of which

689 are Cultural

176 are Natural

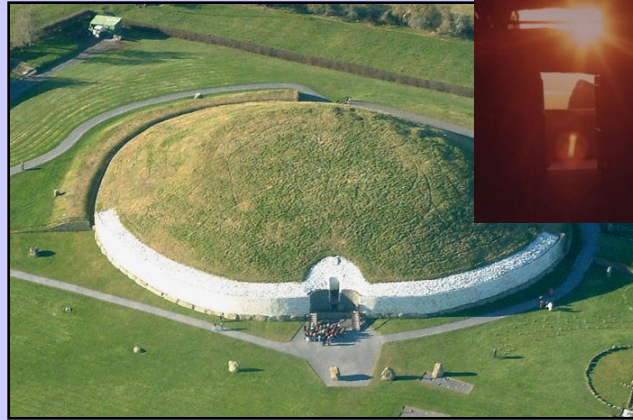
25 are mixed (both Cultural and Natural)



Astronomical heritage sites already on the World Heritage List include:



**Kukulcan pyramid at  
Chichen Itza, Mexico**



**Newgrange, Ireland**



**Ulugh-Bek Observatory,  
Uzbekistan**



**Great Pyramids of Giza, Egypt (WHS)**

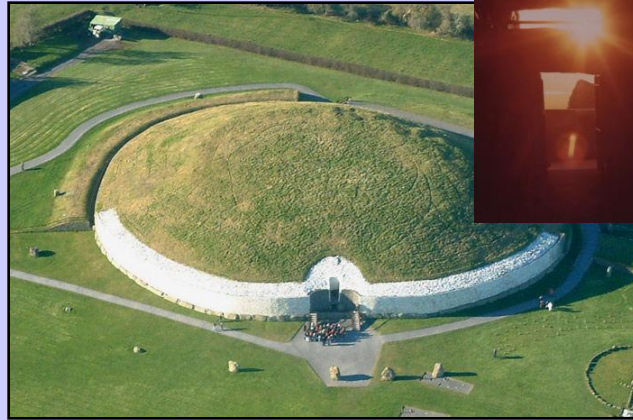


**Stonehenge, UK**

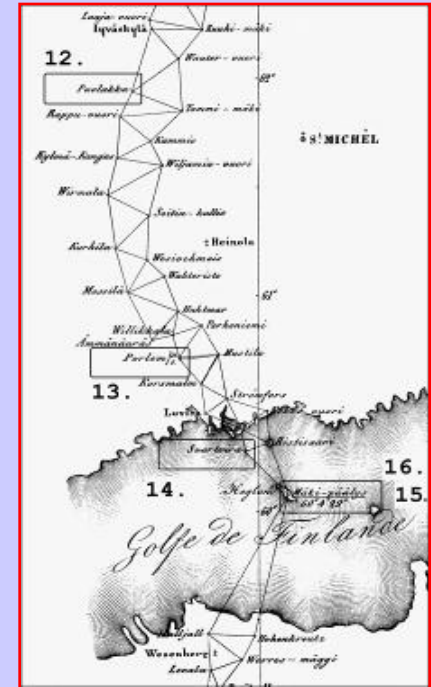
Astronomical heritage sites already on the World Heritage List include:



