

## The position of the Sun and the shape of the Earth

April 24<sup>th</sup>, 6:47UT

By: Ehsan Ranaei

We started our preliminary measurements on **Thursday April 23<sup>th</sup>**, because in 24<sup>th</sup>, from 5:47 to 7:47 UT ( $t_0-60$  to  $t_0+60$ ), it was before of our “local noon” time. According to our geographic coordinate<sup>1</sup> and the **calendar program in Calendar Center of University of Tehran’s website**<sup>2</sup>, the local noon of Thursday was at **13:02 (8:32 UT)** and we set the shadow line of the gnomon with y-axis of the sheet on Thursday. We used two **measurement sheets** (and have sent you the more exact one’s data).

At first we aligned surfaces of the plates with the Horizon sheet and then, aligned "y-axis" with the **north-south axis**. As you see some cement around the plate’s legs on attachment pictures, we fixed the sheets on the plates and the plates on the ground (page No3).

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Unfortunately it was partly cloudy on Friday morning (April 24<sup>th</sup>), and we loosed the first and second times ( $t_0-60$  and  $t_0-45$ ). But it went to be better and we could and we could continue registering the shadows. According to the schedule, we marked the gnomon’s shadows top on our **measurement sheets**.

After the last time, we checked the shadow’s top of the gnomon at our local noon time again to be sure about its alignment with y-axis.

Without inclination, it was pointed to the north. Filling our report tables separately, we analyzed our data. "x" and "y" in mm, the coordinate of each point, "**lsch**" in mm, the length of each shadow line.

"h" and "A" in deg, the altitude and azimuth of the Sun and result from following equations:

$$A = \text{Arcsin} (Y / \text{lsch}) + 90 \quad h = \text{Arctan} (148 / \text{lsch})$$

\* \* \* \* \*

See the data table in page No2 and Photos in page No3.

1- 32d 37m 15s N, 51d 40m 38s E

2- <http://calendar.ut.ac.ir>

## The data table of the project:

Observer's name	Adib Astronomy Center team
date of observation	2003/04/24
geogr. latitude in degrees (>0 for North)	32.6
geogr. longitude in degrees (>0 for East)	51.7
length of the gnomon in mm	148
angle to north in degrees	0

Time (UT)	x in mm	x in mm	lsch in mm	h in deg	A in deg
05 : 47	-	-	-	-	-
06 : 02	-	-	-	-	-
06 : 17	-103.5	46.5	112.5	52.8	114.4
06 : 32	-89.5	48	101	55.7	118.2
06 : 37	-84.5	48.5	97.5	56.6	119.8
06 : 42	-80	49.5	94	57.6	121.8
06 : 47	-76	50	91	58.4	123.3
06 : 52	-73	50	89	59	124.2
06 : 57	-69	50.5	86	59.8	126
07 : 02	-65	50.5	82.5	60.9	127.7
07 : 17	-53	51.5	74	63.4	134.1
07 : 32	-42	52.5	67.5	65.5	141
07 : 47	-31.5	53	62	67.3	148.7

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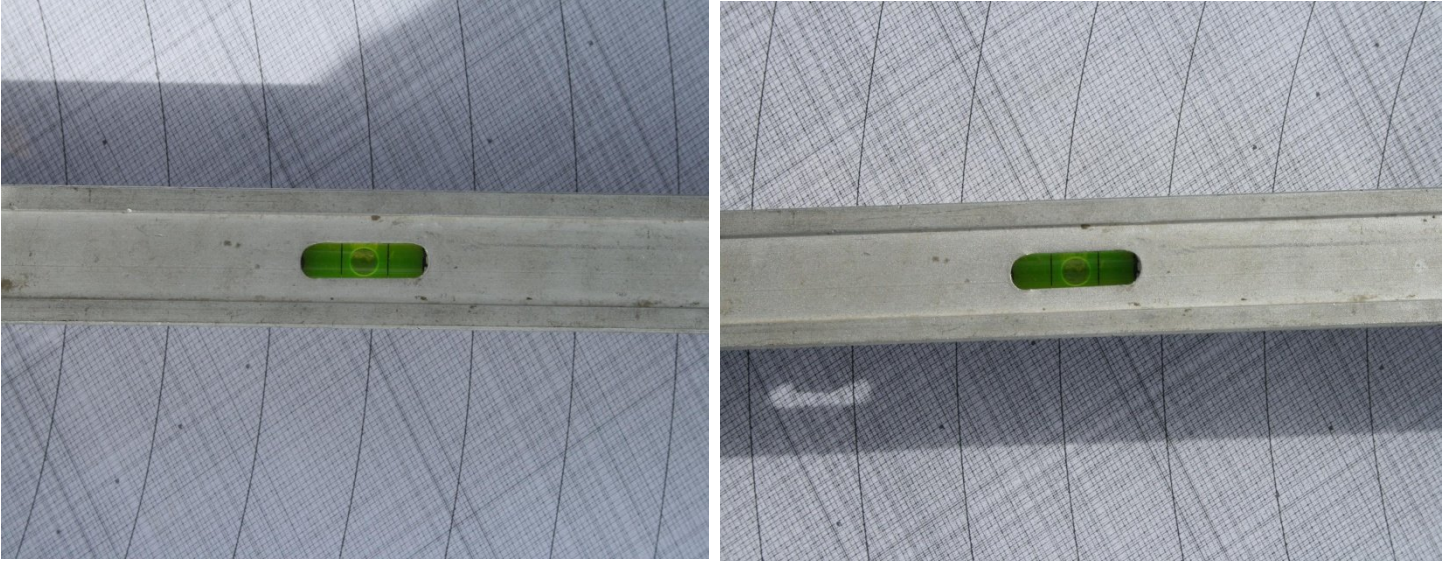
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## Photos of project



Align the plates with the "Horizon sheet



Right to left: Ehsan Ranaei, Mehdi Eshaghi, Neda Afghari, Hajar Ahmadzadeh, Elham Sheykipoor, Maryam Hashemi