

What is Land Surveying?

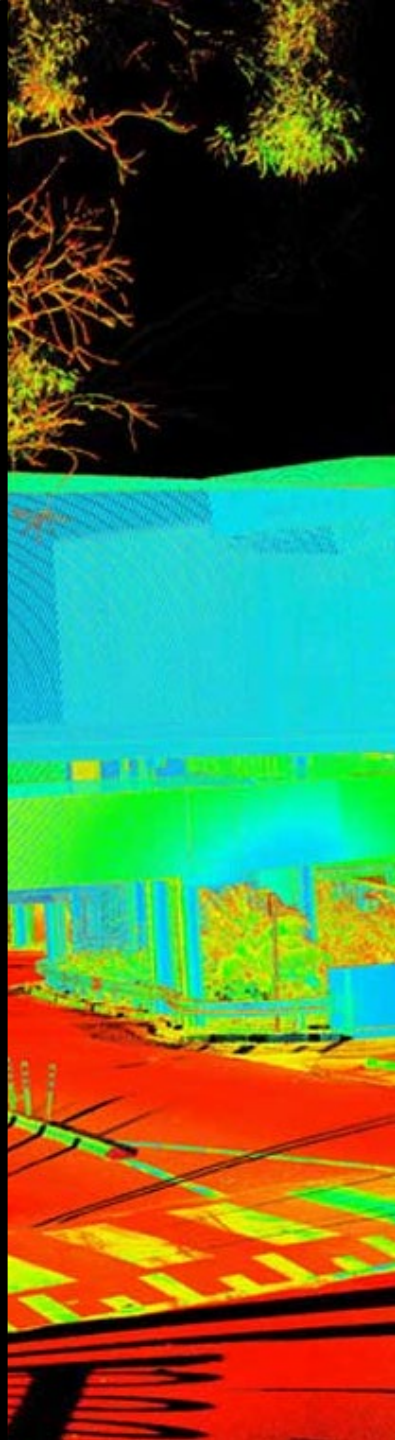
NORTH CAROLINA SOCIETY OF SURVEYORS



Land Surveyors measure and map features and boundaries on the Earth's land, sky & sea. They have a range of expertise from mathematics to the law to high tech equipment and software.

Land Surveying Shaped History

- Three of the four presidents on Mount Rushmore started as surveyors: George Washington, Thomas Jefferson and Abraham Lincoln.
- Surveying tools and basic mathematical principles helped ancient Egyptians set the corners of the Great Pyramid.
- President Thomas Jefferson commissioned Lewis and Clark to explore and survey the Louisiana Purchase. Their reports, maps, and collected data provided critical information that encouraged westward expansion.



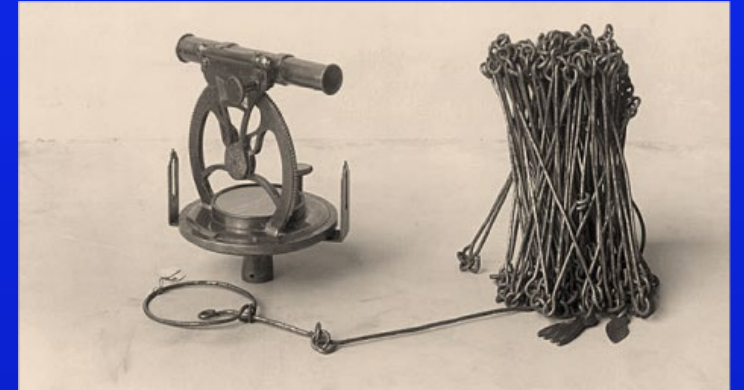


- Surveyors made sure the Union Pacific and the Central Pacific railroads met in Promontory Point, Utah, to form the first transcontinental railroad.
- Surveyors helped measure the distance from the earth to the moon. The first men to land on the moon placed a grouping of reflector prisms—measuring tools used by surveyors.
- When the Space Shuttle Columbia disintegrated on February 1, 2003, debris scattered over hundreds of miles across 40 counties. Using high-precision GPS equipment, surveyors helped to mark the location of debris so that scientists could reconstruct the accident.