**Kukulcan pyramid at Chichen Itza, Mexico**



**Newgrange, Ireland**



**Struve Geodetic Arc, Norway – Russia**



**Ulugh-Bek Observatory, Uzbekistan**



**Great Pyramids of Giza, Egypt (WHS)**

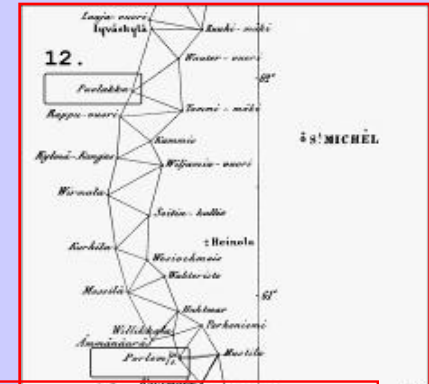
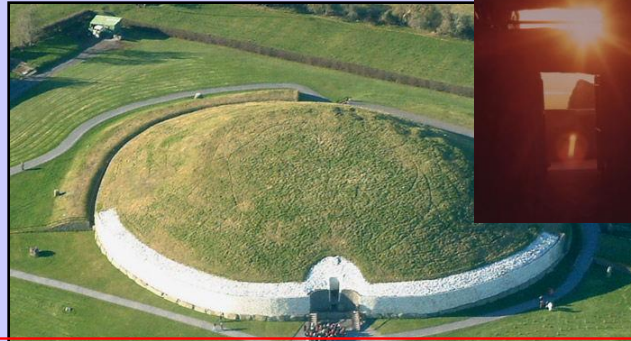


**Stonehenge, UK**

Astronomical heritage sites already on the World Heritage List include:



Kukulcán  
Chichén Itzá



**Astronomical heritage is under-represented on the World Heritage List!**



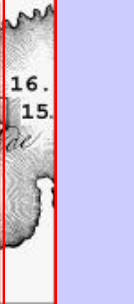
Ulugh-Bek Observatory,  
Uzbekistan



Great Pyramids of Giza, Egypt (WHS)



Stonehenge, UK



Russia



# Astronomy and World Heritage Initiative

2005

To identify, promote and safeguard sites that possess a connection to astronomy in the past and present





# UNESCO–IAU Memorandum of Understanding

October 2008

Formal agreement between UNESCO and the IAU in order to implement UNESCO's Astronomy and World Heritage Initiative

Joint programme of activities focusing on research, education, and promotion



# Astronomy and World Heritage



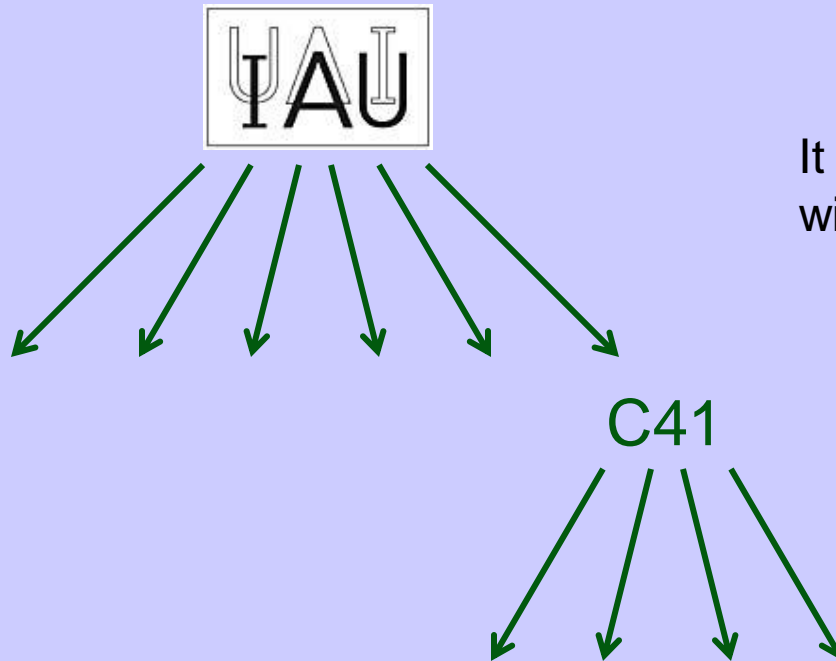
in co-operation with



# Working Group

<http://www.astronomicalheritage.org/>

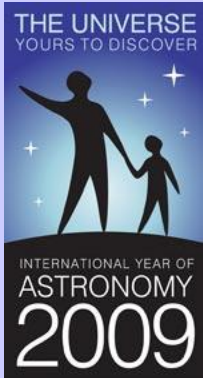
This Working Group was established in Oct 2008 in order to fulfil the IAU's commitments under the MoU



It is one of 74 Working Groups within the IAU

and is a Working Group of IAU Commission 41 (History of Astronomy)

**A&WH WG**



# IAU/UNESCO Astronomy and World Heritage: universal treasures

One of 13 International Cornerstone projects for the International Year of Astronomy 2009

