

Astronomical Observations of the Southwest

By Chris Chavez, New Mexico Professional Land Surveyor

Astronomical Observations of the Southwest presentation is a trip back in time to see how surveyors, navigators, astronomers, explorers, and cartographers observed celestial bodies, which includes the Moon, Stars and the Sun for the purpose of finding direction, establishing coordinates, and to tell the time of day and year. This presentation will also include two significant aspects, the astronomical marker at Chaco Canyon and the Dominguez-Escalante Expedition of 1776 in which more than a dozen astronomical observations were made. The field notes of the observations were taken by Fray Silvestre Velez de Escalante, a Franciscan Friar, with amazing detail. This Expedition took place at a time in which the Declaration of Independence was being drafted giving birth to the United States. In addition, this presentation will also briefly cover a few examples of real-world applications using Spherical Trigonometry, Geodetic Astronomy, and time calculations.

Chaco Canyon Astronomical Marker

A presentation of the Chaco Observatory including the “sun dagger” and its connections to surveying, geodesy and astronomy. This includes discussions on the solstice, the equinox and lunar cycle.

Time

UTC time, sidereal time, apparent solar time, mean solar time and an example of how to construct a reflected sundial.

Discussions on use of time for surveying

Spherical Trigonometry and Geodetic Astronomy

Some mathematical examples will be shown throughout the presentation, and how they are applied to real world applications.

This includes computations of time, astronomic latitude, longitude and direction.

Brief Presentation on the Story of Longitude

Discussions on the Longitude Act of 1714

Brief Presentation on Ship Navigation

Discussions on the use of the quadrant and the sextant

Astronomical Observations of the Dominguez-Escalante Expedition of the Southwest

The main presentation on this will be on the Dominguez-Escalante expedition of the southwest in 1776. The expedition was led by two Franciscan Friars through New Mexico, Colorado, Utah, and Arizona. Along the way the priests took field notes of the astronomical observations of the Sun and Polaris that were taken along the route.

Bernardo Miera y Pacheco

A presentation on the legacy of Miera y Pacheco an Explorer, Surveyor, Cartographer, Engineer, Artist, and Santero a true New Mexico Renaissance Man. Miera y Pacheco produced maps of the southwest 1743-1779.

General Land Office Surveyors

A brief presentation on the astronomical observations taken by the U.S. Deputy Surveyors. Discussions on use of the Gurley Transit and the solar attachment