Ancient Tools of the Trade



Compass



Chain



Transit



Level



Steel Tape

Modern Tools of the Trade



Prism
& Pole



UAV



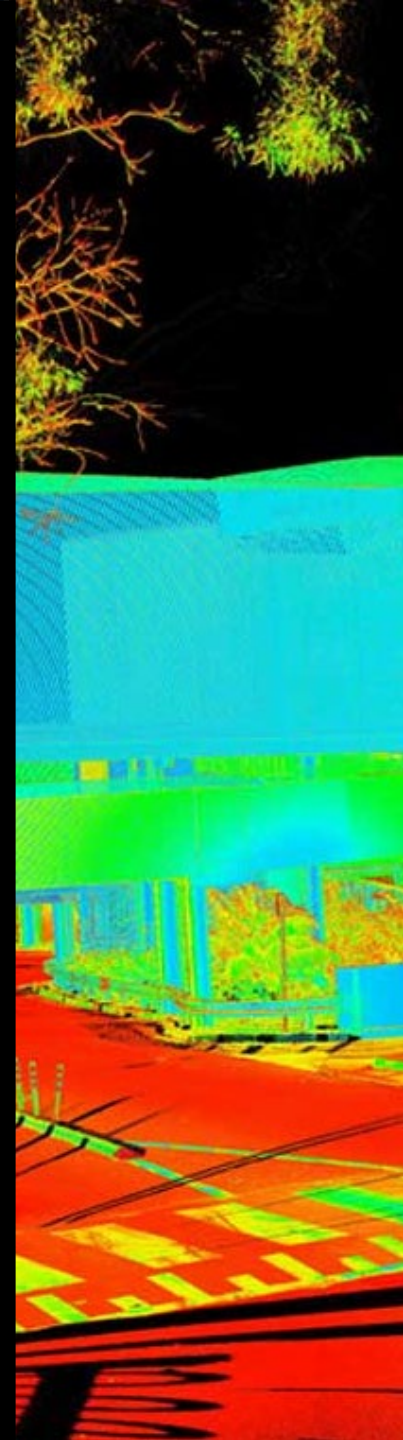
GPS



Total
Station

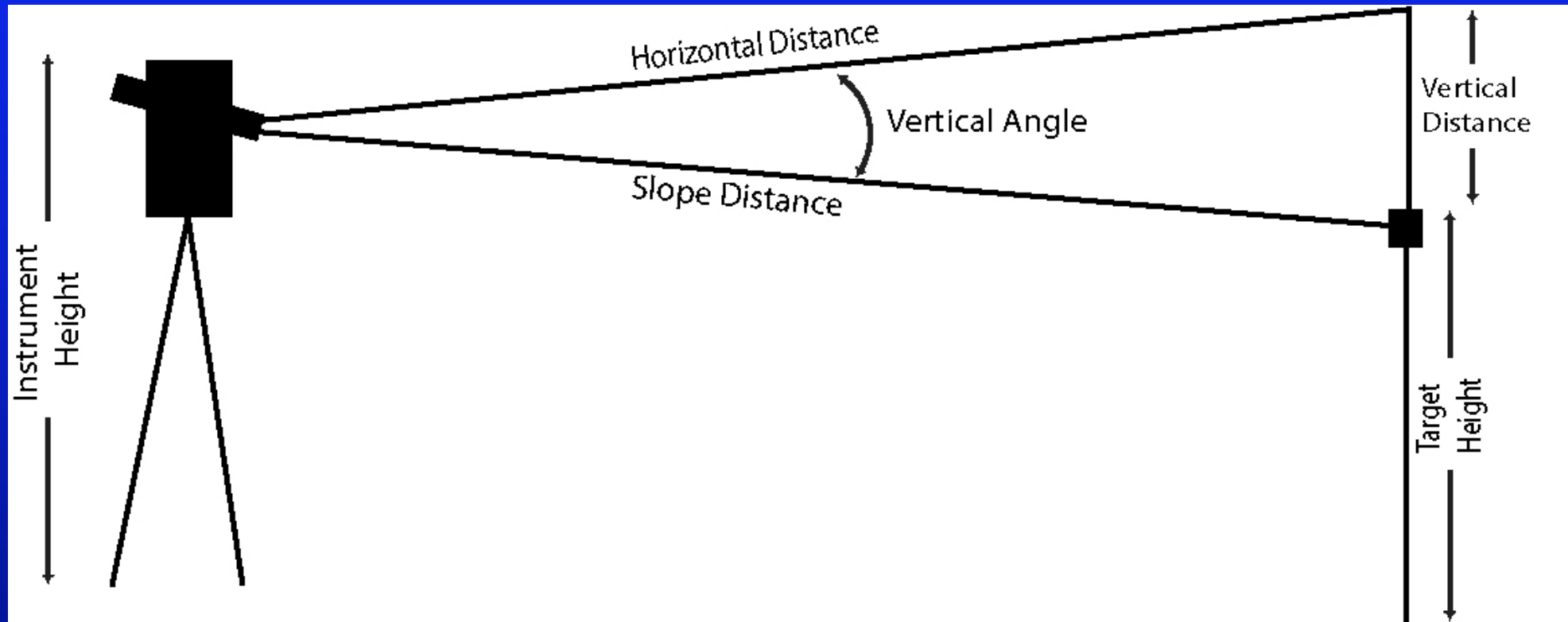


Laser
Scanner





Surveyors Use Geometry and Trigonometry



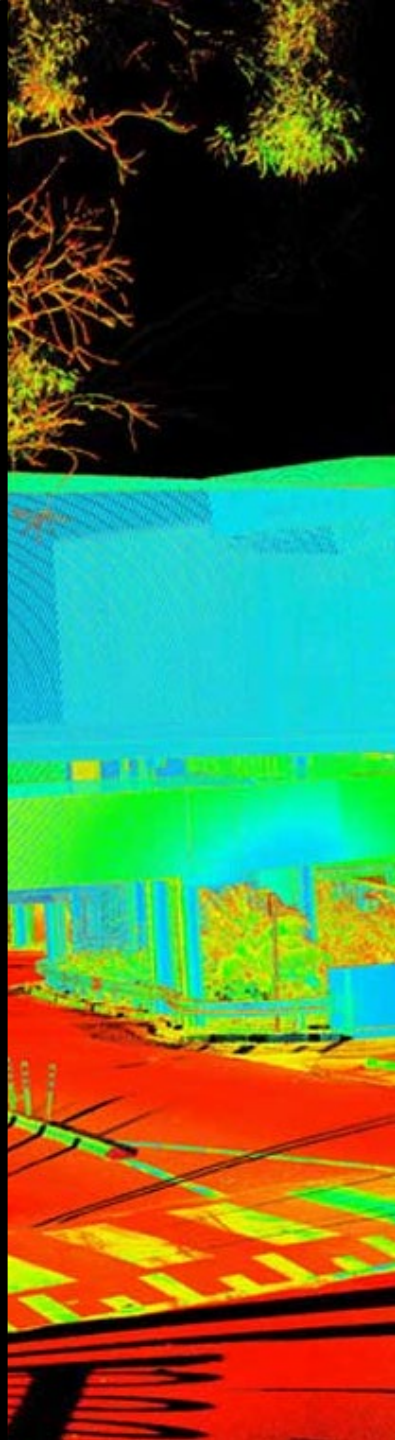


Types of Surveyors

- Boundary or land surveyors identify legal property lines and determine the exact locations of real estate and construction projects.
- Engineering or construction surveyors identify the precise location of roads and buildings or the appropriate depth for building foundations. They learn about changes in property lines and potential restrictions on the property. They may also survey the grade and topography of roads.
- Forensic surveyors record accident scenes for potential landscape effects.