Seeking support from the international community to help save sites connected with astronomy from progressive deterioration and to recognise astronomical heritage by the inclusion of the most representative of these properties on the World Heritage List





# Astronomy and World Heritage



in co-operation with



## Working Group

<http://www.astronomicalheritage.org/>

### Activities in 2009

- Increasing awareness:
  - October issue of UNESCO *World Heritage* magazine
- ICOMOS-IAU Thematic Study on the Heritage Sites of Astronomy
- Develop the UNESCO database of outstanding astronomical properties
- Work with Starlight Initiative



**State Party** selects property for nomination

ICOMOS



IUCN  
The World Conservation Union

**ICOMOS and IUCN evaluate:**

- does it meet selection criteria?
- is it of "outstanding universal value"?
- is it well managed and protected?

**UNESCO's WH Committee:**

- inscribes the site as Natural, Cultural or Mixed property
- defers or rejects the inscription

## Thematic Study of Astronomical Heritage

- WRITTEN BY: IAU working with 

Overall vision on astronomical heritage

Uses examples of properties worldwide to illustrate broad themes

Does *not* present those sites that we consider most significant since this would undermine the later nomination process!



*Rideau Canal, Canada.*



*Canal du Midi, France*



*Mountain Railways, India*



*Semmerling Railway, Austria*

## What is a Thematic Study?

### OFFICIAL ANSWER:

ICOMOS Thematic Studies (<http://www.icomos.org/studies/>) are produced in order to support possible nominations for the World Heritage List by summarising the available documentation in a specific field. They aim at highlighting the potential of all regions to contribute to the World Heritage List, especially in association with the global strategy for a “balanced, representative and credible List”. They do not aim to identify outstanding universal value in individual sites, as this could compromise the subsequent process.



*Rideau Canal,  
Canada.*



*Canal du Midi, France*



*Mountain Railways, India*



*Semmerling Railway, Austria*

## Why are we doing it?

By producing our own vision of what qualities contribute to outstanding universal significance in relation to astronomy, we will

- Help ICOMOS to develop criteria for judging the significance of WHL nominations relating to astronomy
- Encourage States Parties to put forward nominations, knowing the criteria they will be judged by

Producing our own list of outstanding sites would NOT achieve this.



*Rideau Canal,  
Canada.*



*Canal du Midi, France*



*Mountain Railways, India*



*Semmerling Railway, Austria*



- ICOMOS

## Wider significance

This will be the first Thematic Study in any field of science heritage



*Rideau Canal, Canada.*



*Canal du Midi, France*



*Mountain Railways, India*



*Semmerling Railway, Austria*



- ICOMOS

## Important!

**The IAU's input must be the impartial input of an international scientific body: it is crucial that we demonstrate scientific objectivity, political impartiality and freedom from national bias.**



*Rideau Canal,  
Canada.*



*Canal du Midi, France*



*Mountain Railways, India*



*Semmerling Railway, Austria*



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## Thematic Study of Astronomical Heritage

### The challenges

Heritage categories

- Tangible immovable
- Tangible movable
- Intangible

Heritage concepts such as integrity

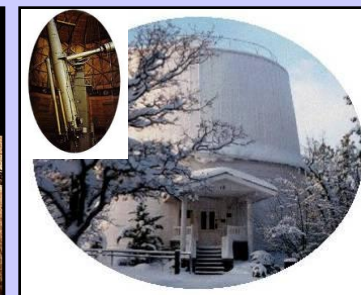
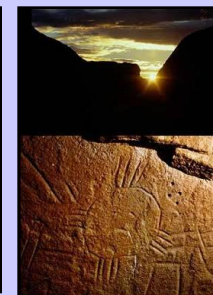




# Thematic Study of Astronomical Heritage



	Tangible immovable heritage	Tangible movable heritage	Intangible heritage
Property / instrument	Architecture; in situ archaeological evidence Fixed instruments	Plans Moveable artefacts Moveable instruments	Scientific knowledge and practical/technical knowhow, rules of use and maintenance History of the site
Results of scientific activities / Iconography	Stone carving, wall painting, palaeography Symbolic representations	Accounts of observations, printed and digital data, sky maps...	Calculations and theories
Socio-cultural applications and uses	Architectural, urban plans and landscapes constructed using astronomy	Archives, drawings, maps and plans	Cosmology, calendars, ideology, prediction of the future (whether rational or irrational from modern perspectives)





