An Easy Way to Measure a Sidereal Day

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Astronomy is highlighted in South Africa due to the SKA telescopes. It’s a topic few South Africans are familiar with. Studying concepts like a sidereal day creates an understanding of the heavens. This study was done to investigate if the duration of a sidereal day can be measured using a simple apparatus. A transparent dome was used to plot the position of different stars on through a night. This was done once a month for a period of 6 months. Three groups of observations were done on a particular night, consisting of 3 observations each, done15 minutes apart. This was done as far as possible since stars were not always visible throughout a night of observation. The observation marks were connected to draw the “orbits” of the stars so that the meridian could be found. The distances between observation marks and the meridian were used to find the time that Sirius crossed the meridian. An angular displacement/ time graph, a time of meridian crossing/date graph, a time difference in meridian crossing per day/ date graph for the period between observation dates and duration of a sidereal day/date graph was drawn. The calculated data from the observation marks were compared to data obtained from Stellarium as well as a sidereal clock. The calculated time of meridian crossing constantly became earlier for the 6 months of observation. The time difference in the time of meridian crossing per day stayed more or less constant and the calculated duration of a sidereal day was ± 23 hours and 56 minutes. The duration of a sidereal day can be accurately calculated from observations using a simple apparatus.

Awards Won:
Society of Exploration Geophysicists: Ricoh Sustainable Development Award of $12,500