Types of Surveyors

- Geodetic surveyors use highly accurate imaging from aerial and satellite observations to measure large areas of the Earth.
- Marine or hydrographic surveyors survey rivers, harbors, and other bodies of water to identify shorelines, the topography of the water body floor, depth, and other features.
- Mine surveyors map the underground tunnels or survey surface mines to determine the volume of minerals mined.





Work Environment

A land surveyor can spend a great deal of time out of doors in all weather. Depending on the geographic region, the surveyor may be chipping ice, stomping through mud, or spending time inside a storage tank. Surveyors work all over the world in all different environments.



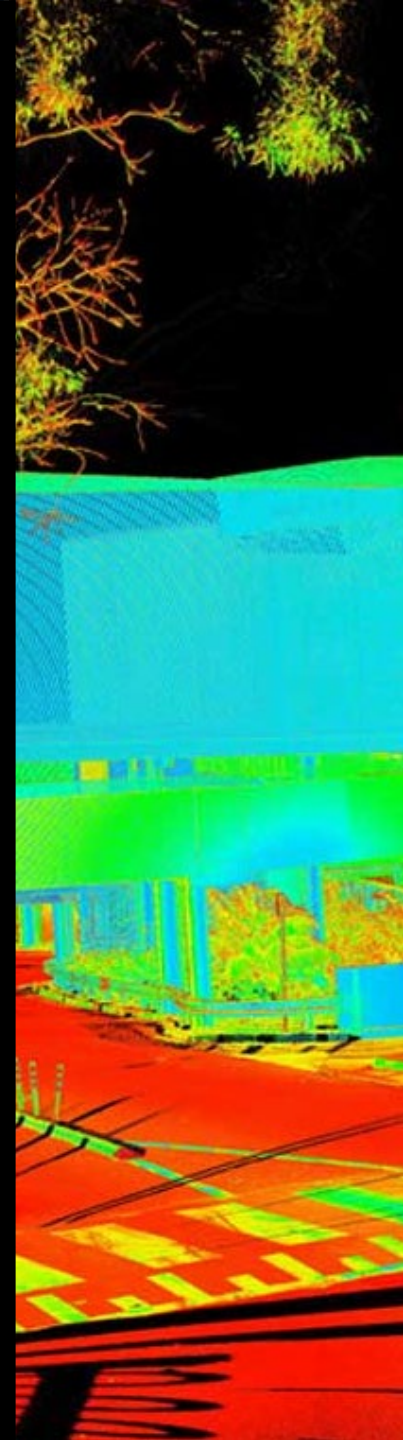
Becoming a Land Surveyor

If you are interested in becoming a Professional Land Surveyor, there are multiple avenues to achieve this goal.

EDUCATION	+	YEARS OF SUPERVISED EXPERIENCE (Under PLS)
BS Surveying (45 semester hrs: Survey Courses)	+	2
AAS Degree Surveying Technology (20 semester hrs: Survey Courses)	+	5
High School Diploma or Equivalent & Apprenticeship	+	7
High School Diploma or Equivalent	+	9

In addition to the above educational & experience requirements, you must have a license from the NC Board of examiners for Engineers and Surveyors to practice land surveying in North Carolina. You must successfully take and pass multiple exams in order to obtain your license to practice surveying in North Carolina. Visit: <http://www.ncbels.org>

SURVEYING EXAMS			
Fundamentals of Surveying (FS) Exam	Online Exam (8 hrs)		
Principles and Practice of Surveying (PS) Exam <small>prerequisite = successfully passing FS</small>	Part 1 Online Exam (6 hrs)	Submit a Printed Map for Review	Part 2 – Written (2 hrs) North Carolina Specific
Mapping Sciences (MS) Exam <small>prerequisite = successfully passing FS</small>	Part 1 Online Exam (6 hrs)	Submit a Printed Map for Review	Part 2 – Written (2 hrs) North Carolina Specific