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# Thematic Study of Astronomical Heritage

## Contents

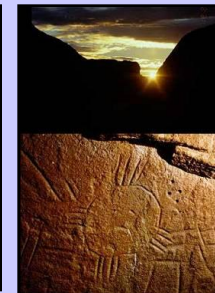
Introduction/overview identifying the broad issues

Thematic essays including case studies

Concluding section drawing out the unifying themes and recommendations

## Editors

Clive Ruggles (IAU) and Michel Cotte (ICOMOS)





- ICOMOS



## Thematic Study of Astronomical Heritage

### Themes

Earlier Prehistory

Pre-Columbian and indigenous America

Later Prehistoric Europe

Later prehistoric and indigenous Africa, Asia (not covered elsewhere), Australasia and Oceania

Ancient and medieval Far East

India

Mesopotamia and the Middle East

Ancient Egypt

The Classical World (ancient Greece; Hellenistic period; Rome)

Arabic and Islamic Astronomy

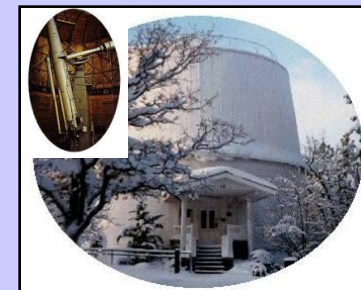
Medieval astronomy in Europe

Astronomy from the Renaissance to the mid-20th century

Contemporary astronomy and astrophysics (since the mid-20th century)

Space astronomy (including launch sites)

“Windows to the Universe”





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# Thematic Study of Astronomical Heritage



## Content of thematic overviews

**Main facts**

**Global chronology**

**Geographic limits**

**Identification of the main sites and evidence**

**General state of preservation**

**Present relationships of people/authorities to the sites**

**Links with other zones, influences**

**Selected bibliography**

**Illustrative materials**

**Limited to 40,000 characters**





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## Thematic Study of Astronomical Heritage



### Case studies (up to 5 per theme)

Geographical position

Location (co-ordinates)

General description

Brief inventory

Brief survey of the site and its uses

Cultural and symbolic significance of the site

Authenticity and integrity, i.e. remaining evidence compared with the original state of the site; construction modifications; renewal of instruments etc.

Documentation and archives

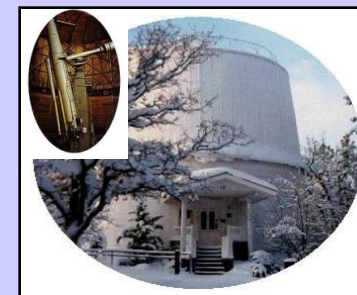
Present use of the site

Protection and state of conservation

Main and potential threats to the site

Management of the site; interpretation and outreach

Limited to 4,000 characters





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## Thematic Study of Astronomical Heritage

### Timescale

January 2009: Initial meetings in Paris

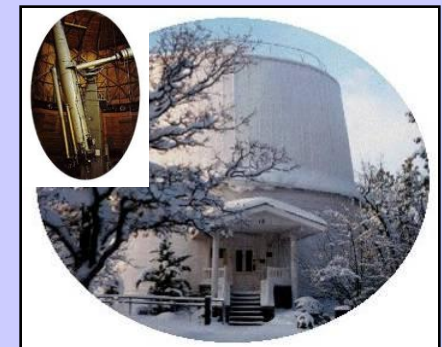
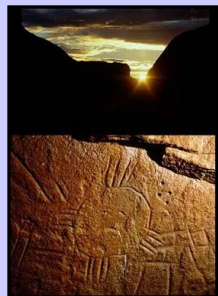
January-March 2009:  
Editors write draft of overview/introduction;  
Negotiations with ICOMOS on authors

April-July 2009: Authors start to prepare their drafts

August-December 2009:  
Meetings to inform and advance the thematic study  
through wider input;  
Authors produce final manuscripts

