Going the Distance – How Far Have We Traveled?

Do you ever wonder how far away an object is or what the exact distance is between two points of reference? The need and desire to measure and map the land for various reasons goes back thousands of years. Today we rely heavily on accurate measurements in transportation, building, construction, communications, and the definition of legal boundaries for land ownership.

The first known reference to measuring land distance was 1400 B.C. when ropes in which knots had been tied at pre-determined intervals were used to measure property boundaries to ensure proper collection of taxes. The Romans later developed a more accurate 10 foot (3 meters) long wooden rod with metal ends, placing them carefully end-to-end along the length of the survey. In 1620, Edmund Gunter invented the surveyor's "chain," which was made up of 100 steel links 66 feet (20 meters) long.

In 1816 Ferdinand Hassler, head of the Survey of the Coast, recognized the adverse affects of temperature, humidity, and everyday wear and tear on measuring equipment and fabricated a metal rod exactly eight meters in length. This rod was used in the first official survey of the U.S. coastline. Although cumbersome and slow, bars and rods continued to be used until late 1800s when the discovery of a nickel-steel alloy was invented that solved the problems of thermal expansion in steel tapes.

Today the tape measure is one of the most common instruments for measuring short distances. Tapes can be made of steel, fiberglass or plastic and vary from 1 to 200 meters in length. Measuring longer distances has evolved as well, and around 1974 the invention of the first vehicle-installed distance measuring instrument was released. This device sparked an explosion in land distance measuring technology. Precise measurements of base lines that were typically 6 to 12 miles (10 to 19 kilometers) in length sometimes took weeks to complete using previous methods. Now they were completed accurately, reliably, and consistently in minutes.

This new electronic instrument, the Vaisala Nu-Metrics NiteStar Distance Measuring Instrument, cost more than several measuring tapes, but it paid for itself rapidly by eliminating the time and labor needed to locate and prepare specific base line sites when measuring land distances. This technology radically decreased the amount of time needed to measure distance and the first distance measuring instruments were used by telephone and utility companies to measure correct distances for pole spacing and cable length requirements. The electronic distance measuring instruments were extremely popular, and thus, rapidly evolved into the highly accurate Nu-Metrics NiteStar Distance Measuring Instrument (a product of Vaisala, Inc.), a fully automatic vehicle-installed distance measuring instrument used worldwide today.

The Vaisala Nu-Metrics NiteStar Distance Measuring Instrument allows you to accurately measure the speed and distance traveled without having to leave your vehicle. With a possible resolution of ± 1 foot per mile (± 1 meter per kilometer) it is effective in measuring highways, parking lots, surveying gas lines, utility pole spacing, guide rail lengths, highway paving and line painting, railway measurements, emergency 911 addressing, and very useful on paint spraying vehicles, snow plows, and other maintenance vehicles.

The NiteStar Distance Measuring Instrument works by counting pulses produced by an electronic interface sensor that uses the pulses produced in vehicles for their speedometers. Once installed in a vehicle the NiteStar Distance Measuring Instrument can display extremely accurate land distance measurements in real-time, and stores distances and roadway features for later analysis and dissemination. The RS-232 output port allows the NiteStar Distance Measuring Instrument to communicate to a printer, PC or laptop. The device can also provide an optional Periodic Distance Interval (PDI) output pulse that can automatically trigger a camera, paint sprayer, or other device at precise predetermined distance intervals.

Using a laptop with Vaisala SDM Distance Measuring Instrument Software and a NiteStar Distance Measuring Instrument with a compact GPS receiver, the combination provides powerful and flexible asset management capability for highway management purposes. While driving the vehicle along the survey route, the SDM Software records distances measured, GPS coordinates every second (latitude, longitude and altitude), and keyboard inputs related to highway asset features such as intersections, bridges, signs, guide rail, culverts, street lights, traffic lights, etc. Additional notations can be entered such as actual condition of signs, roadway condition, bridge or culvert repairs needed or any other necessary maintenance activity all stored in a Windows Access database.

One unique but critical application of distance measuring instrument technology is the use for determining emergency 911 addressing. The officials responsible for assigning 911 addresses can travel down the roadway and at each house or driveway provide a number along with precise distance from known landmarks and even GPS coordinates. This essential information is recorded and used by emergency response personnel such as ambulance, police, fire, etc. so that patients or victims can be located quickly and accurately.

The NiteStar Distance Measuring Instrument has been successfully installed on almost every type of vehicle known, including automobiles, trucks, buses, police cars, giant earth moving equipment, golf carts, all terrain vehicles, and even mountain bikes.

Vehicle-installed distance measuring instruments are now in use around the world, leaving behind nearly 200 years of ropes, metal bars, rods and steel tapes. For more information on the NiteStar Distance Measuring Instrument technology visit www.vaisala.com.