Necessary Skills

- Communication skills are essential to provide clear instructions to team members, government officials, and clients. Surveyors also need to understand instructions and information from others such as architects and construction managers. They provide status updates to lawyers and developers.
- Surveyors are detail-oriented Their work must be both precise and accurate, meaning the measurements they make must be repeatable within a margin of error and match benchmark measurements. Survey documents are considered legal documents that a surveyor must stand behind for a lifetime.



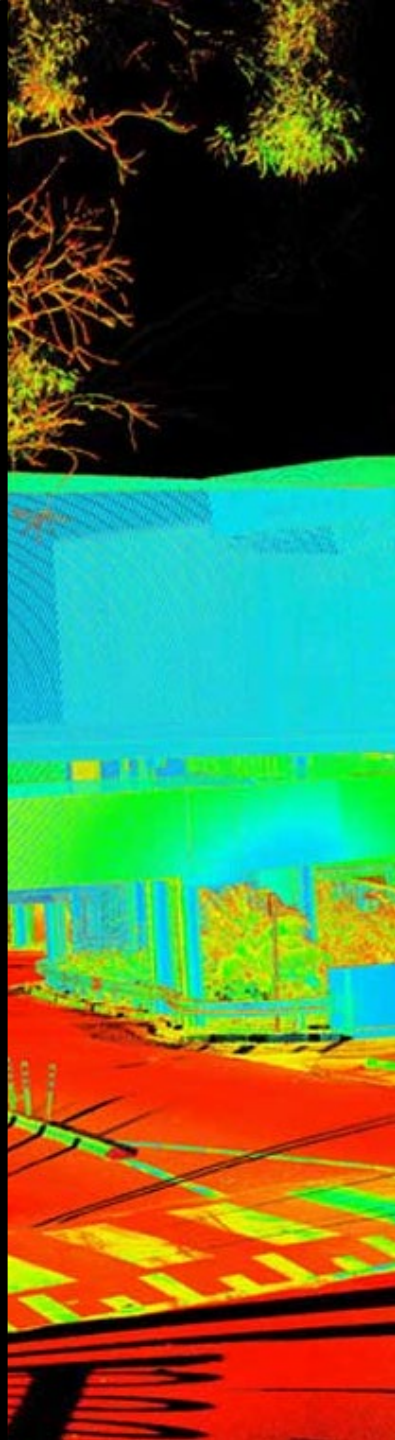
Necessary Skills

- Physical stamina is important. Surveyors work outside in many types of terrain. They may walk long distances and stand for long periods.
- Surveyors require top-notch problem-solving skills to resolve discrepancies between documents, fix equipment, or find ways to operate when the appropriate equipment or information is unavailable.
- Time management is critical. A surveyor must be able to complete tasks and direct team members to complete projects, especially with tight deadlines or to make the most of the daylight.

Non-Licensed Positions

There are other positions in land surveying that do not require a license.

- CADD Technician
- Utility Locator/SUE Technician
- Survey Instrument Operator
- Survey Rod Person
- Survey Crew Chief
- Survey Project Manager
- Survey Party Chief
- LiDAR Technician
- GIS Analyst





Resources

For additional information on Land Surveying Visit the Following Links

- North Carolina Society of Surveyors (NCSS) <http://ncsurveyors.com>
- Be A Surveyors <https://beasurveyor.com>
- National Society of Professional Surveyors (NSPS) <https://www.nsps.us.com>
- North Carolina Board of Examiners for Engineers and Surveyors(NCBEEES) <https://www.ncbels.org>
- National Council of Examiners for Engineering and Surveying (NCEES) <https://ncees.org>



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