December 2009 – February 2010: Editing

April 2010: Publication, in time for UNESCO WHC  
meeting in July





- IC  MOS



## Thematic Study of Astronomical Heritage

### Example 1

Pre-Columbian and Indigenous America, co-ordinating author Stanislaw Iwaniszewski

Case studies:

Boca de Potrerillos rock-art site, Mexico, by Stanislaw Iwaniszewski

Caguana Ceremonial Ball-Courts site, Puerto Rico, by Angel Rodriguez

North American indigenous astronomies, by Stephen McCluskey

Viña del Cerro Metallurgic Centre, Chile, by Ricardo Moyano





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## Thematic Study of Astronomical Heritage

### Example 2

Astronomy, symbolism and landscape in ancient Egypt, co-ordinating author Juan Belmonte

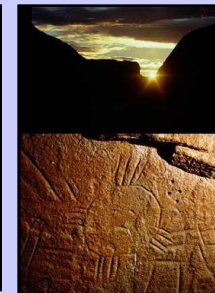
Case studies:

Ancient Thebes

The Temple of Amun at Karnak

The Temple of Hathor at Dandara

The Pyramids of Giza and related buildings in the plateau





- ICOMOS



## Thematic Study of Astronomical Heritage

### Example 3

Mesopotamia and the Middle East, co-ordinating author John Steele

Case studies:

Astronomical Cuneiform Tablets from Assyria and Babylonia





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## Thematic Study of Astronomical Heritage

### Example 4

Optical astronomy from the Renaissance to the mid-twentieth century, coordinating author Gudrun Wolfschmidt

Case studies:

Odessa Observatory, Ukraine, by Sergei Andrievsky

Paris Observatory, France, by Danielle Fauque

Greenwich Observatory, UK, by Rebekah Higgitt

Lowell Observatory, USA, by Paolo Brenni





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## Thematic Study of Astronomical Heritage

### Example 5

The natural heritage of astronomy: Dark Sky Areas as “Windows to the Universe” by Cipriano Marín, Richard Wainscoat and others

Case studies to include:

Lake Tekapo Starlight Reserve initiative, New Zealand, by Margaret Austin

AURA Observatory, Chile, by Malcolm Smith





- IC  MOS

## Thematic Study of Astronomical Heritage



### Funding problems

Co-publishers urgently sought





# Astronomy and World Heritage



in co-operation with



## Working Group

<http://www.astronomicalheritage.org/>

### Activities in 2009

- Increasing awareness:
  - October issue of UNESCO *World Heritage* magazine
- ICOMOS-IAU Thematic Study on the Heritage Sites of Astronomy
- Develop the UNESCO database of outstanding astronomical properties
- Work with Starlight Initiative



science

UNESCO World Heritage Centre - Astronomy & World Heritage - Microsoft Internet Explorer

Address: [http://whc.unesco.org/pg.cfm?cid=281&id\\_group=21&s=home](http://whc.unesco.org/pg.cfm?cid=281&id_group=21&s=home)

Links: Google, Microsoft Licensing Services, whc.unesco.org, mimas, manager, MySQL Reference, TV5 - Dictionnaires, LINESDIR, Admin ad

Programmes & Initiatives  
 Projects  
 Actions  
 Partners  
 Group Tools

Site Finder

Member Login | Join Free  
 30892 members  
 username:   
 password:   
 Submit  
 Forgot your password ?

## Astronomy & World Heritage

This travel through time and continents presents the development of architectural forms and landscapes related to the observation of the sky. Information presented (in gathering phase) is the result of the collaboration between experts working in the framework of the initiative. The aim of the initiative is to establish a link between science and culture on the basis of research aiming at the acknowledgement of...

