The Sundial Cities
When Astronomy and Surveying meet together …

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Joël van Cranenbroeck
Stonehenge is an astronomical calendar and a sundial to forecast the season’s …

Joël van Cranenbroeck

Jaïpur city in India has many Sundials and even they claims the biggest in the world …

Joël van Cranenbroeck
Design 500 years ago with an outstanding accuracy ... Still working! Only need sun ...

It’s all about the sun and the shadow ...
What can we do with?
If we know the orientation of the sun …
We can calculate the position of shadows

The position of the Sun versus the Earth is related to orbit, longitude, latitude and … time
FIG Congress 2010
Facing the Challenges – Building the Capacity
Sydney, Australia, 11-16 April 2010

Sun position at Sydney the 14th April 2010
Today in Sydney Harbour at 11:55:29 the Sun was culminating, passing through the North meridian …

To use the Sun to orient the GNSS Antenna to the North – Reference Station installation
RTK GNSS pole shadow for radiations!

One of the features on board GNSS RTK!

When you can’t get enough satellites e.g., corner of a building or under a tree, you can take GPS observations out in the open area then you can use the shadow of the pole.

The University of Athens released a thesis about the use of Total Station and GPS...

The University of Athens released a thesis about using a Total Station and a PC synchronised in time with GPS to evaluate the accuracy of astronomical methods of determination Azimuth of directions...
Urban planners and architects are using the Sun Ephemeris to design new buildings …

In Hong Kong, penalties and indemnities are paid when a new building is shading existing ones …
From Sun Azimuth and Elevation to design Sundial
Let’s reverse the process …

When the Sun’ shade is crossing “Hour” lines
The observer can “read” the time …
Building’s shade at the University of New South Wales in Sydney, Australia …

Sundial can be part of an architectural project …
The Sundial Bridge in the United States
Designed by Calatrava, Spanish inspired architect

Joël van Cranenbroeck

The “Solar Vessel” in the south of France
Along the highway from Montpellier to Orange ...

Joël van Cranenbroeck
Why not create a new urban concept?
The Sundial Cities … Time and Space …

The Burj Khalifa (Dubai) is not only the highest building in the world up to 850 meters and 160 floors … but the largest Sundial!
Moslem Prayer Times

Defined by altitude of sun determined by shadow lengths:

\[ \text{Zuhr} = \text{Noon} + \frac{1}{4} \text{gnomon height} \]

\[ \text{Asr} = \text{Noon} + \text{gnomon height to Noon} + 2 \text{gnomon heights} \]
I have the feeling that a new architecture wave can be inspired by playing with the sun shade. Today I don’t know what it will be but I am sure that space must integrated time through shade.