### TIMELINE

Region	Approximate Period	Key Sites / Topics
Sub-Saharan Africa	5000 BC - 3000 BC	Prehistoric sites
North Africa	3000 BC - 1000 BC	Egyptian astronomy
Middle-East	2000 BC - 1000 BC	Mesopotamian astronomy
Europe	5000 BC - 1000 BC	Prehistoric sites, Greek sites
Asia	2000 BC - 1000 BC	Indian astronomy, Chinese astronomy
America	1000 BC - Present	Prehistoric sites

Done Local intranet

science

http://whc.unesco.org/pg.cfm?cid=281&id\_group=21 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites

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UNESCO World Heritage

United Nations Educational, Scientific and Cultural Organization

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News & Events The List About World Heritage Activities Publications Get Involved Resources

Programmes & Initiatives  
Projects  
Actions  
Partners  
Activity Manager  
Group Tools

Site Finder

You are Logged in as:  
Admin: e.esquivel  
Edit Your Profile  
Logout

World Heritage

"ASTRONOMY" group Sub-groups...

Discussion Board Documents Database Calendar Contacts

Welcome to the  
**Astronomy Group**

Elaborated within the framework of  
the thematic Initiative:  
**'ASTRONOMY & WORLD HERITAGE'**

DFID UNESCO

ORDER OF THE COSMOS

Copyright © 1992-2006 UNESCO World Heritage Centre, All Rights Reserved | Terms / Policies | v3.0, Updated 07 Aug 2006 | ref:281

Local intranet

A night sky with a full moon, stars, and a silhouette of a tree. The moon is large and bright, partially obscured by clouds. The sky is dark blue with many small stars. A silhouette of a tree is visible on the left side of the image.

# Ancient-Skies - Human Cultures and Their Skies

<http://www.ancient-skies.com/>

Ancient-Skies is a global scientific project, which aims to collect, verify and publish available information about various human cultures, their astronomical knowledge and its representation in the sky within a single web accessible knowledgebase.

The aim is to rely on primary sources and verify them scientifically, so that the published information is valuable to the general public and scientists all over the world.

The expansion of the A&WH database will integrate the experience and technical expertise of the Ancient Skies team, with whom we have been collaborating in the context of the IYA global cornerstone project



# Astronomy and World Heritage



in co-operation with



## Working Group

<http://www.astronomicalheritage.org/>

### Meetings in 2009 included:

- International conference on Astronomical Heritage: “Astronomy across Time and Continents”, Kazan, Russian Federation, Aug 19–22
- Round Table on Astronomy and World Heritage at the conference on “Astronomy and its Instruments before and after Galileo”, Venice, Italy, Sep 28 – Oct 3

## Kazan resolutions:

- To promote inter-convention recognition so that both the tangible and intangible nature of astronomical heritage can be recognised and managed at astronomical heritage sites.
- That States Parties who wish to submit nominations relating to astronomical heritage, prepared in accordance with the above mentioned definitions and categories, should be authorised to do this in addition to their existing quota, until the point is reached at which they constitute at least 1% of all World Heritage properties.
- That a unified website be set up for the Astronomy and World Heritage Initiative, integrating its cultural and natural aspects.
- To promote the recognition of the ability to see natural starlight in a truly dark night sky as a contributing factor to the natural heritage of a place.

## Venice recommendations:

- To sensitise observatory directors to the importance of identifying, protecting and preserving the various material products of astronomical research and discovery that already have, or have significant potential to acquire, universal value.
- To identify modes of interconnectivity between different forms of astronomical heritage, including its intangible aspects, that will help in the development of more integrated approaches to identification and cataloguing, protection and preservation.
- To increase global awareness of regional, national and local initiatives relating to astronomical heritage.

## Venice recommendations:

- We need to forge links between tangible and intangible, and fixed and immovable, forms of astronomical heritage. Only tangible and immovable “cultural properties” are eligible for inclusion in the UNESCO World Heritage List, but all the other categories of astronomical heritage are of vital importance, both in contributing to the significance of a particular place and for science heritage in general.
- Recommended actions:
  - To develop the AWHI website as a portal to existing on-line catalogues and thesauri.
  - To organise a meeting of international experts in the historical and heritage aspects of astronomical structures, instruments, and archives, with a view to developing more integrated approaches to identification and cataloguing, protection and preservation.



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## Astronomy and Starlight

Astronomy and World Heritage Initiative (cultural heritage relating to the sky)

working with

Starlight Initiative (natural heritage of the dark night sky)





# Astronomy and World Heritage Initiative



<http://whc.unesco.org/en/astronomy>

<http://www.astronomicalheritage.net>